

Geo. M. M. S.

THE
CYCLOPÆDIA;

OR,

UNIVERSAL DICTIONARY

OF

Arts, Sciences, and Literature.

BY

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WITH THE ASSISTANCE OF

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IN THIRTY-NINE VOLUMES.

VOL. XXI.

LONDON:

PRINTED FOR LONGMAN, HURST, REES, ORME, & BROWN, PATERNOSTER-ROW.
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1819.

CYCLOPÆDIA:

OR, A NEW

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OF

ARTS and SCIENCES.

LIGHT-HOUSE.

LIGHT-HOUSE, in the *Marine*, is a building or watch-tower erected upon the sea-shore, to serve as a landmark to mariners in the night, to avoid any rocks or other dangers. The light-house is generally a high tower, having at the top an apartment called the lantern, with windows on all sides, to exhibit the light made within it by the flame of an open fire, or by lamps or candles. It is frequently of service to navigation, to erect light-houses upon insulated rocks rising from the sea, to warn ships of their approach to such rocks. Of this kind are the Eddystone rocks off Plymouth, and the Bell rock at the mouth of the Forth in Scotland. In these situations, the heavy swell of the sea, when agitated by a storm, strikes with such force against the building, as to require every precaution to secure them from being overthrown by the continued action of so powerful an enemy. The Eddystone rocks being the most celebrated, as well from their peculiarly exposed situation, as from the great ingenuity displayed in the construction of the light-houses erected at different periods upon them, renders them deserving of particular description. The history of the different erections has been already given under the head of EDDYSTONE. We here intend describing the construction of each, which will be a summary of all the different kinds of light-houses of wood or stone.

Mr. Winstanley's light-house was begun upon the Eddystone rock in 1696, and was more than four years in the erection, from the many interruptions of the wind, which from some quarters causes the sea to break over these rocks with such violence, as to prevent the possibility of landing upon them, though the sea around is very quiet. This is occasioned by the rocks being open to the swell from the Great Atlantic ocean, or from the Bay of Biscay, in all the south-western points of the compass; and is increased by the form and position of the rocks, which have

a regular slope to the south-west from the deep sea to the rock upon which the house is erected, and which, therefore, receives the uncontrouled fury of these seas, meeting no other object to break upon, and the effect of so great an extent of water, caused by the hard S.W. winds, continues for many days, though succeeded by a calm, and breaks frightfully upon Eddystone. When there is no wind, and the surface of the sea appears smooth, Mr. Winstanley's light-house appears, from an engraved plate of it, published by himself, to have been a stone tower with 12 sides, rising 44 feet above the highest point of the rock, which is inclined so as to be 10 feet lower on the opposite side of the house. The tower was 24 feet in diameter. At the top were a balustrade and platform: upon this eight pillars were erected, and supported a dome of the same diameter as the tower. From the top of this arose a smaller octagonal tower, 15 feet in diameter and seven in height; and upon this was the lantern 10 feet in diameter, and 12 high, containing the lights. It had a gallery or balcony surrounding it, to give access to the outside of the windows. The whole was surmounted by a fanciful iron work with a vane. The entry was by a door at the bottom, which was solid stone, except the aperture for the staircase, 12 feet in height. Above this were three floors, the lowest being the store-room, the next the flate-room, and the third the kitchen. These occupied the height up to the level of the platform, or open gallery above-mentioned. The dome above this contained the lodging-room, and the octagon above it the attending or look-out room, immediately beneath the lantern. This edifice was, as before-mentioned, more than four years in erecting. The first summer (for it is only in this season the rock is accessible) was spent in making 12 holes in the rock, and fastening 12 great irons to hold the future work. In the second year, a solid pillar 14 feet diameter, and 12 feet high,

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high, was built as a core or centre for the building. The third year the pillar was increased to 16 feet diameter, and all the work was raised, which to the vane was at that time 80 feet. The workmen lodged in the house soon after Midsummer, but were by bad weather imprisoned 11 days before a boat could relieve them. A light was exhibited on the 14th of Nov. 1668. But finding that the sea frequently broke over the lantern, in the fourth year the whole building was encompassed with a new work of four feet in thickness, made solid for near 20 feet high, and the lantern was raised 40 feet higher than at first, making it 90 feet to the top of the cupola of the lantern, above which the vane rose 22 feet. "Yet after all," Mr. Winstanley says, "the sea in storms lies in appearance 100 feet above the vane, and at times doth cover half the side of the house and the lantern, as if it were under water." The joints of the additional stone work of the fourth year, appear to have been covered with an iron or copper hoop encompassing the building, to prevent the sea washing out the mortar. The building withstood the wrath of the sea only till the year 1713, when the inventor, being at Plymouth to superintend some repairs of the building, went off to it on some of his friends intimating the danger of the building, from a storm which seemed coming on. He expressed a wish that he might be present in the most violent storm which ever blew, to observe its effect on the structure. In this he was too amply gratified, for on the 26th of November a violent storm arose, and the next morning no vestige of the light-house remained, except some of the irons which were fastened in the rock, and a piece of iron chain, which was jerked fast into a cleft of the rock, and nothing was ever afterwards found. Thus perished the first light-house with its ingenious, but unfortunate, builder. A West Indian ship was lost on the rocks soon after the light-house was overthrown. This circumstance, and the great utility of the light while exhibited, stimulated the Board of Trinity house, who had the management of the building, to erect another, and an act of parliament, of the 4th of queen Anne, was passed in 1706, to enable the Board of Trinity house to raise duties on ships to rebuild it, of which they granted a lease of 99 years to Capt. Lovel, as he engaged to build and maintain the house. In July 1706, the work was begun under the direction of Mr. John Rudyerd, who was at that time a silk mercer on Ludgate hill, London, but who appears to have possessed much ingenuity and mental resource. He, like Mr. Winstanley, published a print drawn by B. Lewis, and engraved by J. Stuart, which informs us, that it was a conical frustum of wood, formed of 71 upright beams, united together by being belted to circular kirbs of wood with staves, upon which kirbs the floors were framed. It, in some degree, resembled an immense conical cake, but with a loop: the diameter at the base was 23 feet, at the top 15 feet, and its altitude, from the highest point of the rock to the top of the upright, was 62 feet. At the top of the building was a balcony, surrounded by a railing, and in the centre of the area thus formed the lantern was situated. It had windows on all sides, and was of an octagonal figure, 12 feet in diameter, and 13 high, surmounted by a cone with a double ball at top, instead of the fanciful iron work which characterised the first edifice. Mr. Rudyerd, from principles totally different from those of his predecessor, made his building quite plain, without the least projection or ornament on which the water could act when dashing against it; and he omitted no precaution of uniting all the parts together, and fastening the whole to the rock. As the surface of the rock was naturally inclined, and the whole building would have had a tendency to slide down it, if merely placed upon it, as Mr. Winstanley's was, Mr. Rudyerd wished to

reduce its surface into level steps, upon which each timber would have a horizontal bearing; but finding this to be the most difficult of the whole undertaking, it was imperfectly executed, only five steps being cut, and those did not take out all the inclined surface; however, it was sufficient for the purpose.

The building was filled up quite solid for 19 feet from the lowest point of the rock, and, excepting the well for the stair-case, was solid to the height of 37 feet. The solid was formed of three beds of masonry, with strong floorings of timbers between each bed, to unite them with the external uprights. The lower bed contained five courses of stone, and was five feet thick; the second was the same, and the third was four feet thick, containing four courses. The whole erection, in addition to the weight of the stone, which was about 250 tons, was secured to the rock by 36 iron cramps, part of them arranged in a circle about a foot within the external uprights, and the remainder, which were smaller cramps, in an interior circle three feet distant from the former, to hold down the floors of timber which had the stone beds between them. In the centre of the building a strong mast was erected, secured by two cramps to the rock at the bottom, and rising above the solid to the height of 48 feet, being united to the framing of each floor it passed through, and thus forming a central axis to strengthen the whole. The rock above the solid contained four apartments, the lower being the store room, the next the slate room, the third the bed chamber, and the fourth the kitchen, immediately beneath the lantern. In the manner of fixing the irons to the rock, upon the duration of which the security of the whole work depended, Mr. Rudyerd succeeded most admirably. The holes in the rock were made by drilling two holes rather diverging from each other, so that they would be an inch more asunder at 15 or 16 inches depth, than on the surface of the rock. A third hole being drilled between these two, and the three being broken into one, formed a hole larger at the bottom than the top. The iron cramp was formed of two pieces, which, when laid together, were of the shape of the hole, but when separated, one was larger at the bottom than the top, and the other smallest at the bottom; therefore the former being first put down into the hole, and the latter driven in by the side of it, wedged it fast, and both being united by the same bolts which attached them to the timbers, rendered it impossible to draw them out. They were put in their places hot, and a quantity of melted tallow being first poured into the hole, when the hot irons were put down the tallow ran over on all sides, and thus certainly filled up all cavities. A quantity of coarse pewter, made red-hot, was now poured into the cavity round the irons, and, being a heavier fluid, displaced the tallow, and filled the space round them completely, the tallow effectually preventing the entrance of the sea water into the most minute cavities. This method is worthy of record, as it may be applied to many other useful purposes. Mr. Rudyerd, as before-mentioned, began his operations in July 1706; in July 1708, he had so far completed it as to exhibit a temporary light; and the whole was completed in the following year. This building had some repairs of its timbers in 1723, and again in 1744, when a violent storm had carried away a great number of the upright timbers; but it shewed itself, in the course of 49 years, to be a very excellent construction of its kind, and only liable to destruction from the perishable nature of its materials, or the catastrophe which awaited it on the night of the 1st of Dec. 1755, when one of the attendants, entering the lantern to snuff the candles, found it in flames, and, notwithstanding every exertion, the fire communicated to the uprights, and burned downwards. The unfortunate men descended

scended from room to room as the fire increased, and were at last obliged to take refuge, from the fall of burning timbers, in a cavity of the rock, from which they were relieved by a boat the next morning. The wind, unfortunately, blew from the east, and though it caused such a swell as to prevent landing, did not break on the house so as to extinguish the fire; and thus, in a few days, the whole was destroyed, except the iron cramps in the rock.

It is remarkable, that whilst one of the light keepers, at the commencement of the fire, was looking up at the fire in the cupola of the lantern, a body of melted lead showered down upon him, and he declared a quantity had passed down his throat into his stomach. He lived only 12 days after being taken on shore; and on opening the body, a mass of lead was taken from the stomach, weighing more than seven ounces. The curious fact, of his having 12 days survived so alarming an accident, was communicated by his attendant surgeon, Dr. Spry, to the Royal Society, but the circumstance appeared so improbable, that it did not, at first, meet that credit, which future experiments on animals proved he was entitled to.

On the news of the fire reaching London, the proprietors (for by the sale of Capt. Lovell's original lease, the property of the light-house was now in many hands,) immediately took measures to restore it, and appointed one of their members, Mr. Rob. Weston, to the sole management of their affairs, and he being recommended to Mr. John Smeaton, F.R.S., by the president of the Royal Society, employed this gentleman to devise the means, and superintend the erection, of a new building. Mr. S., whose originality of genius, and soundness of judgment, have since been so generally known, was at that time just entering into his profession as a civil engineer, but immediately devoted himself to the consideration of the light-house, and soon determined upon erecting a stone building; and reasoned, that by making the building very heavy, and uniting all the stones firmly together, he should obtain such a weight and strength, as would firmly resist the united action of the wind and water. He determined upon dovetailing the stones together, as being a more secure method than cramping with iron, and not liable to interruption from the work getting wetted, as would almost unavoidably happen in such an exposed situation. On the whole, the building he erected, and which is now standing, may be considered as the most perfect light-house in existence, and gives examples of the best kinds of masonry. We have therefore given drawings of it in the *Plate of Light-houses*, which are taken from a superb work in folio, published by Mr. Smeaton in 1791, entitled "Narrative of the Building, and Description of the Construction of the Eddystone Light-house with Stone." It is from the same source the whole of this article has been compiled.

Fig. 1. is a south elevation of the whole house, and *fig. 2.* a section of the same. A represents the landing place; B a natural cave in the east side of the rock; D an iron rod, serving as a rail to hold by in passing up steps cut in the rock, to the foot of the ladder occasionally put out from the entry door at E. At F is a cascade of water, pouring over a low part of the rock, but this is only momentary, for the swell will in an instant cause it to fet the other way. In *fig. 2.* a B shews the upright face of the rock, and the line *ab* the general direction of its grain or slope. In this figure it is seen that, as high as the first 14 courses of stone work, the building is entirely solid. Here the entry F commences, but excepting this cavity, and the staircase X, the solid still continues to the floor of the lowest chamber G, which is the store room, and H the door at which the stores are drawn up and received. I is the upper store room; K the kitchen con-

taining the fire-place L, from which the smoke ascends by a copper funnel *m*, through the bed room M and lantern N, to the ball on the top of the cupola O. The ascent from room to room is by the perforations through the middle of each floor, a moveable step ladder being used for the attendants; but here may be drawn up from the lower room into any other. P is the railing forming the balcony; its floor is covered with very thick sheet lead, turned down over the cornice Q, which surmounts the column of the building. R is the stone base of the lantern, and N the glazed part: the cupola O is supported by eight cast-iron standards, between which the copper window frames are fixed: the standards have claws at bottom, which are screwed to flat iron bars resting upon the stone work. By this means the whole lantern is framed together; and to strengthen it, the window frames are cast with diagonal bars, as shown in *fig. 2.* The whole lantern is held down by eight bolts at its angle, passing down through the balcony floor; one of these is seen at *d*: S is the door to the balcony. The lantern is lighted by 24 candles arranged in two iron circles, one six feet four inches diameter, containing 16 lights; and the other, three feet four inches diameter, holding eight candles. These circles are suspended by cords going over pulleys, so that they mutually rise and fall parallel, and counterbalance each other. By this arrangement either circle can be drawn down to snuff the candles, which is done every half hour, without losing the whole light. Having thus described the general outline of the building, the minutia of its construction comes next to be described, and the manner of uniting the stones composing it. The section, *fig. 2.* shews the several steps which were cut in the rock to engraft the stone work upon. *Figs. 1, 2, 3,* &c. denote the different courses of stone, each of which makes a level surface with the step it is fitted into. The seventh is the first complete course. *Fig. 3.* is a plan of the rock, shewing the courses 1, 2, and 3, laid in their places, and exhibiting the dovetails which are cut in each step to hold the several stones in their places; and these stones are so formed as to enlock the others with them in a manner which will prevent any stone quitting its position. The dark shaded stones are *moor* stones, while the lighter sorts are Portland stone. *Fig. 4.* is a plan of the seventh or first complete course, shewing a central stone with four dovetails uniting it to four others, and these tying in the remainder. All the solid courses are laid in this manner to the fourteenth, which, as before mentioned, completes the entire solid. Every course is laid in such a manner upon the one beneath it, that all the joints break each other, as masons term it, that is, immediately above and below the joints of any course the middle of a solid stone is disposed. The several courses are retained upon each other, to prevent them sliding sideways, by means of *joggles*, which are plugs or cubes of hard black marble, shewn by the dark squares in *fig. 2.* and in the plan, *fig. 4.* to be received one-half through every two adjacent courses. All the courses of the entire solids have a central joggle *j*, and eight others, *g*, arranged in a circle round it, as shewn in *fig. 4.* Above the entire solid, the centre stone is omitted to leave the well-hole for the staircase, X, or rather, it is composed of four stones, united by hook or dovetail joints, to form, when put together, one piece, large enough to have the well-hole through its centre, and the exterior stones are united to it as a central piece in the same manner, as *fig. 4.* In these courses the continuity of the stones being somewhat broken, double the number of joggles, *h*, and these half the size, are introduced between the courses. It is to be observed, that none of the joggles, except the centre ones,

come immediately over the others, as the figure would infer, but they break joint with each other to give every part of the solid an equal strength. Above the solid, a new system of building was necessarily adopted: the lower courses were composed of Portland stones to fill up the centre, and moor stones, as being more durable, to make the outside. The whole of the upper works are of moor stone; and dovetailing being no longer practicable, the stones are united by iron cramps and joggles, as shewn in *fig. 7*, which is a plan of the upper or bed-room M. Each stone is here seen to have an iron cramp to join it to its neighbour, and has a small marble joggle to unite it with that above it. The vertical joints are rendered impervious to water, by cutting a notch between every two adjacent stones, so that when they come together it forms a hole of a lozenge shape, and a piece of stone being put down into this hole with mortar, makes a perfect joint, at the same time increasing the bond of the stones. This kind of joint is partly seen in *fig. 8*, at *n*, but one-half is hid by the iron cramps *r, r*, extending over every joint. In this figure they are seen inclined, that they may take firmer hold of the stones *s, s*, forming the sides of the apertures T, for the window. The stones of the different floors are dovetailed together, as in *figs. 5* and *7*, and are rather arched on the lower side, as shewn in *fig. 2*. To retain the thrust of these arches, every course from which a floor springs, is bound by an endless chain inland in the stone work, as in *fig. 5*, and run in solid with lead. The chain is shewn enlarged in *fig. 6*. *Fig. 7*, is a plan of the bed-room M, shewing the disposition of the three cabin beds *k, l, m*, with a window between each. The dark spot *m* is the smoke funnel, and *n* is the place for a clock.—The reader is now tolerably well acquainted with the construction of Mr. Smeaton's light-house; but in such a peculiarly exposed situation, every trifling operation was attended with difficulty, and demanded thought and ingenuity to devise the means of accomplishing it. On this account we shall briefly follow Mr. Smeaton through his narrative, though it relates circumstances which, if recorded in the account of a common building, would appear impertinently minute. The season when Mr. Smeaton first took up the business of the light-house not being favourable for a visit to the rock, he did not attempt it till April 1756, before which time he had designed the general principles of the building. He found upon the rock the ruins of both the former erections, and several of the moor stones of the late building lying in the gut, which was a narrow channel of twelve feet deep between the house rock, and a reef of rocks to the wellward, in which channel the boats coming to the house could lie in fair weather. His first visit was employed in observations on the rock, and in experiments of the time requisite to drill and pick holes of a certain dimension, that he might estimate the time necessary to complete the work on the rock. In succeeding voyages he took dimensions of every part to enable him to make an accurate model, to which he could adapt a model of the intended building. The unfavourable days at sea were employed on shore in examining the stone in the country round, a convenient situation for a work-yard, &c. The dimensions of the rock were taken by the following means: He fixed up the circle of a theodolite, with its index, in the centre of the rock, and leveled it with the spirit-level; a light rod was fixed to the index, long enough, when turned round, to reach all parts of the rock; it was provided with a spirit-level to shew when it stood horizontal. It is obvious that this rod, when turned round, would describe a horizontal plane, and the depth of any point of the rock beneath this plane was ascertained by a rod set up vertically upon the point in question, and ap-

plying the horizontal ruler to it. The divisions on the vertical rod shewed the depth; and the division of the horizontal ruler shewed the distance from the centre, and the degrees of the theodolite circle pointed out the direction. By these means the position and altitude of thirty-two principal points were obtained, which were well marked upon the rock, and a line being stretched from one of these points to another, gave the means of determining the position of the iron flanchions, or any thing else which was remarkable. Having thus, in ten voyages, made all the necessary observations on the rock, and determined upon regulations for the management of the work, he returned to London, and, in his way, visited the various stone quarries in Devonshire, and the isles of Portland and Purbeck. He was employed, till the month of July, in making exact models of the building, when he returned to Plymouth, where he found a vessel, the Neptune Bufs, which had been fitted up for exhibiting a temporary light during the period of rebuilding the house. From some misunderstanding between the Board of Trinity and the proprietors, this vessel was not employed in this manner, but was devoted to Mr. Smeaton's use, who immediately began the works upon the rock; mooring the Bufs near the rock to serve as a retreat for the workmen, who were frequently driven off by the waves. In the month of September the three lower slips of the rock were completed, and the upper ones in a state of great forwardness; after which time, bad weather prevented much more being done that year, and in November the Bufs left her moorings to return to Plymouth, in which voyage she was driven to sea, and narrowly escaped shipwreck. Thus concluded the operations of the year 1756. The winter season was passed in preparing stone work on shore, in building boats, and, by Mr. Smeaton, in a long and valuable series of experiments on the different kinds of cements, which could be applied to the building.

In May 1757, the Bufs was carried out and moored, and on the 12th of June the lowest and first stone was laid in its place; from the great uncertainty of the weather every stone was so contrived, that it was of itself in a condition to resist the wash of the sea, even when it was immediately laid, and before it was hardened. For this purpose, each stone had one or two holes drilled through it before it left the work-yard, and this hole being continued a few inches into the rock or the stone beneath, a strong trenail, or oaken pin, was driven through it, to pin it fast in its place: as the dovetails did not of course fit perfectly close into each other, but left space for the mortar; notches were cut in the edges of each stone to receive strong oak wedges, which held them firm until the mortar came to its solidity. As a further precaution to defend the mortar, all the outward joints were coated over with plaster of Paris, as a temporary expedient. The work went on rapidly in this manner, and the second course was nearly set in a few days; but a gale sprang up, which obliged them to quit the work, leaving a few stones of the second course, which could not be set, lowered down into their places, and chained strongly to the rock, by lines inserted into the holes made in each of the stones, to lift them by; and one of the most exposed was secured, by laying upon it, when in its dove-tail, a weight of lead of five cwt. in form of a hemisphere. A storm came on, and it was afterwards found, that this weight had been lifted by the waves, so that the stone beneath it had escaped and was lost, as were four others, from which circumstance the force of the sea on the rock may be imagined. New stones were immediately prepared, and the work renewed. In the progress of the work, it constantly happened, after all precautions, that the cement was washed away in particular places,

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places, and it was always repaired the first opportunity with Pozzolana or Dutch terras; which repairs, if they withstood one rough tide, were never found to fail afterwards; but some places were found so difficult, that it became necessary to mix oakum, chopped very small, with the mortar, and this method always succeeded. On the 11th of August the six basement courses were completed, and the first entire course, N^o 7, was begun. All the stones for this course were fitted and put together in the work-yard, as shewn in *fig. 4*. They are numbered, so that after being taken to pieces, they could be restored to the same relative position on the building; but to do this accurately, while they were in the work-yard, radial lines were drawn from the centre to the circumference, so as to intersect each stone; and concentric circles were drawn through the middle of each tier of stones. Where any of these lines crossed the joints, a nick was sawn in the edge of the stone, that the mark might be felt as well as seen; and by the coincidence of these lines the stones were set with the greatest accuracy. On the stones arriving at the work, the central stone was first set; the hole to receive the centre joggle was cut through the centre of course six, and the joggle set up therein, as shewn in *fig. 2*, and the centre stone of course seven let down upon it, a mortar bed being made beneath. When the stone was thus fixed, the joints round the joggle were filed in by grouting, which is mortar made very thin and poured in from ladles. The four stones surrounding the centre were now set, and the work proceeded thus to the circumference, every stone being wedged and trenched as soon as set, and the joints grouted. To fix the eight smaller joggles, they were set, wedged, and grouted into their holes in the lower course; but the holes for their reception in the lower side of the upper course, being only cut half through, did not admit of wedging; they were therefore fixed by the mortar only, as much being put on the top of the joggle as would nearly fill the hole, but not quite, and the remainder was introduced through a hole previously drilled through the stone, and forced down by a wooden ramrod.

The mortar used in the building was compounded of equal portions of lime and pozzolana. The lime was burned from the blue Lyas limestone found near Watchet, a small seaport in Somersetshire. It was carried out in tight casks, which were opened at the rock, and a small quantity beat up in a strong bucket with a wooden pebble, and used immediately. The work proceeded in the same manner without any deviation or accident, except now and then losing a few stones by storms, until the end of September, when the ninth course, being completed, the work was given up for the year, and the Buys left her moorings.

During the winter, the buoy of the moorings for the Buys was lost, but was recovered on the 11th of May, 1758. Yet, before any work could be begun, the chains were broken, and the buoy of the anchors having got loose, the moorings were lost; much time being consumed in preparing new ones, it was the 2d of July before the work was renewed; but by the 8th of August, the 14th course, completing the entire solid, was laid, and by the 20th the entry door was covered in, and by the 24th of September, the whole of the solid, up to the store-room floor, was finished. Above this the method of working was totally altered, but not being now so liable to the action of the sea, it became less difficult, and requires less description. In addition to what has been said before, the iron cramps were all filled in their places with lead, and a whole course was done at once, by putting each cramp into a kettle of red-hot lead, till it was equally hot. A small quantity of oil was poured into the holes in the stone, and the hot cramp put in: this oil caused

the lead, when poured in, to occupy every cavity in the stone.

On the 30th of September, the work had arrived at the store-room floor, and here the iron chain, shewn in *fig. 5*, was let into the stone, and filled in with lead in the following manner:—the chain was oiled before putting it in, and the groove divided into four parts by dams of clay. Two kettles were used, which together would hold lead enough to fill the whole groove, which was 11 cwt. In these the lead was made red-hot, and two persons with ladles filled the lead into the same quarter of the groove. As soon as it was at all set, they removed one of the clay dams, and filled the next quarter, pouring the lead on the end of the first quarter, till it re-melted and united with the second. The dam at the opposite end of the first quarter was now removed, and the third filled, and then the 4th. By this means the lead was all round united in one mass.

The centering for the floor was next set up, and the floor partly put together, the outward stones being set first, and then the centre ones. When the first room had been thus finished, Mr. Smeaton proposed exhibiting a temporary light during the winter, and, by fixing three floors in the well for the staircase, to form store rooms, and lodging for two men: but this idea was given up, as it did not meet the approbation of the Trinity corporation, and the work was, on the 7th of October, left for the year, the floor being partly finished. The winter was spent in preparing the iron, glass, and copper work for the lantern; and the spring in unsuccessful endeavours to recover the moorings which were again lost, and on the 5th of July the work was begun again. They found one of the stones for the floor, which was lodged in the store room H the year before, had been washed down the well, and thence through the entry into the sea, though it weighed four or five cwt. The stones for the building had hitherto been raised out of the boats, by what are termed *shears*, formed of two poles, united at top, and their feet pitched on the rock close to the building, at a proper distance asunder. A block of pulleys was suspended from the top of the two beams, to take up the stone. The shears were supported by a tackle called a guys, which was attached to the top of the shears, and hooked to the far side of the building, so that the stone, being raised up from the boat by a windlass fixed on the rock at X, *fig. 1*, the guy was drawn in to swing the stone over the building. When the work got above the entry E, the stones were landed into it, and drawn up the well X by a tackle suspended from a small triangle set over the well; but when the floor was covered in, the hole in the centre being too small to let the stones come up, a smaller pair of shears were made to lie upon the building and rise as it advanced. These were worked by a windlass set up in the store room H, and as they hung over the sides of the building, they drew up the stones clear of the wall. The work proceeded in this manner till the 17th of August, when the last piece of the cornice Q was fixed, which completed the whole column, and the workmen were enabled to lodge in the building. The balcony rails P, and the stone basement R of the lantern, were soon completed; and by the 26th, the stairs and all the masonry were finished. The iron frame of the lantern was next screwed together in its place, all the joints being first smeared with thick white lead and oil to prevent them from rusting; it was then raised up on wedges a small height, and lead poured in the joint between it and the stone to make a solid bed for it upon the stone. On the 17th of September, the copper cupola O was set up, by a particular kind of shears made for the purpose, the guys, in different directions, being fastened to booms projected out from the

the several windows of the upper room. The next day the ball, which was double gilt, was screwed on; and by October the 16th, an electrical conductor was fixed, which finished the edifice. A light was then exhibited, which has been continued ever since without any particular occurrence, or any accident produced by the many violent storms which have happened since. Mr Smeaton has, in the title page of his narrative, given a representation of the house in a storm, as seen through a telescope from Plymouth, when the waves dash up against the building, till they meet the cornice Q, by which the water is thrown off in all directions in a white column, which envelopes the house like a sheet, and rises to at least double its height, though the top of the ball is 100 feet above low water. See BEACONS.

LIGHT Infantry. See INFANTRY. When the light infantry companies are in line with their battalions, they are to form and act in every respect as a company of the battalion; but when otherwise disposed of they may loosen their files to six inches.

The open order of light infantry is usually two feet between each file.

The files may be extended from right, left, or centre; in executing it, each front rank man must carefully take his distance from the man next to him on that side from which the extension is made: the rear rank men conform to the movement of their file leaders.

When light infantry men fire in extended order, it is to be a standing rule, that the two men of the same file are never unloaded together; for which purpose, as soon as the front rank man has fired, he is to slip round the left of the rear rank man, who will take a short pace forward, and put himself in the other's place, whom he is to protect while loading.

The extended order of light infantry varies according to circumstances and situations. They may sometimes loosen their files to three times the distance of open order. But the general rule is to allow convenient intervals for the rear rank men to slip by, and return after they have fired.

All movements of light infantry, except when firing, advancing, or retreating, are to be in quick time.

The officer commanding the company will be on the right, covered by a serjeant; the next on the left, also covered by a serjeant. The youngest officer in the rear. In extended order the post of the officers and serjeants is always in the rear at equal distances.

In marching by files the officer commanding leads: by divisions each officer leads one. The supernumerary officer, if there be one, is in both cases with the officer commanding, ready to obey any directions he may receive from him.

The arms of light infantry in general will be carried sloped and with the bayonet fixed. Flanking or advanced parties, however, or parties in particular situations, may carry them trailed, and without bayonets, for the purpose of taking a more cool and deliberate aim.

When the light infantry is ordered to cover the line to the front, the divisions will move from their inner flanks round the flanks of the battalions, and when at the distance of fifty paces, the leading flanks will wheel towards each other, so as to meet opposite the centre of the battalion, opening their files gradually from the rear, so as to cover the whole extent of the battalion.

The files are not to wait for any word of command, but to halt and front themselves. In this position, and in all positions of extended order, the post of the officer commanding is in the rear of the centre, and the movements

are to be regulated by the company belonging to the battalion, which governs those of the line. For a fuller explanation of light company manœuvres, see page 273 to page 281 of Infantry Regulations.

Light infantry men, like hussars, are frequently detached to act as scouts on the flanks, in the front, or with the rear guard of the body of troops to which they belong. They then acquire the appellation of skirmishers, and being previously told off for that specific duty, they advance and form in the front in rank entire; which is effected by each man from the rear rank placing himself on the left of his file leader. The rank entire may be resorted to for various purposes during the movements of one or more battalions, since it may serve not only to cover them from the enemy's observation, but in some cases, especially in foggy weather, will itself appear a larger body than it really is. Too much attention cannot be given to the organization of light troops on foot. They are very properly called the eyes of an army, and ought always to be considered as indispensably necessary.

LIGHT-ROOM, is a small apartment inclosed with glass windows, near the magazine of a ship of war. It is used to contain the lights by which the gunner and his assistants are enabled to fill the cartridges with powder, to be ready for action.

LIGHT TROOPS, in *Military Language*, generally denote all horse and foot which are accounted for detached service.

LIGHT WATER-LINE, in *Naval Architecture*, the line of floatation of the ship, before she takes in her cargo.

LIGHTEN, in the *Manège*. To lighten a horse, or make him light in the fore-hand, is to make him freer and lighter in the fore-hand than behind. If you would have your horse light, you ought to keep him always disposed to a gallop, when you put him to a trot; and after galloping some time, you should put him back to the trot again.

LIGHTER, a large open vessel, generally managed with oars, common on the river Thames, and on other rivers and canals; where it is used for the carriage of timber, coals, ballast, and any goods to or from a ship, when she is to be laden or delivered. There are also some lighters furnished with a deck throughout, in order to contain those merchandizes which would be damaged in rainy weather: these are usually called *close-lighters*. See BOAT.

LIGHTER-MEN. See COMPANY.

LIGHTFOOT, JOHN, in *Biography*, the son of a clergyman, was born at Stoke upon Trent, in Staffordshire, in the year 1602. He received his grammar learning at Moreton-green, near Congleton, Cheshire, after which he was entered a student of Christ's college, in the university of Cambridge. Here he applied himself with much diligence, and made so great a proficiency in classical literature, and the studies connected with it, that he was reckoned the best orator among the under graduates of the university. At the age of nineteen he quitted the university, and engaged himself as assistant to his old school-maister, who had, at that time, removed from Cheshire to Repton in Derbyshire. Having continued in this situation about two years, he took orders, and settled as curate at Norton-under-Hales, in Shropshire: about the same time he became chaplain to Sir Rowland Cotton, and resided in his family. This gentleman, being a perfect master of the Hebrew tongue, engaged Mr. Lightfoot in the study of that and the other Oriental languages. He followed his patron to London, and would have proceeded with him to the continent, but the living of Stone, in Staffordshire, being offered him, he preferred settling there, as it likewise gave him an opportunity of entering upon the marriage

state, which he immediately embraced. Here he found the means of study exceedingly scanty, and in the course of a few months resigned the living of Stone, and removed to Hornsey, near London, a situation which he chose, on account of its vicinity to the metropolis, where the sources of learning were very abundant. He was now a frequent attendant at the library of Sion-college, which afforded him the most ample means of supplying all his literary wants. In 1629, Mr. Lightfoot published his first piece, entitled "Erubhim; or Miscellanies Christian and Judaical, and others, penned for the recreation of vacant hours." In 1630, he was presented by sir Rowland Cotton to the rectory of Ashly, in Staffordshire, and immediately removed to his parish, in which he lived twelve years, applying himself with indefatigable diligence in searching the scriptures, and in the performance of various duties attached to his office, as a conscientious clergyman. He was next appointed by the Long Parliament a member of the assembly of divines at Westminster; and as he could no longer reside among his parishioners he resigned the rectory, but obtained the presentation for a younger brother. He arrived in London in 1642, and was almost immediately chosen minister of St. Bartholomew's, behind the Royal Exchange. In the assembly of divines, which met in June 1643, Mr. Lightfoot became distinguished for his eloquence in debate, and activity in business. He was friendly to the Presbyterian form of church government, which he declared in a sermon before the house of commons, he verily believed was "according to the pattern in the mount." In 1643 he was appointed master of Catherine-hall, in Cambridge, and in the same year he was presented to the living of Much-munden, in Hertfordshire. In 1644 he published the first part of his "Harmony of the New Testament," with a plan of his whole design, and continued afterwards to send out, at different periods, the other branches of the same work. In 1652, Mr. Lightfoot took the degree of doctor of divinity, and went through all the regular exercises, on that occasion, with great applause. In 1653 he was chosen vice-chancellor of the university of Cambridge, the duties of which important office he performed with exemplary diligence and fidelity. Upon the restoration of king Charles II. Dr. Lightfoot offered to resign the mastership of Catherine-hall in favour of Dr. Spurstow, but upon his declining to accept it, our author obtained a confirmation from the crown of that place, and of his living. For these marks of royal favour he was chiefly indebted to the kindness of archbishop Sheldon, who, out of pure respect for his learning and talents, undertook to serve him. Soon after this he was collated, through the interest of lord-keeper Bridgman, to a prebend in the cathedral church of Ely. In 1661 he was appointed one of the assistants at the conference at the Savoy on the subject of the liturgy, but he attended only twice, on account of the violence displayed in the debates. He now gladly withdrew as much as possible from the world, in order that he might spend his time in studies to which he was attached, and which he prosecuted with vigour to the last. His publications would have been more numerous, but the expense of them was more than he could bear, and he never was sufficiently patronized by the public to interest the booksellers in his behalf. A short time before his death he was, however, requested by them to collect and methodise his works, in order that they might be printed in an uniform manner. He died in December 1675, before he could accomplish the task required of him, in the 74th year of his age. Dr. Lightfoot was indefatigable in his pursuits, and extremely temperate in his mode of living. He lived in the greatest harmony among his parishioners,

being easy of access, affable, communicative, hospitable, and charitable. As a writer he was one of the most ingenious, as well as learned, of our English commentators, and has furnished his successors with very valuable materials in the same line of studies: he had few equals, and no superior in rabbinical literature; and in this branch of learning his celebrity was so great, that many foreigners came to him for assistance in it. His works were collected and published in 1684, in two volumes folio. A new edition of them was published in Holland in 1686, containing all his writings that had been originally given to the world, in the Latin language, and a Latin translation of those which he had written in English; and a third edition was published at Utrecht in 1699, by John Leusden: this impression contained some posthumous pieces, which were comprised in a third volume. These were, in the following year, published in an 8vo. volume by Mr. Strype, under the title of "Some genuine Remains of the late learned and pious Dr. John Lightfoot." The doctor was not only indefatigable in his own pursuits, but an encourager of other learned men in theirs. He gave great assistance in completing the English Polyglott bible, by drawing up a chorographical table prefixed to it, and by superintending the sheets of the Samaritan version, as they were printed: he afforded much pecuniary assistance to Dr. Castell in the publishing of his Heptaglott Lexicon, which would otherwise have occasioned his entire ruin for want of support from the learned world: and Dr. Lightfoot was the person who excited Mr. Pool to undertake his valuable work entitled "Synopsis Criticorum." Biog. Brit. Gen. Biog.

LIGHTFOOT, JOHN, a distinguished British botanist, chiefly known as the author of the *Flora Scotica*, was born in 1735. He was educated at Oxford, where he took the degree of Master of Arts, and having entered into holy orders, became chaplain to the late duchess dowager of Portland, "that great and intelligent admirer and patroness of natural history in general," as he justly denominates her in the dedication of his book. He was recommended to this illustrious lady, whose accomplishments gave a lustre to her high rank, by his taste for botany and conchology, as well as his courtly and assiduous manners, which, accompanied by an habitual pleasantry and cheerfulness, rendered his company generally acceptable. By her grace's influence, we believe, he obtained the rectory of Gotham, in Nottinghamshire, and subsequently the living of Cowley, in Middlesex.

In 1772, the late Mr. Pennant, so well known as a zoologist, invited Mr. Lightfoot to be the companion of his second tour to Scotland and the *H. brides*, advising him to undertake the "compilation," as he himself modestly calls it, of a *Flora Scotica*, which Mr. Pennant offered to usher into the world at his own expense. These generous and flattering offers Mr. Lightfoot gladly accepted, and made the most of the opportunity afforded him for "gratifying a favourite affection he had long conceived for the science of botany." He enjoyed "the enchanting prospect," to use his own words, "of examining a country whose vegetable productions had been attended to by very few." Our author was justly aware that a single summer could by no means be sufficient for the full accomplishment of such an undertaking, nor would he perhaps have ventured upon it, but for the assistance of "able and ingenious botanists, who had resided in that country their whole lives," who permitted him "to examine their collections, and freely communicated the observations of many years." These were the late Dr. Hope, professor of botany at Edinburgh; the Rev. Mr. (now Dr.) John Stuart of Luss; and the Rev.

Dr. Burgess, the venerable pastor of Kirkmichael in Dumfriesshire: three men whose urbanity conferred upon their beloved science her most attractive charm, as the writer of this can well testify. Mr. Stuart was the companion of our travellers in their excursion, and supplied each, in his own line, with much learned information, respecting the Erse nomenclature, as well as the real or supposed uses and history of the native animals and plants. Thus Mr. Pennant was enabled to prefix a compendious *Fauna* to the *Flora* of his friend; and thus Mr. Lightfoot found his path made straight and plain before him, and literally strewed with flowers. He profited likewise from the communications of Dr. Parsons, at that time professor of anatomy at Oxford, and of Mr. Yalden, an ingenious young man, whose premature death happened soon after. These gentlemen had cultivated botany in the course of their medical studies at Edinburgh, the latter especially, with eminent success. When Mr. Lightfoot's materials were got together, the library, herbarium, and personal superintendence, of his friend Sir Joseph Banks, in conjunction with the help of Dr. Solander, were of the most eminent and indispensable use; and the comparison of his cryptogamic specimens with those of Dillenius at Oxford, under the eye of the professor, or rather of his son Dr. John Sibthorp, gave the finishing stroke to his labours. Thus the *Flora Scotica* became ready for publication in 1777, when it appeared in two thick volumes 8vo. with 35, rather indifferently engraved plates, five of which are zoological. The work is disposed according to the system of Linnæus, with short essential generic and specific characters copied from that author, and references to a few of the best figures of each species. English, Scottish, and Erse names are subjoined, with the general or particular places of growth, duration, &c.; and the account of every plant finishes with a longer or shorter description in English, various botanical remarks, and compiled notes of its economical or medical uses.—The plan and the execution of this work appear calculated to render it one of the most popular Floras. It has found its way to the continent, where it is generally quoted, especially for the Cryptogamous class, which the author says “cost more time and attention than all the other 23 classes together.” Yet we have heard that this publication did not, for a long time at least, pay its expenses. This certainly did not arise from any want of merit; for its only great and radical fault was not known, or at least scarcely considered such, till lately. Of this notice is taken under the botanical article FRONV. The fault we mean is this: compiling descriptions from foreign authors, without mentioning whence they are taken; so that a student can never be certain of their just application, but, on the contrary, often finds them erroneous or unsuitable, without knowing why. Even in the last class, on which Mr. Lightfoot bestowed so much pains, the synonyms of Linnæus and Dillenius often disagree, though in many cases such contrarieties are properly indicated, so as to throw original light on the subject.

Mr. Lightfoot was for some years a fellow of the Royal Society, and was one of the original fellows of the Linnæan Society, the formation of which he contemplated with great pleasure, though his death happened before he could attend any of its public meetings. Having married the daughter of an opulent miller at Uxbridge, he resided in that town, and died there suddenly in the spring of 1788, aged 53, leaving a widow and several daughters. He was buried in Cowley church, where his grave remained, for some time at least, without any memorial. He is supposed never to have recovered from a distemper, respecting a living, which

his patron, the late duke of Portland, solicited from Lord Chancellor Thurlow, but which the latter did not think fit to bestow.

The subject of our memoir had, in the course of his botanical studies, collected an excellent British herbarium, consisting of abundant specimens, generally gathered wild, and in many cases important for the illustration of his work. He had also amassed, from Sir Joseph Banks and other friends, a number of exotic plants. The whole was bought, after his death, for 100 guineas, by his majesty, as a present to the queen, and deposited at Frogmore, the price being fixed by an intelligent friend of the family. The specimens having been for some time neglected, were, after a while, discovered to be much infested with insects; and as their royal possessor, having a genuine and ardent taste for the study of botany, was anxious for their preservation, the writer of the present article was requested to give his advice and assistance on this subject. This led to his frequent invitation as a visitor at Frogmore, and to a regular course of conversations, rather than lectures, on botany and zoology, which her majesty, and the princesses Augusta and Elizabeth honoured with their diligent attention; the queen regularly taking notes of every lecture, which she read over aloud at its conclusion, to prevent mistake. The plan of this exemplary mother, on which she has often been heard to decant, was, in the education of her royal offspring, to open as many resources to them as possible, in a variety of studies and pursuits; out of which they might subsequently make their own choice, and thus be independent of circumstances for occupation and amusement. Nor has the herbarium of Lightfoot been confined to useless repose. It was allowed to be consulted frequently, on the subject of Scottish Willows, and other doubtful matters, while the *Flora Britannica* was preparing; and the present bishop of Carlisle was permitted to make all requisite use of it, for the completion of his valuable paper on British *Carices*, printed in the second volume of the Linnæan Society's Transactions. In the knowledge of these two genera of plants, Mr. Lightfoot excelled most botanists of his day; but the specimens of Linnæus, being compared with his, have brought errors to light, which were never suspected before. S.

LIGHTFOOTIA, in *Botany*, so named by L'Heritier, in honour of the author of the *Flora Scotica*. (See LIGHTFOOT) L'Herit. Sert. Angl. 4. Ait. Hort. Kew. v. 1. 217. ed. 2. v. 1. 343. Wild. Sp. Pl. v. 1. 887. Juss. 450—Class and order, *Pentandria Monogynia*. Nat. Ord. *Campanulaceæ*, Linn. *Campanulacæ*, Juss.

Gen. Ch. Cal. Perianth of five equal, acute leaves, broad at the base, encompassing the middle of the germen. Cor. of one petal, in five deep, equal, regular, oblong, spreading segments, rather longer than the calyx; the very short tube closed by five valves, bearing the stamens. Stam. Filaments five, linear, flat, equal, much shorter than the corolla; anthers small, roundish, incumbent. Pist. Germen half inferior, ovate, style thread-shaped, about the length of the corolla; stigma dilated into three or five, somewhat spreading, segments. Peric. Capsule ovate, with three or five cells, opening at the top by as many valves. Seeds numerous, small, roundish.

Efl. Ch. Corolla in five deep segments, closed at the bottom by valves bearing the stamens. Calyx of five leaves. Stigma of three or five lobes. Capsule half superior, of three or five cells, and as many valves.

1. *L. oxycoccids*. Cranberry-leaved Lightfootia. L'Herit. Sert. Angl. 4. t. 4. Sm. Exot. Bot. v. 2. 19. t. 69.—(*Loebelia tenella*; Linn. Mant. 120. Thunb. Prodr. 40. *L. parviflora*;

parviflora; Berg. Cap. 345.)—Leaves plain, ovato-lanceolate, alternate, reflexed. Stigma three-cleft. Corolla widely spreading.—Native of the Cape of Good Hope, as are the two following species also. This was sent to Kew in 1787, by Mr. F. Maffon. It is kept in the greenhouse, and flowers from July to September. The *stem* is perennial, shrubby, of humble growth, bushy and spreading, not prostrate, very much branched, often finely downy. *Leaves* numerous, small, alternate, sessile, reflexed, ovate or somewhat lanceolate, acute, smooth, thick-edged, entire, except a small glandular tooth or two at each side. *Flowers* small, on little, terminal, naked, simple stalks. *Corolla* white, with a tinge of purple along the middle of each segment. *Stigma* purple. *Capful* of three pointed valves forming a cone.

2. *L. tenella*. Curve-leaved Lightfootia. (*Campanula tenella*; Linn. Suppl. 141.)—Leaves ovato-lanceolate, channelled, clustered, recurved. Stigma three-cleft. Corolla widely spreading, with narrow linear segments. Stigma three-cleft. Gathered by Thunberg at the Cape. It seems a stranger to our gardens. L'Heritier confounded it with the preceding, from which it differs in its very numerous, clustered, recurved, and deeply channelled *leaves*, and the longer and narrower segments of the *corolla*. We cannot but think it more than a variety, though there is scarcely any difference besides what we have mentioned.

3. *L. fululata*. Awl-leaved Lightfootia. L'Herit. Sert. Angl. 4. t. 5.—Leaves awl-shaped. Calyx almost altogether inferior. Corolla moderately spreading, with linear segments. Stigma five-cleft.—Sent to Kew by Mr. Maffon in 1787, from the Cape.—This is distinguished by its copious, awl-shaped, very narrow *leaves*, sometimes near an inch long. The shrubby *stem*, with downy *branches*, accords nearly with the two former. The *flowers* stand on shorter stalks, and have longer sharper calyx leaves, tumid at the base, and almost perfectly inferior. Segments of the *corolla* moderately spreading, recurved, narrow, white or bluish. *Stigma* five-cleft. *Capful* we presume of five valves.

Nothing can agree more exactly with this as to habit than *Campanula paniculata*, Linn. Suppl. 130, and *Trachelium diffusum*, 143; but their corolla has a long tube. The capsule of this supposed *Campanula* has five valves opening at the top, exactly as in *Lightfootia*, not by pores laterally, and the calyx is half superior, so that it certainly belongs to the same genus, the length of the tube of the corolla being of much less importance.

LIGHTFOOTIA is also the name of an arboresecent genus of the *Polyandria Monogynia*, in Swartz's Fl. Ind. Occ. v. 2. 947, referred to *Prockia* in Willd. Sp. Pl. v. 1. 1214. This is *Lightfootia* of Mart. Mill. Dict. v. 3.

LIGHTNESS. See LEVITY.

LIGHTNING, in *Physiology*, is a large bright flame, darting swiftly through the air, and extending every way to a considerable distance, of momentary duration, and commonly attended with thunder. Some have accounted for this phenomenon by supposing, that, from the particles of sulphur, nitre, and other combustible matter, which are exhaled from the earth, and carried into the higher regions of the atmosphere, is formed an inflammable substance, which, when a sufficient quantity of fiery particles is separated from the vapour buoyed up into the air, with these particles adhering to them by the collision of two clouds or otherwise, takes fire, and shoots out into a train of light, larger or less, according to the strength and quantity of the materials. Others have explained lightning by the fermentation of sulphureous substances with nitrous acids: see THUNDER. But in the present advanced state of the science of electri-

city, this is universally allowed to be an electrical phenomenon. Philosophers had not proceeded far in their experiments and inquiries on this subject, before they were struck with the obvious analogy between lightning and electricity, and they produced many arguments, *a priori*, to ascertain their similarity. But the method of verifying this hypothesis was first proposed by Dr. Franklin, who, towards the close of the year 1749, conceived the practicability of drawing lightning from the clouds: having long, by previous experiments, that the electric fluid is attracted by points, he apprehended, that lightning might likewise possess the same property; though the effects of the latter must, in an astonishing degree, surpass those of the former. The other circumstances of resemblance between lightning and electricity remarked by this ingenious philosopher, and abundantly confirmed by later discoveries, are the following: flashes of lightning, he observed, are generally seen crooked and waving in the air; and the electric spark drawn from an irregular body at some distance, and when it is drawn from an irregular body, or through a space in which the best conductors are disposed in an irregular manner, always exhibits the same appearance.

Lightning strikes the highest and most pointed objects in its way, preferable to others, as high hills, trees, towers, masts of ships, &c. and all pointed conductors receive and throw off the electric fluid more readily than those which are terminated by flat surfaces. Lightning is observed to take the readiest and best conductor; and this is the case with electricity in the discharge of the Leyden phial; whence the doctor infers, that in a thunder storm, it would be safer to have one's clothes wet than dry. Lightning burns, dissolves metals, (see FUSION,) rends some bodies, has been often known to strike people blind, destroys animal life, deprives magnets of their virtue, and reverses their poles; and these are well-known properties of electricity.

Lightning not only gives polarity to the magnetic needle, but to all bodies that have any thing of iron in them, as brick, &c.; and by observing which way the poles of these bodies lie, it may be known, with the utmost certainty, in what direction the stroke passed. Signor Beccaria supposes, that persons are sometimes killed by lightning, without being really touched by it; a vacuum of air only being suddenly made near them, and the air rushing out of their lungs to supply it; and with so much violence that they could never recover their breath. In proof of this opinion he alleges, that the lungs of such persons are found flaccid; whereas, when they are properly killed by the electrical shock, the lungs are found inflated; but this hypothesis is controverted by Dr. Priestley. In order to demonstrate the identity of the electric fluid with the matter of lightning, by actual experiment, Dr. Franklin contrived to bring lightning from the heavens, by means of an electric kite, which he raised, when a storm of thunder was perceived to be coming on; and with the electricity thus obtained, he charged phials, kindled spirits, and performed all other electrical experiments, which are usually exhibited by an excited globe or tube. This happened in June, 1752, a month after the electricians in France, of whom the most active were Messrs. Dalibard and Delor, followed by Mr. Mazeas and M. Monnier, pursuing the method which he had proposed, had verified the same theory; but without any knowledge of what they had done. In April and June, 1753, he discovered that the air was sometimes electrified positively, and sometimes negatively; and found that the clouds would change from positive to negative electricity several times in the course of one thunder-gust. He soon perceived that this important discovery was capable of being applied to practical

LIGHTNING.

use, and proposed a method, which he soon accomplished, of securing buildings from being damaged by lightning, by means of conductors. The English philosophers had not been less attentive to this subject than their neighbours on the continent; but for want of proper opportunities for trying the necessary experiments, and from some incidental circumstances that were unfavourable, they had failed of success. However, in July, 1752, Mr. Canton succeeded; and in the following month, Mr. Wilton and Dr. Devis observed nearly the same appearances which Mr. Canton had observed before. Mr. Canton also soon after observed, in a number of experiments, that some clouds were in a positive and some in a negative state of electricity; and that the electricity of his conductor would sometimes change from one state to the other, five or six times in less than half an hour. This variable state of thunder clouds was discovered by S. Beccaria, before he heard of its having been observed by Dr. Franklin, or any other person: and he has given a very exact and circumstantial account of the external appearances of these clouds. From his observations of the lightning abroad, and of his apparatus within doors, he inferred, that the quantity of electric matter, in an usual storm of thunder, is almost inconceivably great, considering how many pointed bodies, as trees, spires, &c. are perpetually drawing it off, and what a prodigious quantity is repeatedly discharged to or from the earth. This quantity is so great, that he thinks it impossible for any cloud or number of clouds to contain it all, so as either to discharge or receive it. Besides, he observes, that, during the progress and increase of the storm, though the lightning frequently struck to the earth, the same clouds were the next moment ready to make a still greater discharge, and his apparatus continued to be as much affected as ever; and, therefore, the clouds must have received at one place, in the same moment when a discharge was made from them in another; and, upon the whole, he infers, that the clouds serve as conductors to convey the electric fluid from those places of the earth that are overloaded with it, to those which are exhausted of it. This electric matter, the rise of which, from the earth into the higher regions of the atmosphere, is ascertained by the great quantities of sand, ashes, and other light substances, carried up with it, and scattered uniformly over a large tract of country, wherever it issues, attracts to it, and bears up with it the watery particles that are dispersed in the atmosphere. It ascends into the higher regions of the atmosphere, being solicited by the less resistance it finds there than in the common mass of the earth, which, at these times, is generally very dry, and consequently highly electric. The same cause which first raised a cloud, from vapours dispersed in the atmosphere, draws to it those that are already formed, and continues to form new ones, till the whole collected mass extends so far as to reach a part of the earth where there is a deficiency of the electric fluid. Thither, too, will those clouds, replete with electricity, be strongly attracted, and there will the electric matter discharge itself upon the earth: a channel of communication being in this manner formed, a fresh supply of electric matter will be raised from the overloaded part, and will continue to be conveyed by the medium of the clouds, till the equilibrium of the fluid between the two places of the earth be restored. When the clouds are attracted in their passage by those parts of the earth, where there is a deficiency of the fluid, those detached fragments are formed, and in a little these uniform descending protuberances, which are, in some cases, the cause of *Warr-sprouts* and *Hurricanes*; which see.

That the electric matter, which forms and animates the thunder-clouds, issues from places far below the surface of

the earth, and that it buries itself there, is probable from the deep holes that have, in many places, been made by lightning; and from the flashes that have been seen to arise from subterraneous cavities and from wells; as well as from the inundations accompanying thunder-storms, and occasioned by water bursting out of the bowels of the earth. The greatest difficulty attending this theory of the origin of electric matter within the body of the earth. With respect to the former, this ingenious philosopher has nothing to say: some operations in nature are certainly attended with a loss of the equilibrium in the electric fluid, but no person has yet assigned a more probable cause of the redundancy of the electric matter, which, in fact, often abounds in the clouds, than what we may suppose possible to take place in the bowels of the earth: and supposing the loss of the equilibrium possible, the same cause that produced the effect would prevent the restoring of it; so that not being able to force a way, at least one sufficiently ready, through the body of the earth, it would issue at the same convenient vent into the higher regions of the air, as the better passage. S. Beccaria observes, that a wind always blows from the place from which the thunder-cloud proceeds; and it is certain, that the sudden congregation of such a prodigious quantity of vapours must displace the air, and repel it on all sides. A great number of observations relating to the descent of lightning, confirm his theory of the manner of its ascent: for, in many cases, it throws before it the parts of conducting bodies, and distributes them along the resisting medium, through which it must force its passage. Upon this principle, the longest flashes of lightning seem to be made, by its forcing into its way part of the vapours in the air. One of the principal reasons why those flashes make so long a rumbling, is their being occasioned by the vast length of a vacuum, made by the passage of the electric matter. For although the air collapses the moment after it has passed, and the vibration, on which the sound depends, commences at the same moment; yet, if the flash was directed towards the person who hears the report, the vibrations excited at the nearer end of the track will reach his ear much sooner than those excited at the more remote end; and the sound will, without any repercussion or echo, continue till all the vibrations have successively reached him. Mr. Lullin, in order to account for the production of electricity in the clouds, made a long insulated pole to project from one side of the Alps, and observed, that when insular clouds of vapour, raised by the heat of the sun, rose near the foot of the mountain, and ascended along the side of it: if they touched the extremity of the pole only, it was electrified; but if the whole pole, and consequently part of the hill on which it stood, was likewise involved, it was not electrified. Whence he concludes, that the electricity of the clouds is produced by their passing through the air while the sun shines upon them. But to which of these two circumstances, namely, the motion through the air or the action of the sun's rays, this was owing, he could not determine, though he made several experiments for this purpose.

Upon the whole, it is easy to conceive, that when particular clouds of different parts of the earth possess opposite electricities, some being electrified positively, and others negatively, a discharge will take place within a certain distance; or the one will strike into the other, and in the discharge a flash of lightning will be observed. But how the clouds or earth acquire this state, is still a question not absolutely determined. Mr. Canton queries, whether the clouds become possessed of electricity by the gradual heating and cooling of the air; and whether air suddenly rarefied,

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may not give electric fire to, and air suddenly condensed receive electric fire from, clouds and vapours passing through it. Mr. Willeke supposes the air to contract its electricity, in the same manner as sulphur and other substances do, when they are heated and cooled in contact with various bodies. Thus the air, being heated or cooled in the neighbourhood of the earth, gives electricity to the earth, or takes it from it; and the electrified air, being conveyed upwards by various means, communicates its electricity to the clouds. Others have queried, whether, since thunder generally happens in a sultry state of the air, when it seems replenished with some sulphureous vapours, the electric matter then in the clouds may not be generated by the fermentation of sulphureous vapours with mineral or acid vapours in the air.

Dr. Franklin advises persons who are apprehensive of danger from lightning, to sit in the middle of a room, provided it be not under a metal lustre suspended by a chain, sitting on one chair, and laying their feet on another. It is still safer, he says, to bring two or three straw mats, or beds, into the middle of the room, and folding them double, to place the chairs upon them, for as they are not so good conductors as the wall, the lightning will not choose to pass through them: but the safest place of all is in a hammock hung with silk cords, at an equal distance from all the sides of a room. Dr. Priestley observes, that the place of most absolute safety must be the cellar, and especially the middle of it; for when a person is lower than the surface of the earth, the lightning must strike it before it can possibly reach him. In the fields, the place of safety is within a few yards of a tree, but not quite near it. Nevertheless, S. Beccaria cautions persons not to depend upon the neighbourhood of a higher, or, in all cases, a better conductor than their own body; since, according to his repeated observations, the lightning by no means descends in one undivided track; but bodies of various kinds conduct their share of it at the same time, in proportion to their quantity and conducting power. See on the subject of this article Franklin's Letters; Beccaria's *Lettre dell' Elettricità*; Priestley's *History, &c. of Electricity*, passim. Lord Mahon (now earl Stanhope) observes, that damage may be done by lightning, not only by the main stroke, and lateral explosion, but likewise by that which he calls the returning stroke, that is, by the sudden violent return of that part of the natural share of electricity (of any conducting body, or of any combination of conducting bodies) which had been gradually expelled from such body or bodies respectively, by the superinduced elastic electrical pressure of a thunder cloud's electrical atmosphere. See an account of his theory and experiments, relating to this subject, in his *Principles of Electricity*, &c. quarto, 1779.

The author of the *Philosophy of Agriculture* remarks, that the blaits occasioned by lightning are more frequent, he believes, than is usually supposed; as he is informed by those who purchase extensive woods, that very many trees, on being sawed through, are found cracked and much injured by lightning. He had last year (1796) a standard apple-tree and a tall apricot tree in full leaf, blasted at the same time by lightning, as was believed. They both lost all their leaves; the apple-tree, nevertheless, put out a new foliage and recovered, and bore fruit this year; but the apricot, which was nailed to a high wall, never threw any returning life. Mr. Tull, he remarks, ascribes one injury to lightning, the effects whereof may be observed by the blackish parts or patches visible in a field of wheat, especially

in those years which have more thunder storms than usual, and adds, that against this there is no remedy. The erection of frequent metallic points could, as the doctor thinks, alone secure a garden or field from this misfortune; which probably occurs more frequently on damp situations than on dry ones.

He conceives, that the manner in which lightning destroys the life of vegetables may be similar to that in which it destroys animal life; which is, he supposes, by its great stimulus, exhausting the sensorial power in the violent action it occasions, and thus producing total irritability to the common stimuli, which ought to excite the vital actions of the system. It may also affect vegetables in another way similar to that, which probably also happens when their young succulent roots are frozen; that is, by bursting their vessels, as it passes through them by its expansive power; as happens to the large branches of some trees, and to stone buildings, and other bad conductors of electricity, when they are struck with lightning. The expansive power of electricity is not only shown by trees and towers being rent by lightning, but by the sound which succeeds the passage of it through air; since a vacuum, or nearly a vacuum, in respect to air, must previously be made by the presence of the electric fluid: and the sides of this vacuum rushing together, when the stream has passed, occasion the consequent vibrations of the air, which constitute sound, whether in the audible spark of electricity, or the tremendous crash of thunder. Some other effects on vegetables have been ascribed by writers to lightning, but they have not yet been satisfactorily proved. See *ELECTRICITY*.

LIGHTNING, Artificial. The phosphorus, when newly made, gives a sort of artificial lightning visible in the dark, which would surprise those who are not used to such a phenomenon: the usual method of keeping this preparation is under water, and if the corrugations are desired to be seen to the greatest advantage, the glass in which it is kept should be deep and cylindric, and not more than three-fourths filled with water. The phosphorus put into this water will send up corrugations at times, which will pierce through the incumbent water, and expand themselves with great brightness in the empty upper part of the bottle.

If we compare this artificial corrugation to the real lightning, we shall find, that as in this the fire passes unaltered through the water, so in that the flashes of lightning, which come at intervals, pass uninterrupted through the most dense clouds, and are not obstructed by the heaviest storms of rain, but like the beams of the sun, or any other fire, pass uninterrupted through glass and water. The season of the weather, as well as the newness of the phosphorus, must concur to produce these flashes; for they are as uncommon in winter as lightning is, but in warm weather both are very frequent.

The flame of lightning is generally inoffensive, and does not, except upon particular circumstances, set fire to any thing that it falls upon: and in like manner, the flashings of the phosphorus through the water will not burn the flesh, nor even fire the most combustible things; though the phosphorus itself, like the lightning, under proper circumstances, may be a very consuming and terrible fire. The warmth of the air, or the immediate beams of the sun, will set fire to the condensed body of the phosphorus, and it then becomes this terrible fire; and in the same manner lightning, when condensed and contracted, and wrapped up in a vehicle of air, so that it does not so easily diffuse itself through the yielding ether, sets fire to trees, houses, or whatever it comes near.

The phosphorus, while burning, acts the part of a corrosive, and when it goes out resolves into a menstruum, which dissolves gold, iron, and other metals; and lighting, in the same manner, melts the same substances. From the whole, it appears that there is much more resemblance between this phosphorus and lighting than between gunpowder, or burning sulphur, and that fire; though these have often been supposed to be nearly allied to its nature. See PHOSPHORUS.

LIGNAC, JOSEPH ADRIAN LE LARGE DE, in *Biography*, a learned French abbe, descended from a noble family, and born at Pontiers about the commencement of the last century. He was brought up among the Jesuits, and in the course of time was chosen to fill different confidential posts in that order, and in the Congregation of the Oratory. During a visit which he had occasion to pay to Rome, he was introduced to the pope Benedict XIV. and cardinal Passionei, who honoured him with attention and friendship. He died at Paris in 1762, leaving behind him a considerable reputation as a philosopher, a naturalist, and theologian. He was author of "Elements of Metaphysics deduced from Experience;" "The Possibility of Man's Corporeal Presence in different Places at the same Time," in which he attempts to prove that the doctrine of transubstantiation contains nothing in it incongruous with the principles of sound philosophy. "An Examination of the *Traité de l'Esprit* of Helvetius." As a naturalist, we have "Memoirs Philistat of Aquatic Spiders;" "A Letter to an American concerning the Natural History of M. de Buffon;" and as a divine he published "The Testimony of internal Sense and Experience, opposed to the profane and ridiculous Creed of modern Fatalists," in three vols. At the time of his death he was employed in composing a treatise "On the Evidences of Religion."

LIGNE, in *Geography*, a town of France, in the department of the Lower Loire, and chief place of a canton, in the district of Ancenis; 9 miles N.W. of Ancenis. The place contains 1642, and the canton 5770 inhabitants, on a territory of 137½ kilometres, in 4 communes.

LIGNEA CASSIA. See CASSIA.

LIGNEVILLE, the MARCANTINE DE, in *Biography*, an ingenious and learned dilettante at Florence in 1776, who had studied counterpoint so seriously as to be able to set the "Missa Salve Regina" in canon for three voices. The composition is correct, and neatly engraved, copies of which were given to his friends. In the title of this production, dated 1775, the marquis de Ligneville is styled prince of Conca, chamberlain to their Imperial majesties, a sector of the music of the court in Tuscany, and member of the Philharmonic society of Bologna. He was son of the famous marshal Ligneville, who was killed in the gardens of Colorno, a villa belonging to the duke of Parma, during the war of 1733, and was prince of Conca, in the kingdom of Naples, by right of his mother.

LIGNICEN: IS TERREA, in the *Materia Medica*, the name of a fine yellow bole, found in many parts of Germany, particularly about Emmerin, in the circle of Westphalia, and used in cordial and astringent compositions. It is a common fire clay, and for the yellow Silesian bole, where that is not to be had, and is generally esteemed very nearly, if not absolutely, equal to it in its virtues.

It is not so heavily, naturally of a smooth surface, and of a beautiful gold colour. It easily breaks between the fingers, and does not retain the skin in handling, melts freely in the mouth, and leaves no grittiness between the teeth, and is immediately dissoluble in water. It makes no effluence

with acids; and burns to a fine red colour, and almost to a stony hardness.

Charlton (Foss. p. 5.) says it is more frequently known by the name of *terra figillata Golbergenfis*.

There is another white bole known by this name. See GOLBERGENSIS terra.

LIGNIERES, in *Geography*, a town of France, in the department of the Cher, and chief place of a canton, in the district of St. Amand; 2½ miles S. of Bourges. N. lat. 46° 45'. E. long. 2° 15'. The place contains 1215, and the canton 655 inhabitants, on a territory of 26½ kilometres, in 14 communes.

LIGNITE. This name is given, by Brongniart, to the species of inflammable fossils, called *braun kelle* (brown coal) by Werner. The following account, from Brongniart's *Traité de Minéralogie*, will supply the omission of the article *Braun coal* in our work.

The combustible minerals belonging to this species are characterized by their small and the products of their combustion. The odour which they emit in burning is pungent, often fetid, and has no analogy with that of coal or bitumens. They burn with a pretty clear flame, without bubbling and caking, like coal, and becoming fluid in the manner of the solid bitumens; they leave powdery ashes similar to those of wood, but often more abundant, more ferruginous, and more earthy. The ashes contain a small portion of potash; at least Mr. Majon has found about 3 in 100 in those of the bituminous wood of Calchucovo. These combustibles yield an acid by distillation, which coal does not.

Lignites vary in colour from deep and shining black to a dull earthy-brown: the texture of most of the varieties indicates their origin and explains their name. The ligneous texture is often observable, though sometimes it has wholly disappeared. Its fracture is compact, often resinous and conchoidal, or shining and even.

The external characters of the varieties of this species vary too much to allow them to be further generalised.

1. *Jet Lignite*; *Jayt*. *Pech kelle*, Wern.

This substance is hard, solid, compact, and susceptible of a bright polish; it is opaque and of a pure black colour; its fracture is undulated, and sometimes shining like that of pitch. Specific gravity 1.259. It is said to be sometimes lighter than water; but Brongniart thinks this property rather belongs to the following variety.

Is found in strata of little thickness, in marly, stony, calcareous or gritty beds. It sometimes exhibits the organical texture of wood.

It is found in France; in Provence, at Beaufort in the Pyrenees; in the department of the Aude, near the village des Bains, six leagues to the south of Carcassonne (this sometimes contains amber), and near Quilhan, in the same department, in the communes of Sainte Colombe, Peyrat, and Balthie; it is situated at the depth of ten or twelve yards, in oblique strata between strata of sandstones; but these strata are neither pure nor continuous. Jet proper to be worked is found in masses, the weight of which is seldom 55 pounds. These mines have been wrought for a long time, and have produced a considerable quantity of jet, which was cut and polished in the same country. It also occurs in Germany, near Wittenberg in Saxony, where it is also cut and polished. Very fine jet has also been found in Spain, in Galicia, and the Asturias. Is likewise said to occur in Iceland, in the western part of the island.

Besides these, professor Janfson has quoted the following localities of pitch-coal or jet lignite: the coal districts of the Lothians,

LIGNITE.

Lothians, Fifeshire, Linlithgowshire, Island of Skye, and Caenoby and Sanquhar, in Dumfriesshire, in Scotland; Newcastle, Tindelfelt, Bolton and Whitehaven, in England; Austria; Hungary, Bannat, Transylvania; Upper Lusatia; Silesia; mountain-Neßthier in Hesse; Württemberg; Prussia; Bohemia; Salzburg; Italy; Prussia.

Of this combustible ornaments are made, particularly mourning trunks; it is piled with water on a horizontal wheel of sandstone. Jet mixed with pyrites is generally rejected.

2. *Fossil Lignite; Moor coal; Moor lobb.* Wern.

This variety occurs in thick and extensive beds. It is of a deep black, but less shining than that of the preceding variety. Its great friability is particularly characteristic of it. Its surface is always cracked, and its masses divide with the greatest facility into a number of cubic fragments; a character which is not found in jet.

Friable lignite is more abundant and consequently more useful than the two first varieties. It is found in horizontal banks often thick and extensive, but is never seen in such large masses as coal, with which it has been confounded by some; it differs not only by its properties but also by its geognostic situation. It occurs in those masses of sand which often fill up valleys in calcareous mountains, or cover the sides of the hills that skirt them. Is also found, though more rarely, in clayey marls.

Friable lignite is pretty common in the south of France, such as in the department of Vaucluse. Also as considerable masses at Lunette, department des Forêts.

Other localities cited by authors are Leitmeritz, Saatz, and Ellenbogen in Bohemia; Thütern near Krems in Austria; Transylvania; Moravia; the island of Bornholm in the Baltic, and the Faroe islands. It occurs more frequently in Bohemia than in any other country. Jam.

It burns without difficulty, but spreads a very disagreeable odour. It can be made use of only in manufactures, or to burn lime. Smiths cannot use it in their forges.

3. *Fibrous Lignite; Bituminous wood; Bituminifera lign.* Wern.

Its colour varies from a clear blackish-brown to clove brown; it has a perfectly woody form and texture; consequently, its longitudinal fracture is fibrous, and its transverse fracture shews the yearly layers of the wood. It is more easily frangible than wood, and takes a degree of polish which is cut with a knife.

This lignite often occurs in large masses.

It is found in France, in the vicinity of Paris, near St. Germain, in the life of Chanton, which appears to be entirely formed of it; and near Vitry on the banks of the Seine, where is a thick bed of trunks of trees well preserved. In the department of Ariege, the clefts of this lignite are filled with calcareous spar. In Liguria, near Cuneo, near the mouth of the Magra, it is found in thick and extensive beds. In Illin, in the mountains of Aulberg, the stratum is above two yards thick. At Steinberg, near Minden in Hanover, it forms two strata, one of about ten yards, the other of six, separated by a bed of rock from ten to fourteen inches thick. In England, at Bury near Exeter, there are fourteen pretty thick strata, situated at a depth of about twenty-two yards under sand and a part of clay. In Iceland, where it is very abundant, it is called *undinnud*; the trunks which form the beds are not decayed, and appear merely to have been compressed.

To these varieties we add the following from Jamieson: 1. *Black lignite*, in the Bantz-trap formation, accompanied with pyrites, in the island of Skye; in separate pieces in the gneiss in the island of Canary; in siltstone, in

the island of Skye, and in the independent coal formation in the county of Mid Lothian; Bohemia, in the Saatz and Leitmeritz circles; Austria; Transylvania; Moravia; Leoben in Styria; Irtenberg in Bavaria; Upper Palatinat; Landeck in Silesia; Halle; Meissen; Eisenach and Eisleben in Thuringia; Kalten-Nordheim near Fulda; Wehrau, Upper Lusatia; Württemberg; Freywalde and Könnigsvalde in Brandenburg; Wittenberg; Salzburg; Rotteln.

But this lignite is still more common in France, in the masses; it sometimes accompanies the preceding varieties; sometimes it is found in the strata, in the sides of banks of clay or sand. It is more abundant every where, and is used as fuel in the places where it is abundant.

This combustible being scarcely decomposed, and is rather vegetable than mineral, would not deserve to constitute a variety in a system of mineralogy, if it did not pass by imperceptible degrees into the preceding varieties, and into that which follows.

4. *Earthy Lignite; Earth coal; Erd lobb.* Wern.

Commonly called earth of Cologne, and sometimes, though improperly, *under*; but the true under, which comes from Italy or the east, contains nothing that is combustible, whence it cannot belong to this species.

This substance is black, or blackish-brown mixed with reddish. Its fracture and aspect are earthy; it is fine-grained, easily frangible and even friable; it is rather soft to the feel. Its specific gravity is nearly that of water. It burns, emitting a disagreeable smell.

It not only often contains vegetable remains, but sometimes itself pretends the texture of wood, without ever possessing either the colour and lustre, or the hardness of the preceding varieties. It burns sufficiently well to be used as fuel. It gives a gentle and equal heat.

It is found in secondary formation in the neighbourhood of coal mines, and more frequently in alluvial land.

As an authentic example of this variety may be mentioned the earthy lignite from the vicinity of Cologne, known in trade by the name of earth of Cologne. It is dug up at a little distance from that city, near the villages Trüffel and Liblar, where it forms very extensive beds of eight or ten yards in thickness, which are situated under elevated ground. It is immediately covered with a bed, more or less thick, of rolled pieces of quartz and Jasper, of the size of an egg, and rests on a bed of white clay of an unknown thickness. The bed of lignite is homogeneous, but fossil vegetables are found in it in a good state of preservation: they are, 1. trunks of trees lying one on the other without order; the wood is black or reddish, generally compressed, it readily exfoliates by drying in the open air. Some of these belong to dicotyledonous trees, others are fragments of palms. Among these M. Cuvier-Montbret has found some that are filled with a number of small round pyritic bodies resembling grains of small shot. Similar small, but elongated round grains, resembling a two-seeded pod, have been found by Mr. Heim, in the lignite of Kalten-Nordheim. The wood burns very well, and even with a small flame. 2. Woody remains of the size of a nut, and which are considered as belonging to a species of arca. The lignite of Cologne contains about twenty per cent. of ashes rather alkaline and corrosive. Its uses are manifold: it is worked in open air with a simple spade, but in order to convey it with greater convenience, it is sometimes made into vessels which give it the shape of a truncated cone. It is generally used as fuel in the neighbourhood of Cologne. It burns slowly but readily and without flame, like fungus timber, giving a large heat and leaving very fine ashes. The latter being considered as a very good name, a page

of the lignite is burnt on the spot where it is wrought, for the sake of obtaining them.

The earth of Cologne is particularly employed for painting in distemper and even in oil painting. The Dutch use it to adulterate snuff, and if it is not added in too great a quantity it gives the snuff a definable fineness and softness, and cannot be in the least injurious. — *Barthes*.

This lignite is found to occur also in Hesse, Bohemia, Saxony, Iceland, &c.; but as there has been a confusion between this lignite and the variety of ochre called *umbr*, we cannot be certain that these indications of localities are referable to earthy lignite.

It may have been observed, from what has been said on the situations peculiar to some varieties of lignite, that this fossil combustible belongs to depositions of the most recent formation, since it is found only in alluvial sand or clay; it seldom or never occurs in stony depositions, except in coarse grained lime stone and under basalt. In the mountains of Hesse called the Ringe Kühle, several thick beds of lignite are seen resting on sandstone, and separated by beds of potter's clay and sand. — (*Möhs*). On the sea-shore near Calais, fragments of lignite have been found that were penetrated by very transparent globularly aggregated quartz crystals.

The air which circulates where lignite is wrought is generally bad.

From what has been said it appears (our author concludes) that lignite is of a very different formation from that of coal; indeed, Mr Voigt thinks that there is no transition between these two substances.

The first of Brongniart's varieties of lignite, is by Werner given as a sub-species of his schwarz köhl, or black coal.

A variety not mentioned in the above account of lignite, but nearly related to the fibrous lignite No. 3, is the sub-species of Werner's brown-coal, called *common brown-coal*. Its colour is light brownish-black, passing into blackish-brown. It occurs massive. Its fragments are indeterminate angular, more or less sharp-edged. It is found at Bovey, and several other places mentioned under the localities of fibrous lignite or bituminous wood.

LIGNON, in *Geography*, a town of France, in the department of the Marne; 9 miles S. of Vitry le François.

LIGNUM ALOES, or *Wood of Aloes*. See ALOES.

LIGNUM Balsam. See BALSAM.

LIGNUM Campechianum. See LOG-WOOD.

LIGNUM Cassia. See CASSIA.

LIGNUM Colubrinum. See SERPENTINUS. Garcias tells us of the wonderful effects of this drug against the bites of venomous serpents, and describes two kinds of the plant which produces it; one having leaves like the pomegranate, and the other like the peach-tree; these, he says, both grow in the island of Ceylon; and Acoita mentions two other species of plants producing this wood, both different from either of those described by Garcias, and both growing in Malabar. We have also accounts in the *Geographus Nubensis* of another *Lignum colubrinum*, different from these, growing in Ethiopia, and possessed of the same virtue against the bites of serpents as the others. This last is called in the Arabic *haud al-ahab*, the plain verbal translation of which is snake-wood, or lignum colubrinum. He tells us, that it has some resemblance in form to pyrethrum, and that the wood is always contorted.

Alba carirka is another of its Arabic names, and this is the word by which Avicenna, and the other Arabian writers, interpret the *pyrethrum* of Dioscorides; but it is not certain whether the similitude of sounds between two or more Arabic words, may not have occasioned some confusion or

error here. *Dicarcarchus*, in his fragment of mount Pelion, describes the root of a tree growing there, which is not only a sovereign remedy for the bites of serpents, but even destroys them by its smell. This is also a lignum colubrinum; but whether the same with any of the others, or different from them all, we have not descriptions enough to determine.

It appears, upon the whole, that little can be depended on in the accounts of the medicine called lignum colubrinum by any author, unless he has had it experimented what he relates, and described the plant which produces the drug; for much imaginary virtue has been at all times given to many things against the bitings of serpents, and the lignum colubrinum of one author is not the lignum colubrinum of another.

LIGNUM Nephriticum. See NEPHRITIC.

LIGNUM Vitæ, the wood of a genus of trees, called by botanists *thuya*; which see.

Lignum vitæ is much valued by turners: making extremely beautiful cups, bowls, boxes, and other curiosities.

Lignum vitæ is also a name given to guaiacum.

LIGNY, in *Geography*, a town of France, in the department of the Meuse, and chief place of a canton, in the district of Bar-le-Duc. The place contains 2815, and the canton 10,081 inhabitants, on a territory of 192½ kilometres, in 16 communes.

LIGNY-le-Château, a town of France, in the department of the Yonne, and chief place of a canton, in the district of Auxerre; 9 miles N.E. of Auxerre. The place contains 1249, and the canton 7301 inhabitants, on a territory of 182½ kilometres, in 15 communes.

LIGOR, a town of Asia, and once capital of a kingdom, now subject to Siam, situated on a river of the same name. Here the Dutch have a factory for tin, rice, and pepper. N. lat. 8° 18'. E. long. 100° 35'.

LIGON, or *Tantalum*, an island at the entrance of the gulf of Siam, triangular in its figure, and about 130 miles in circuit. N. lat. 8° 10'. E. long. 100° 50'.

LIGUA, a river of Chili, which runs into the Pacific ocean, S. lat. 32°. — Also, a town of Chili, on this river; 72 miles N.N.E. of Valparaíso.

LIGUET, a town of France, in the department of the Indre and Loire, and chief place of a canton, in the district of Loches; 9 miles S.W. of Loches. The place contains 1028, and the canton 9756 inhabitants, on a territory of 327½ kilometres, in 14 communes.

LIGUNY, a town of Samogitia; 44 miles E. of Miedika.

LIGULA, a word used by medical writers in very different senses. Some express by it the clavicle, others the glottis; others use it as the name of a measure, for things either liquid or dry, being a quarter of a cyathus, equal to a forty-eighth part of a pint with us; others finally use it for a weight, less than half an ounce by two scruples, or ten scruples.

LIGULA, in *Natural History*, a genus of the mollusca order of the class Veneres, according to the Linnæan system; the character of this genus is body linear, equal, long; the fore part obtuse, the hind part acute, with an impressed dorsal suture. There are only two species, viz. 1. the *intestinalis*, which has a clear white, and very narrow body, and which is found in the intestines of the merganser and guillemot; about a foot long, and exactly resembling a piece of tape. 2. The *abdominalis*, of which there are several varieties; the body is of a pale ash colour, and rather broad; it is found in the abdomen of the loche, gudgeon, tench, crucian, dace, bleak; cyprinus vimba, and bream. These ani-

mals are found chiefly in the mesentery, emaciating the fish they infest, and making them grow deformed: when they escape from the body they penetrate through the skin; they are sometimes solitary and sometimes gregarious, about one-twentieth of an inch thick, and from six inches to five feet long.

LIGULATE FLORETS, in *Botany*, from *ligula*, a small strap, are such as compose the radiant part of a daisy. See **FLORET**.

LIGURES, in *Ancient Geography*, a people of Gallia Cisalpina, who occupied a territory along the sea-coast, bounded on the N. by the Po, and separated from Gaul by the Alps, and the oblique winding course of the Varus. Its eastern limit, at different periods, was the Macra, and the rapid Arnus. It comprehended the greater part of the districts of Nice, Piedmont, Montferrat, Genoa, Modena, and Parma. This powerful nation was composed of many tribes, the boundaries of whose settlements cannot now be ascertained with precision. These tribes were the Vediantii, who inhabited a mountainous tract watered by the Varus, in which were Nicca or Nice, and Cemenelum, or Cimia; the Intemelii, who occupied several places along the sea-coast, viz. Intemelium, or Ventimiglia, Tropæa Anguati, or Torbia, &c.; the Ingauni, whose capital was Albingaunum, or Albenga, and they also occupied the sea-port towns of Vada Sabatia, or Vau, and Savo, now Savona; the Epanterii, who inhabited a mountainous district between the Vaugienni and Ingauni; the Vaugienni, who resided near the declivity of Mons Vesulus, mount Viso, and the sources of the Po; the Statielli, who were stationed at the bottom of the gulf of Genoa, in a hilly territory, that extended northward to the Tanarus; the cities and towns in this district, occupied by the Statielli, and other inferior tribes of the Ligures, were Genua or Genoa, Portus Delphinus, or Porto Fino, Segestria or Selti, Portus Veneris, or Porto Venere, and Luna; and the principal rivers of this district were the Macra and Boates; the inland towns in the territory of the Statielli were Aquæ Statiellæ or Aquæ, Ceba or Ceva, near the source of the Tanarus, Pollentia, Alba Pompeia, Alta or Alti, Bodincomagus or Indultra on the Po, Forum Fulvii, furnished Valentium, on the Po, Caristum, Dertona or Tortona, and Iria or Voghera. The Celates and Cerdicates inhabited an inconsiderable district between the Trebia and the Po, now called Pavese; their principal towns were Clatidium, Chiallezo, and Litubium. The Brinates occupied a hilly tract not far from the sea-coast, watered by the Boates. The chief town of the Apuani was Apua, now Pontremoli, at the foot of the Apennines, near the source of the Macra. The Ananes, or Anamani were for some time established in the territory now called Parma and Modena; the Lingones, in the northern part of Bolognese, and in Ferrara; the Baii, in the S. part of the Bolognese, at the foot of the Apennines; the Senones, in the estate of the church, along the coast of the Adriatic from Rimini to Ancona. To those tribes belonged the following towns, viz. Parma, Braxellum or Berseello, Forum Novum or Fornovo, S.W. of Parma on the Taro or Taro, Tanetum or Tanedo, between Parma and Modena, Calicaria, S. of the Po, Padinum or Buondena, N.W. of Forum Aheni, now Ferrara, Hadrianum or Ariano, between above the mouth of the Po, and Spina at the mouth of the fourth branch of the Po. The following towns were situated on Via Æmilia, between Parma and Ariminum, viz. Tanetum already mentioned, Regium Lepidi or Reggio, Mutina or Modena, Bononia now Bologna, Claterna or Claterna, New Quaderno, Forum Corneli or Imola, Faventia or Faenza,

Forum Livii or Forli, Forum Popilii or Forlimpopoli. The inland settlements were Sufemontium, Aquinum, and Ravenna.

LIGURIA, a country of ancient Italy, which had on the W. a part of the Maritime Alps, and the river Varus; on the N. the Po; on the E. a part of Gallia Cispadana, and a small portion of Etruria. In the time of Scythax, who wrote about the year 350 B.C., the Ligurians extended themselves to the Arnus. See the preceding article.

LIGURIAN REPUBLIC. See **GENOA**.

LIGURINUS, in *Ornithology*, a name used by many authors for the bird more commonly known by the name of *spinus*, and called in England the *skylark*.

LIGURIUS, in *Jewish Antiquity*, a precious stone on the high priest's breast-plate. It is called *leſchem* in Hebrew. Theophrastus and Pliny describe the ligurius to be a stone like a carbuncle, of a brightness sparkling like fire.

The ligurius was the first stone in the third row upon the high priest's pectoral, and the name of God was inscribed upon it. Ælian, De Animal. lib. iv. cap. 17. Pliny, lib. viii. cap. 38, and lib. xxxvii. cap. 3. Calm. Dict. Bibl. See **LYNCERIUS Lapis**.

LIGUSTICUM, in *Botany*, *Aquilegia* of Dioscorides, so called from Liguria, in Italy, its native country. The ancient plant evidently appears by the description of this author to have been of the umbelliferous tribe, growing in mountainous situations, and of an aromatic purgative nature. So far it agrees with the Linnæan adaptation of the name; but among so intricate a tribe, who shall say that the *Ligusticum* of Linnæus is, or is not, the very same with that of Dioscorides? Linn. Gen. 137. Schreb. 187. Wild. Sp. Pl. v. 1. 1424. Mart. Mill. Dict. v. 3. Sm. F. Brit. 309. Prodr. Fl. Græc. v. 1. 103. Ant. Flor. Kew. ed. 2. v. 2. 141. Juss. 222. Tourn. t. 171. Lamarck. Illustr. t. 198. Germ. t. 85. (Cientaria; Tourn. t. 171. Denaa; Allion. Pedem. v. 2. 34. t. 63.) - Class and order, *Pentandria Digynia*. Nat. Ord. *Umbellifera*.

Gen. Ch. *General umbel* of numerous ray; *partial* similar to it. *General involucrium* membranous, of about seven unequal leaves; *partial* of scarcely more than four, likewise membranous. *Perianth* of five teeth, scarcely discernible. *Cor.* *Universal* uniform; flowers all equally fertile; *partial* of five equal, involute, flat, undivided petals, keeled inwardly. *Stam.* Filaments five, capillary, shorter than the corolla; anthers simple. *Pist.* Germen inferior; styles two, close together; stigmas simple, obtuse. *Peric.* Fruit oblong, angular, furrowed, separable into two parts. *Seeds* two, oblong, smooth, marked with three elevated lines on the outer side, flat on the other.

Ess. Ch. Fruit oblong, with three ribs on each side. Flowers uniform. Petals involute, regular, undivided. Calyx of five teeth.

Obs. Reichard observes that some male flowers are occasionally intermixed. The fruit has not five grooves or furrows, but three elevated ribs, at each side.

1. *L. officinarum*. Common Lovage. Linn. Sp. Pl. 340. Woodv. Med. Bot. t. 102. Zorn. Ic. t. 133. Ehret. Pl. Off. 303. (Laciniatum vulgare; Ded. Penz. 311. Germ. 1028. Morif. Sect. 9. t. 3. p. 1.) Leaves repeatedly compound; leaflets wedge-shaped at their base, unequally cut in the fore-part. Umbels many together. Native of the Ligurian Alps, whence it is taken for the *L. officinarum* of Dioscorides. In medico-botanical gardens it is preserved on that account, but rarely elsewhere. The root is perennial, requiring a rich, rather moist soil. *Height* five feet high, of a light, rather glaucous, green, smooth, strongly aromatic

and

and acrid. *Leaves* bipinnate; leaflets about two or three inches long, and one broad, deeply cut. *Umbels* aggregate, stalked, their involueral leaves deflexed, whitish. *Flowers* small, yellowish, coming out in May and June.

This plant, especially the root, "whose flavour is less ungrateful (says Dr. Woodville) than the leaves," abounds with a yellowish fetid gum resin. It was thought to be useful in removing obstructions of various kinds, and even to assist delivery; but is now laid aside.

2. *L. scoticum*. Scottish Lovage. Linn. Sp. Pl. 359. Tagl. Bot. t. 127. Fl. Dan. t. 207.—Leaves twice ternate, dilated, deeply serrated.—Native of sea-shores in Sweden, Canada, Scotland; and recently discovered, as Mr. Wench informs us, at Dunsinborough castle, Northumberland. It is of much humbler growth than the first species, with twice ternate, broader and rounder leaves, shining beneath, rather serrated than cut. *Umbels* fewer, white with a reddish tinge. Mr. Lightfoot says this is eaten raw as a salad, or boiled as greens, in the isle of Skye, where it is called *Sianis* or *Sianis*. The root is reckoned a good carminative, and an infusion of the leaves in whey serves to purge calves.

3. *L. nolydium*. Nettle-leaved Lovage. Villars Dauph. v. 2. 608. t. 15. (Smyrniun nodiflorum; Allion. Pedem. v. 2. 21. t. 72. Angelica alpina, ad nodos florida; Tourn. Ind. 313.)—Leaves twice or thrice ternate, dilated, taper-pointed, strongly serrated. Umbels very numerous. Flower-stalks whorled, widely spreading.—Native of shady pine-forests on the Alps. Stem three or four feet high, foliary, with very numerous, whorled, divaricated, slender flower-stalks, and copious white umbels, whose involueral leaves are very few and narrow. Radical leaf foliary, large, smooth, twice or thrice ternate, or somewhat pinnate; the leaflets two or three inches long, ovate, taper-pointed, strongly serrated in the manner of a nettle. Villars says the root is sold at Lyons by the name of Bohemian Angelica, and has an aromatic flavour, less agreeable but more lasting than that of the true Angelica. It is distinct, as Villars well observes, from the *Angelica verticillaris* of Linnaeus, and appears never to have come under his observation.

4. *L. peloponense*. Hemlock-leaved Lovage. Linn. Syst. Veg. ed. 14. 283. (L. peloponnesiacum; Linn. Sp. Pl. 360. Jacq. Austr. 33. append. t. 15. Sefeli peloponense; Camer. Epit. 514. Matth. Valgr. v. 2. 112. Cicuta latifolia fetidissima; Ger. em. 1062 Morif. Sect. 9. t. 6. f. 5.)—Leaves repeatedly pinnate; leaflets lanceolate, decurrent, taper-pointed, cut.—Native of mountainous woods in Carinthia, Rhætia, Switzerland, and, as it should seem, in the Peloponnesus; but Dr. Sibthorp did not find it. In gardens it is conspicuous, but too much like hemlock to be cultivated for ornament. The leaves are very large, but finely cut, of a fine shining green, their segments numerous, crowded, remarkably decurrent and taper-pointed. Umbels white, one very large, with several smaller in whorls, accompanied by leaves, at the base of its stalk.

5. *L. austriacum*. Aulrian Lovage. Jacq. Austr. t. 151. Allion. Pedem. v. 2. 15. t. 43. (L. n. 11; Gmel. Sib. v. 1. 176 t. 45.)—Leaves twice pinnate; leaflets wedge-shaped, decurrent, cut. Umbels leafy.—Native of the Alps of Austria, France, Italy, &c. Much like the last, but the stem is stouter; umbels larger and more leafy; leaves not so regularly pinnate or pinnatifid, nor so exactly decurrent, neither are they by far so taper-pointed.

6. *L. cornubiense*. Cornish Lovage. Linn. Sp. Pl. 359. Sm. Fl. Brit. 310. Ic. Pin. t. 11. Engl. Bot. t. 683. (L. aquilegifolium; Willd. n. 3. L. alterum belgarum;

Lob. Ic. 786. Danae aquilegifolia; Allion. Pedem. v. 2. 34. t. 63. Smyrniun lufitanicum minus, apii foliis; Tourn. Inst. 316.)—Radical leaves twice compound, wedge-shaped, cut; stem-leaves ternate or simple, lanceolate and entire. Seeds ovate, tumid, obscurely ribbed.—Native of bulky stony places in Cornwall, Piedmont, and Portugal. Gathered by Dr. Sibthorp on mount Athos. It is perennial, and known from all the rest by its principal compound leaves being all radical, the stem bearing only a few ternate or simple ones, quite undivided. The umbels are few and solitary. Involucrium scarcely membranous. Seeds remarkably tumid, ovate, black, obscurely ribbed.—This plant, found in Cornwall in the time of Dillenius, who has figured it in his edition of Ray's Synops. t. 8, was long overlooked, and supposed to be lost, till it was recovered about 25 years ago. Specimens sent by Prof. Allion to the writer of this have proved his Danae to be the same. (See DANAEA.) Little did the late Prof. Sibthorp suspect he had found so celebrated an English plant on mount Athos, which from his herbariana proves to be the case. Willdenow perhaps learnt from the Essay on Dorsiferous Ferns, Mem. de l'Acad. de Turin, v. 5. 420, that it was a Ligusticum, but having never seen it, either as the Danae or the Cornish Lovage, he has it twice in his Sp. Pl.

7. *L. pyreneum*. Pyrenean Lovage. Willd. n. 8. Goum. Illustr. 14, but not his t. 10. f. 2, which, though cited by himself, and copied by others, is *Thapsia garganica*. (L. alpinum perenne, ferulae folio, floribus a bis; Segoe. Veron. v. 2. 41. t. 13.)—Leaves repeatedly compound; leaflets pinnatifid; segments nearly linear, awned. General involucrium slight. Seeds oblong, with membranous even ribs.—Native of the south of France about the Pyrenées; also of mount Baldus, near Verona. The leaves are large, very finely divided, light green; their segments inclining to elliptical, decurrent, obtuse, with a minute bristle. Stem leafy. Umbels rather large; the general involucrium wanting, or deciduous; when present it is sometimes of one three-cleft leaf. Flowers white, small. Fruit elliptic-oblong, with straight, pubescent, membranous ribs, and crowned with but a small slender floral receptacle. Styles reflexed.—Linnaeus confounded this with his *Selinum Carvisfolia*, but they appear to be sufficiently different.

8. *L. multifidum*. Five-leaved Lovage. (L. foliis triplicato-pinnatis, extremis lobulis breviter multifidis; Gmel. Sib. v. 1. 190 t. 46. Herb. Linn.)—Leaves thrice compound; segments linear, channelled, decurrent, pointed. Seeds ovate, with membranous, somewhat crisped, ribs.—Native of fields in the province of Nét, in Siberia. Gmelin's specimen is in the herbarium, but appears never to have been noticed in the works of Linnaeus. The root is said to have the taste and shape of Carrot; it is as thick as the middle finger at the top, long and taper downward, yellowish without, white within. Stem two cubits or more in height, hollow, branched from about a third part of its height upward, the branches a foot long, somewhat leafy. Radical leaves with their long stalks about a span long or more, finely thrice compounded, the segments uniformly narrow, acute, scarcely awned, channelled, entire, all decurrent, light green, smooth: stem leaves much less divided, and smaller. Umbels not large, white; their general involucrium of about eight lanceolate, membranous-edged, leaves, and the partial ones are similar. Fruit short and roundish, with crisped wings, and a very large floral disk or receptacle. Styles divaricated. Stigmas very obtuse.

9. *L. cardians*. Pale Lovage. Ait. Hort. Kew. ed. 1. v. 1. 348. ed. 2. v. 2. 142.—Leaves repeatedly compound;

leaflets wedge-shaped, cut, smooth. General involucre of two leaves, somewhat leafy. Ribs of the seeds membranous, smooth.—Introduced into Kew garden about the year 1780. It is said to be a hardy perennial, flowering there in July and August; but its native country is unknown.

10. *L. peregrinum*. Parsley-leaved Lovage. Linn. Sp. Pl. 360. Jacq. Hort. Vind. v. 3. p. 13. t. 18.—Leaves repeatedly compound; leaflets three-cleft, wedge-shaped, cut. Seeds ovate, obscurely ribbed. Umbels terminal.—Native of Portugal; gathered by the late M. Broussonet on the rock of Gibraltar, flowering in May. The root is biennial. The whole plant has the appearance, even the taste and smell, of common parsley, but is in every part stouter and more rigid. There can be no doubt of its close affinity to that plant; and great violence is offered to nature in referring one to *Ligusticum*, the other to *Apium*. Yet even the Bauhins distinguished them as species.

11. *L. diffusum*. Spreading Lovage. Roxburgh MSS.—Leaves twice compound; segments wedge-shaped, decurrent, three-toothed. Seeds ovate, strongly ribbed. Umbels on lateral stalks, opposite to the leaves.—Native of the East Indies; given by Dr. Roxburgh, with the above name, to lord viscount Valentia, to whom we are obliged for the specimen. Its habit is so like the last, the fruit being of the same shape, though more strongly ribbed, that it confirms the genus of that species. It differs in having smaller, less compounded, and blunter neatly toothed leaves, strongly decurrent in their segments, and umbels on solitary, simple, lateral stalks. The involucre leaves are of a sufficient number, lanceolate, long, narrow, pointed, with membranous edges. Ribs of the seeds prominent and somewhat crisped, not membranous.

12. *L. Meum*. Brittle-leaved Lovage, Spiguel, Meum, or Bald-money. Crantz. Aultr. fasc. 3. 82. Roth. Germ. v. 1. 123. v. 2. 322. (*Meum athamanticum*; Jacq. Aultr. v. 4. 2. t. 303. Sm. Fl. Brit. 308. Engl. Bot. t. 2249. *Athamanta Meum*; Linn. Sp. Pl. 353. Hudf. 116. *Ethusa Meum*; Linn. Syst. Veg. ed. 14. 287. Willd. Sp. Pl. v. 1. 1447.)—Leaflets all in numerous, deep, brittle-like segments.—Native of mountains in Italy, Spain, Germany, Switzerland and Britain, flowering in May. The propriety of referring it to this genus was hinted in Fl. Brit. and Crantz and Roth had previously so arranged it. Where so many different opinions have been started, the genus cannot be supposed very clear, but we venture to remove the plant hither. Its root is powerfully aromatic, with a flavour like melilot, of which the herb partakes; and an infusion of the plant is said to give cheese the taste of the Swiss *Chapelle-gar*. The finely divided leaves distinguish it readily. The flowers are white, with a blush occasionally. Fruit oblong, often curved, coloured; its ribs strong, not membranous, even, not crisped.

13. *L. balearicum*. Balearic Lovage. Linn. Mant. 218.—Radical leaves pinnate, rounded, serrated; the lower leaflets auricled; stem-leaves pinnate, narrow, cut. Fruit oblong.—Native of the Balearic islands, as well as of Italy and Spain. M. Broussonet gathered it at Gibraltar in May. Linnaeus had this plant in the Upsal garden, but says it did not ripen seed, so that he was doubtful of the genus. It appears to us rather to belong to *Athamanta*. The young fruit is striated rather than ribbed; the involucre leaves very slender, awl-shaped, not membranous. The leaves have somewhat of the aspect of *Pastinaca sativa* in a wild state. The umbels are wide, but slender, yellow.

14. *L. Gingidium*. New Zealand Lovage. Forst. Prod. 22. Willd. n. 12. (*Gingidium montanum*; Forst. Gen. 21.)—Leaves pinnate; leaflets ovate, crenate; oblique and

entire at the base.—Native of New Zealand. Its aspect is not unlike *Stium angustifolium*, but the umbels are axillary or terminal, and the leaflets very finely, rather sharply, crenate, all broad and ovate.

15. *L. longifolium*. Long-leaved Lovage. Willd. n. 13.—“Leaves twice ternate; the radical ones doubly compounded; leaflets linear-lanceolate, entire.”—Native of Siberia. Prof. Willdenow saw a dried specimen. We know this species by his account only. He cites the *Pseudanum majus italicum* of Morison, sect. 9. t. 15. f. 1, (at the bottom,) as seeming to agree with his plant.—The leaflets are stalked, linear, entire, tapering at each extremity, six or seven inches long, and three lines wide. General involucre wanting; partial of many fetaceous leaves.

We have, in the above view of the genus *Ligusticum*, added three species to his list, although we have reduced two of his into one.

LIGUSTICUM, or *Common Lovage*, in the *Materia Medica*. The odour of this plant is very strong, and peculiarly ungrateful; its taste is warm and aromatic. It abounds with a yellowish, gummy, resinous juice, very much resembling opoponax. Its virtues are supposed to be similar to those of angelica and mallow-wort in expelling flatulencies, exciting sweat, and opening obstructions; and it is therefore chiefly used in hysterical disorders and in uterine obstructions. A teacup-ful of the juice with Rhenish wine, or a decoction of the seeds with wine or mugwort water, was, by Forestus, said to be a secret remedy of extraordinary efficacy in slow or laborious parturition. The leaves, eaten as salad, are accounted emmenagogue. The root, less ungrateful than the leaves, is said to possess similar virtues, and may be employed in powder. Woodv. Med. Bot.

LIGUSTICUM Marmor, in *Natural History*, a name by which some authors have called the *Carrara marble*, the *marmor lunense* of the ancients. It is a fine white marble, harder than the Parian or statuary kind, and used for tables, chimnies, &c. as the other for carving. See **LUNENSE Marmor**.

LIGUSTRUM, in *Botany*, a name found in Pliny and other Latin writers, by which the oriental Cypros (*Lazofonia inermis*) seems originally to have been intended, but which is now universally received for our Privet.—Linn. Gen. 9. Schreb. 12. Willd. Sp. Pl. v. 1. 41. Mart. Moll. Dict. v. 3. Sm. Fl. Brit. 12. Ait. Hort. Kew. ed. 2. v. 1. 19. Tournef. t. 367. Juss. 106. Lamarck Illustr. t. 7. Gaertn. t. 62.—Class and order, *Diambris Monogynia*. Nat. Ord. *Sepiaria*. Linn. *Jasminae*, Juss.

Gen. Ch. Cal. Perianth inferior, of one leaf, tubular, very small; mouth four-toothed, erect, obtuse. Cor. of one petal, funnel-shaped; tube cylindrical, longer than the calyx; limb spreading, cut into four ovate segments. Stam. Filaments two, opposite, simple; anthers erect, almost as long as the corolla. Pist. Germen superior, roundish; style very short, stigma cloven, obtuse, thickish. Peric. Berry globose, smooth, single-celled. Seeds four, convex on one side, angulated on the other.

Obf. Gaertner more correctly describes *Ligustrum* as having a two-celled berry; the cells coated with a thin membrane, having two seeds in each cell.

Ess. Ch. Corolla four-cleft. Berry superior, of two cells, with two seeds in each cell.

1. *L. vulgare*. Privet. Linn. Sp. Pl. 10. Engl. Bot. t. 764. Curt. Lond. fasc. 5. t. 1.—Leaves elliptic-lanceolate, obtuse, with a little point.—Not uncommon in hedges and thickets where the soil is moist and gravelly, flowering in May and June, and ripening its berries in August.—This shrub rises to the height of five or six feet. *Br. incl.* wood-

like. *Leaves* opposite, nearly sessile, dark green, smooth, lanceolate, (now and then elliptical,) entire, pointed, not acuminate, generally remaining through the winter. *Panicles* terminal, dense. *Flowers* white, smelling disagreeably. *Berries* dark purple, or blackish, very bitter, like the foliage and bark.

Privet is remarkable for thriving amidst the smoky atmosphere of towns, being frequently planted for hedges in gardens, for which purpose it is particularly eligible, since its foliage somewhat resembles that of the myrtle, and in mild winters is almost evergreen. It was formerly known by the name of Print, or Prim-print, most probably from its neat and regular appearance when clipped and trimmed. The best mode of propagating this plant is by seed. It is eaten by the *Sphinx ligustri*, in its caterpillar state, one of our finest native insects. Curtis says that the berries are recommended in dyeing, colouring of wines, and as affording a purple colour to stain prints, though at the same time he remarks there are much better materials in common use for the same purposes.—This species is subject to variation with respect to its leaves, which are sometimes variegated, and growing three at each joint. The berries have also been found white, or rather yellow. We ought not to omit mentioning that this fruit is one of the vegetable substances which has been suspected to form a principal ingredient in the present popular gout medicine, the *eau medicinale d'Huffn.*

2. *L. japonicum*. Broad-leaved Privet. Willd. n. 2. Thunb. Japon. 17. t. 1.—Leaves ovate, acuminate. Panicle divaricated.—A native of Japan, as its specific name testifies; where it flowers in June and July, and ripens its fruit late in the autumn.—*Stem* eight or nine feet high, very much branched. *Branches* opposite, roundish, rugose, ash-coloured, erect, rather spreading. *Leaves* opposite, on footstalks, entire, with a deep furrow in their centre, green above, pale underneath, smooth, an inch broad, an inch and half long. *Footstalks* round, furrowed on the upper side. *Flowers* in terminal spreading panicles. *Berry* ovate, smooth, the size of a pea.

3. *L. lucidum*. Chinese Privet. Wax-tree. Ait. Hort. Kew n. 2.—Leaves ovate-oblong, acuminate, shining above. Panicle greatly divaricated.—A native of China, and introduced into Kew garden by the Right Honourable Sir Joseph Banks, K.B. in the year 1794. It flowers from July to September.—This *shrub* is only to be seen at the place above mentioned, where we are informed it makes a beautiful appearance, when covered with its copious white blossoms, in the open air. It is to be regretted that so desirable a plant should not be in general cultivation.

4. *L. sinense*. Narrow-leaved Privet. Loureir. Cochin. 19. Mart. Mill. Dict.—Leaves lanceolate, downy, panicles oblong, both lateral and terminal. Found near Canton in China.—This small tree, according to Loureiro, grows to the height of about eight feet. *Branches* diffuse, straight. *Leaves* opposite, lanceolate, entire, downy, dark-green. *Flowers* white, small, in oblong panicles. *Berry* very small, roundish, of a brown colour.

LIGUSTRUM, in Gardening, comprehends a plant of the hardy deciduous and evergreen shrubby kind; of which the species cultivated is the common privet (*L. vulgare*). It is a shrub, usually about six feet in height, branched, the bark of a greenish ash-colour, irregularly sprinkled with numerous prominent points; branches opposite, the young ones flexible and purplish; the leaves opposite, on very short petioles, smooth on both sides, perfectly entire, the lower ones at the bottoms of the small branches leaved: the panicle about two inches in length, close and somewhat pyra-

midal; branches and pedicels appearing villose when magnified; the corolla white, but soon changing to a reddish-brown; the flowers are sweet-scented; berry superior, fleshy, sub-globular, thinning, of so dark a purple as to seem black; it is found wild in most parts of Europe, &c. flowering in July, and the berries ripen in autumn.

Of these plants there are several varieties; as with the leaves in threes, and enlarged at the base; with silver-striped leaves; with gold-striped leaves, with white berries; and the evergreen or Italian privet, which rises with a strong stem, the branches less pliable, and grows more erect; the bark is of a lighter colour. The leaves much larger, ending in acute point, of a brighter green, and continue till they are thrust off by the young leaves in the spring: the flowers are rather larger, and are not often succeeded by berries in this climate.

Method of Culture. These different plants are capable of being increased by seeds, layers, suckers, and cuttings; but the first method affords the best plants: the seeds should be sown in autumn, in a bed of common earth an inch deep, or in drills the same depth; but as they do not always grow freely the first year, they may be buried till next autumn, in pot of sandy earth, in the ground, and then sown as above: when the plants come up they should be kept well weeded, and, when a year or two old, be planted out in nursery rows, to remain two or three years, then removed where they are wanted to remain: the layers should be laid down, from some of the pliable young branches, in the earth, in autumn or winter, when they will be rooted by the autumn following; then take them off from the stool, with their roots, and plant them in the nursery for a year or two, or till of a proper size for the purposes they are intended: the suckers which arise annually from the roots should be taken up in autumn, winter, or spring, with roots, and planted in the nursery as above; the cuttings of the young shoots, eight or ten inches long, should be planted in the autumn, in a shady border, where they will be properly rooted by the following autumn, when they may be planted out in nursery rows, to acquire proper growth, in the manner directed above. The varieties with striped leaves may be increased by budding, or marching upon the plain sort, or by laying down the branches; but they seldom shoot so full as to produce branches proper for this purpose: and being more tender, they should have a dry soil and a warm situation: in a rich soil they soon lose their variegation, and become plain. The Italian or evergreen sort, which is now generally found in the nurseries, is equally hardy with the other sorts, and thrives in almost any situation: it is increased in the same manner; but as it seldom produces berries in this climate, they must be procured from the place of its native growth.

These plants may be introduced in the shrubberies and other parts by way of variety, especially the evergreen sort.

But the chief use of the common sort is to form such hedges as are required in dividing gardens for shelter or ornament; yet the Italian or evergreen kind should be preferred; it bears clipping well, is not liable to be disfigured by insects, and having only fibrous roots, it robs the ground less than almost any other shrub; it is one of the few plants that will thrive in the smoke of large towns, though it seldom produces any flowers in the closer parts after the first year: it also grows well under the drip of trees and in shade; the *sphinx ligustri*, or privet hawk moth, and *phalena tyrin-garia*, feed on it in the caterpillar state, and *meloe vesicatorius*, *cantharides* or blister beetle, is found on it. From the pulp of the berries a rose-coloured pigment may be prepared;

pared; with which, by the addition of alum, wool and silk may be dyed of a good durable green: for which purpose they must be gathered as soon as they are ripe.

LIHONS, in *Geography*, a town of France, in the department of the Somme; 18 miles E. of Amiens. N. lat. $50^{\circ} 15'$. E. long. $2^{\circ} 31'$.

LIKA, a county and province of Dalmatia, or Austrian Croatia, bordering on the Adriatic, opposite to the island of Pago.

LIKAVA, a town and castle of Hungary; 5 miles N. of Rosenbergh.

LIKE QUANTITIES, in *Algebra*, are those which are expressed by the same letters, under the same power, or equally repeated in each quantity.

Thus $2b$ and $3b$, and $9ff$ and $3ff$, are like quantities; but $2b$ and $3bb$, and $9ff$ and $3fff$, are unlike ones, because the quantities have not every where the same dimensions, nor are the letters equally repeated.

LIKE Signs, or *Symbols*, are when both are affirmative, or both negative.

If one be affirmative, and the other negative, they are unlike signs.

Thus $+6d$ and $+5d$, have like signs; but $+9f$ and $-7f$, have unlike signs.

LIKE Figures, in *Geometry*, are such as have their angles equal, and the sides about those equal angles proportional. See SIMILAR.

LIKE Arcs, in the projection of the sphere in plano, are parts of lesser circles, containing an equal number of degrees with the corresponding arcs of greater ones.

LIKE solid Figures, are such as are contained under like planes, equal in number.

LIKENAS, in *Geography*, a town of Sweden, in the province of Warmeland; 60 miles N. N. W. of Philipstadt.

LI-KIANG-TOU, a city of China, of the first rank, in the province of Yun-nan, near the source of the river Yan-gong-kiang. This place is said to be occupied by descendants of some ancient colonies of Chinese; it has no other city under its jurisdiction, but the mountains that surround it separate it from the land of the Lamas. Its mountains are said to contain mines of gold. Amber and pine-apples are plentiful. The adjoining land is fertile, and is well watered. N. lat. $26^{\circ} 52'$. E. long. $100^{\circ} 8'$.

LILA, a town of Abyssinia, on the coast of the Red sea; 48 miles S. S. E. of Arkiko.

LILAC, in *Botany*, or rather *Lilik*, the Turkish name for the Privet, *Ligustrum vulgare*, according to Dr. Sibthorp; see Prodr. Fl. Græc. v. 1. 3. It is generally known in England as the appellation of the beautiful and popular *Syringa vulgaris*, which was introduced into our gardens, under the name of *Lilach*, or *Lillach*, in the time of queen Elizabeth; nor was this word by any means borrowed, as Dr. Johnson supposes, from the *Lilas* of the French, though they have, doubtless, one common origin. The close affinity and near resemblance between the Privet and the Lilac, leave no room for wonder at their having the same name among the Turks. The common as well as the Persian Lilac is cultivated by them, and the former at least is found wild in some countries under their dominion. Matthioli has given a fine cut of it (see *Lilac*, Matth. Vulg. v. 2. 575, 576.), from a drawing brought from Constantinople under this name; and it is curious to observe how the incorrect delineation of its fruit led him to mistake it for a plant of the Pistacia kind, and thence to suppose it a sort of *Glans Uguentaria*, or *Ben nut*.

LILÆA, in *Ancient Geography*, a town which, according to Homer, was not far from the springs of the Cephissus, in the Phocide. When the Macedonians took possession of it, Patron, one of the citizens, roused and armed the people, and caused them to evacuate it. In commemoration of this event, his fellow-citizens erected a statue to his honor in the town of Delphi. In the time of Pausanias it had a theatre, baths, and two temples, one in honour of Apollo, and another of Diana. The statues were formed of Pentelic marble.

LILBURNE, JOHN, in *Biography*, famous for his exertions in the cause of liberty during the tyrannies of Charles I. and Cromwell, was born in the year 1618, of an ancient family, in the county of Durham. At an early age he was sent, with very little education, to London, and put apprentice to Mr. Thomas Hewton, of London-stone, a wholesale clothier. He had, probably, imbibed those principles for which he was afterwards distinguished among his own relations in the country, and having a bold and intrepid mind, he was, from this period, involved in that perpetual series of contention and suffering, of which we shall proceed to give a brief account. The first display of his temper was exhibited in a complaint which he laid before the chamberlain of London, against his master for ill usage. He carried his point, and obtained redress, and ever afterwards not only lived in peace with him, but he says, in his "Legal and Fundamental Liberties, &c." that he had in Mr. Hewton "the truest friend that ever servant had of a master in the day of his trial." While he was in his apprenticeship he had much leisure time, which he spent in reading the bible, the book of Martyrs, and the works of Luther, Calvin, Beza, &c. From these he unquestionably imbibed an enthusiastic passion for encountering all dangers and sufferings in the cause of truth. In 1636 he was introduced to the acquaintance of Dr. Bastwick, at that time a prisoner in the Gate-house, whom he constantly visited, and for whom he contracted such a friendship and affection, that he could, he says, have readily laid down his life in his defence. He was soon engaged actively in the popular cause, and carried to Holland one of the doctor's anti-episcopal writings in order to get it printed. Shortly after his return he was apprehended, tried, and convicted in the star-chamber court of printing and publishing libels and seditious books. At his examinations he refused to answer the interrogatories of his judges, and in every instance he justified and maintained the rights and privileges attached to his character as an Englishman. He was sentenced on this occasion to receive 500 lashes, and then to be set in the pillory, which sentence was executed with great severity, the whipping being inflicted with knotted cords, as ordered by the bloody decree of old Sir Henry Vane. His spirit was not, however, subdued, for even on the pillory he uttered many invectives against the bishops, and threw pamphlets from his pockets among the crowd. For this conduct he was remanded to prison, and, according to his own account, endured a world of other unheard-of miseries and barbarous cruelties for three years together. Though double-ironed, and in one of the worst cells in the prison, he contrived while there to get another libel printed and published. Such was the opinion held respecting his desperate resolution, that a fine having taken place near the cell in which he was locked up, he was suspected of being the occasion of it, for the sake of obtaining his deliverance, and the other prisoners and neighbours joined in an application to have him removed, by which he obtained a more airy situation. On the meeting of the Long Parliament in 1640, he was allowed the liberties of the Fleet, an indulgence that enabled him to appear as a supplanter of

an armed mob which assembled at Westminster, and cried out for justice against the earl of Strafford, for which he was brought to the bar of the house of lords, on a charge of treason, but dismissed. In the following year the house of commons voted "That the sentence of the star-chamber against Mr. Lilburne was illegal, barbarous, bloody, and tyrannical, and that reparations ought to be given him for his imprisonment, sufferings, and losses sustained by that illegal sentence." Nevertheless, he tells us, that he never received any remuneration, though he had been put to the expence of from 1000 to 1500*l.*, and had endured seven or eight imprisonments for nothing. When an army was raised by parliament, Lilburne entered into it as a volunteer, and, at the battle of Edge-hill, he acted as a captain of infantry. He behaved with distinguished bravery at the battle of Brentford, where he was made prisoner, carried to Oxford, and arraigned on a charge of high-treason, but was saved by a declaration of parliament, threatening reprisals, and was soon after exchanged, was received with triumph by his party, and rewarded with 300*l.* as a compensation for his sufferings. Cromwell and Fairfax would willingly have employed him after they had new-modelled the army in 1645, and given him a high command; but his dislike to the Presbyterian church government would not permit him to serve the party then in power, and he laid down his sword to resume his pen, which he employed against Prynne, Lenthall, and other persons. He was in consequence committed to Newgate on a charge of seditious practices, but no bill being found against him, he was released without trial. He next was brought before the house of lords for certain reflections cast on the earl of Manchester, in a work entitled "The Just Man's Justification;" being examined upon interrogatories respecting the writing of that work, he not only refused to answer questions, but protested against their jurisdiction over him. He had stated the argument on this point, in full, in his "Legal and Fundamental Liberties of the People of England;" which he had maintained in the house, but which proved of no avail, as the house immediately made an order "that he be committed a close prisoner in Newgate, and that none have access to him but his keeper, until this court doth take farther order;" that is, said Lilburne, "when they turn honest and just, which I confidently believe will never be." So much was he now regarded by the people as a champion of liberty, that a remonstrance, signed by many thousand names, was presented to the house of commons in his behalf. This failing of effect, he continued to publish pamphlets, in which he displayed his grievances in such bold and virulent language, that he rendered the leading men of all parties his enemies. It should, however, be observed, that the leading men alluded to, were those who were either adherents to the king, or those who were attached to Cromwell; but Lilburne, perceiving that both parties were hostile to the liberties of the subject, did not scruple to oppose all their projects, which he suspected, and justly too, would lead to the establishment of a tyranny in some shape or other. He charged Cromwell with a design of usurping the sovereignty; and accused him and his relation Ireton of high treason, for which he was ordered to be tried as a libeller. At this period he had for many friends among the people, that the house of commons judged it proper to discharge him from prison, and make an order for remunerating him for his sufferings. At the time of the king's death, Lilburne was busy in plans for settling a new model of government. Finding the leaders of the army resolved to keep the power in their own hands, he opposed them with his usual intrepidity and maintained the right of the people to form a

constitution for themselves. So dangerous now did he appear to Cromwell and his council, that he was again committed to the Tower, and was brought to his trial for high treason before a special commission. On this occasion he defended himself with great firmness, never once shewing a disposition to crouch to his prosecutors or his judges: he felt that he stood on firm ground, and was determined not to bend to the circumstances of the times. The trial lasted many hours, and when the jury were about to retire to consider their verdict, the foreman asked permission of the court to take a cup of sack among them; to which the judge replied, it was impossible, they could have no manner of refreshment while impannelled in a case of high treason. One of the court was willing they should be indulged, but the chief justice said he dare not permit it. Mr. Lilburne's jury retired for three quarters of an hour, and then brought in a verdict of Not Guilty: which, says the reporter of the trial, was received with unanimous plaudits from within and without, that continued without intermission for more than half an hour. The judges, who seem to have strained hard for a verdict of guilty, were abashed and confounded. Lilburne stood silent, affected and oppressed with the gratulations of his countrymen, unable to express those sensations which he unquestionably felt for the general interest which was taken in his cause. A medal was struck of his head, with the following inscription: "John Lilburne, saved by the power of the Lord and the integrity of his jury, who are judges of law as well as of fact." The names of the jurymen were given on the reverse; names which must live so long as England is a free country. Mr. Hume, speaking on this subject, and of those who had usurped the government, and of their unwillingness to trust their cause to the decision of juries, chosen according to the ancient constitution of the country, says, "They had evidently seen in the trial of Lilburne what they could expect from juries. This man, the most turbulent, but the most upright and courageous of human kind, was tried for a transgression of the new statute of treasons; but though he was plainly guilty, he was acquitted to the great joy of the people. Never did any established power receive so strong a declaration of its usurpation and invalidity, and from no institution, besides the admirable one of juries, could be expected this magnanimous effort."

A new offence which he gave to parliament caused that body to pass a sentence of heavy fine and punishment against him, upon which he retired to Holland. Here he remained till the dissolution of the Long Parliament, when he used all his interest to obtain a passport for his return to England, and not succeeding, he ventured, in June 1653, to come back without one. He was very soon apprehended and committed to Newgate, and being brought once more to trial, he defended himself on the plea of illegality in his sentence of banishment, and was accordingly acquitted by his jury. The government, however, ordered him to be immediately sent out of the kingdom, but giving security for his future quiet behaviour, he was suffered to remain. The nature of the security here referred to has excited some doubts in the historian; but the writer of the article in the *Biographia Britannica*, makes it appear highly probable, that Lilburne's brother Robert became security in this instance for his future peaceable demeanour. Having brought together the arguments in favour of this hypothesis, the writer referred to says, "Laying then all these circumstances together, can there be any reasonable doubt who was the person that averted Cromwell's wrath against our author, and saved him from transportation, and after going through an uncommon variety of storms, tempests, and shipwrecks, settling the

whether.

weather-beaten vessel in a peaceful and still harbour; where, partly through a full conviction, that all possibility of success in any further strugglings against his adversary was cut off, and chiefly out of a religiously affectionate regard for his entirely beloved brother who stood responsible for him, he passed the remainder of his days in perfect tranquillity, equally undisturbed by, and undisturbing his triumphant competitor." John Lilburne now settled at Eltham, in Kent, joined the society of quakers, and even preached at their meetings in Woolwich, and other adjacent places, till his death in 1657, at the early age of thirty-nine. He had a wife, who possessed the same undaunted spirit with that of her husband, and was his faithful and affectionate helpmate in all his sufferings. By Anthony Wood, Lilburne is styled, "a great trouble-world in all the variety of government:" by other historians and biographers he has been represented to have been of so factious and quarrelsome a temper, that "if there were none living but him, John would be against Lilburne, and Lilburne against John." Such charges were brought against him by his contemporaries, and in his "Legal and Fundamental Liberties of the People of England," he has taken pains to rebut the calumnies of his adversaries, and to shew that his hand was never lifted up but against tyranny and tyrants: and at the close of that work he subscribes himself "An honest and true bred free Englishman, that never in his life feared a tyrant, nor loved an oppressor." If it were Lilburne's misfortune to be a trouble to the existing governments under which he lived; it must be remembered that he vindicated the cause of his country in opposition to the arbitrary measures of Charles I. and the usurpations of Oliver Cromwell; and however he might be regarded by his contemporaries, and misrepresented by party writers, posterity must look to him with respect, and should be thankful that such a man existed, in times of peculiar difficulty, when the will of the few had well nigh superseded the authority of the law, and when every thing holy and excellent in our constitution must have been for ever lost, but for the exertions of such patriots as Lilburne. His efforts in the public cause were not more zealous than they were pure and disinterested. What he conceived to be justice and the public good, he pursued against all parties with an invincible spirit, and through a life of persecution. He was, at the same time, a firm supporter of the laws of his country, which, in return, often supported him, and proved effectual barriers against arbitrary violence. Biog. Brit. Hume. Lilburne's Trial by Varax; and his Legal Fundamental Liberties of the People of England, revived, asserted, and vindicated.

LILEN, in *Geography*, a town of South America, in the province of Popayan: 15 miles S.W. of Cali.

LILESWARA, in *Hindoo Mythology*, a name of Siva, the regenerative power of the deity. (See SIVA.) It means Iswara (or the lord) who gives delight, and was assumed with manhood, in one of the numerous metamorphoses detailed in the Puranas, by this deity, who in this form became re-united to his spouse Parvati, giving delight to her in her terrestrial manifestation, under the name of Lileswari. (See PARVATI.) The Puranas abound in this description of incarnation of their male and female deities, which, thus veiled in allegory, are supposed to conceal historical and philosophical facts. (See PURANA.) Mr. Wilford, in several of the volumes of the Asiatic Researches, has pursued this allegorical maze with great industry. See more particularly vol. iii. vi. and viii. See also Hindu Pantheon, p. 389.

LILI, the name of one of the favourite remedies of Para-

celsus, the basis of which is antimony; but he has not given us the process for preparing it.

LILIA, in *Botany*, a natural order of plants, so called from *Lilium*, the Lily, which is one of them. Tournefort, who understood this order in a wider sense than more recent authors, denominated the plants which he referred to it, *lilacei*; Linnaeus, and most others, call them *liliaceae*.

The *lilia* constitute the fourteenth order in Jussieu's system, and the fourth of his third class. The essential characters of this class are "Cotyledon one. Stamens inserted into the calyx or corolla." He gives its distinctions at length as follows.

"Calyx of one leaf, tubular or deeply divided, superior or inferior, sometimes naked, more generally attended by a sheath containing one or many flowers, rarely by an involucre resembling an exterior calyx. Corolla none; for what is called corolla by Tournefort, Linnaeus, and others, in the opinion of the writer (Jussieu), is a real calyx. Stamens definite in number, rarely indefinite, inserted either into the lower or the upper part of the calyx, opposite to its segments: the filaments separate, rarely united; the anthers separate, of two cells. In a few instances the germen is feveral and superior; with as many styles and stigmas, and the same number of single-celled capsules, with one or many seeds, internally of two valves, which bear the seeds on their margins. In most cases the germen is single, superior or inferior; style single, rarely threefold, or wanting; stigma simple or divided; fruit pulpy or capsular, of three cells, with three seeds or many; sometimes two of the cells are abortive, or there is only one of the seeds perfected. The seeds of the berries are affixed to the internal angle of each cell; in the capsules, usually of three valves, they are inserted here and there upon the edges of an elevated receptacle, constituting the partition, in the middle of each valve, and separating along with it. The *coracium* is small, in a large horny albumen."

The order of *lilia* is thus defined.

Calyx inferior, coloured, in six deep segments, usually equal and regular. *Stamens* six, inserted into the bottom of each segment. *Germen* simple, superior; style one, rarely wanting; stigma in three divisions. *Capsule* superior, of three cells and three valves, with many seeds, which are ranged in a double row in each cell, and generally flat.

The *stem* is mostly herbaceous. Radical *leaves* sometimes sheathing; the rest sessile, for the most part alternate, rarely whorled. *Flowers* either naked, or furnished with a sheath, (*spatha*), or accompanied by a leaf resembling such; often drooping, the style being longer than the stamens.

The genera are eight; *Tulipa*, *Erythronium*, *Gloriosa*, (for which last Jussieu retains the name *Macdonaldia*), *Cyclaria*, *Fritillaria*, *Imperialis* (the Crown Imperial, separated from *Fritillaria*, because its nectariferous cells are round instead of oblong), *Lilium*, and *Fucox*.

Linnaeus calls his *lilia* the Patrician order, or Nobility of the vegetable kingdom, in his famous distribution of plants at the head of his *Systema Vegetabilium*. We may suppose that he had in view, in this instance, not only the analogies of the other orders, but especially the text, so often quoted, "consider the lilies of the field,—they toil not, neither do they spin." &c. in which these gorgeous plants seem more particularly indicated. The very species, which our Saviour had then perhaps before his eyes, is thought to have been the splendid *Amaryllis lutea*, with which the fields of Palestine are over-run at the end of autumn. Possibly this hint may be of use to biblical chronologists. The learned Olaus Cellius seems not to have adverted to this text, as alluding

to any particular plant. Some have, without any reason, taken for granted that the Garden Tulip was meant; but that plant is not a native of Palestine.

The order of liliaceous plants is now receiving most magnificent illustration at Paris, in a work expressly destined to that purpose, by M. Redouté, of which five volumes in folio have reached us. The figures are printed in colours, in the modern French manner. The descriptions are in French. Many plants, not properly belonging to the same family, are admitted into this publication, as a few of the *Orchideæ*, and *Scitamineæ*, which, though they interfere with its ostensible designation, certainly do not lessen its value, either as to beauty or utility.

LILIACEOUS PLANTS, in *Gardening*, all such as resemble those of the lily kind, in their flowers having six regular petals, in the form of a lily; or three, or even one petal deeply divided into six segments, assuming a lily-flower form: they have not, however, all flowers so large as that of the lily, some being considerably smaller; and as the common lily has no calyx, so several of the liliaceous flowers are also destitute of a cup; and others have cups, which are principally of that sort called a spathe. They may, therefore, be distinguished into such as have cups and such as have not.

Those with cups are all the different sorts of the common lily: the tulip, all the kinds; fritillary, and crown imperial; hyacinth; star of Bethlehem; bastard star of Bethlehem; tuberose; asphodel; squill; hemerocallis, or day-lily; anthericum, or spiderwort; aloe; yucca, or Adam's needle; gloriosa, or superb lily, &c.

Those with spathes or cups are the crocus; galanthus, or common snow-drop; leucocium, or great snow-drop; daffodil, narcissus, and jonquil; crinum, or asphodel lily; colchicum; iris, or flower-de-luce; hemanthus, or blood-flower; gladiolus, or sword-lily; Virginia spider-wort; amaryllis, including the Guernsey lily, belladonna lily, and Jacobea lily, &c.; paneraticum lily, &c.

It may be noticed, that the greater part of these liliaceous plants of both kinds are bulbous-rooted: some, however, have tuberous, and some fibrous roots; and all of them are perennial in root, but annual in the stalk or stem.

These are all ornamental garden-flowers, and most of them sufficiently hardy to grow in the open ground; though a few are proper for the green-house and stove, as they require protection. See these different genera.

LILIAGO, in *Botany*. See **ANTHERICUM**.

LILIASTRUM, the beautiful St. Bruno's lily. See **ANTHERICUM**.

LILIENDAL, in *Geography*, a town of Sweden, in the province of Nyland; 15 miles N.E. of Borga. N. lat. 60° 23' E. long. 26 3.

LILIENTHAL, a town of the duchy of Bremen, situated on the river Worp; 10 miles N.N.E. of Bremen.

LILIO-ASPHODELUS, in *Botany*. See **CRINUM** and **HEMEROCALLIS**.

LILIO-Fritillaria. See **FRTILLARIA**.

LILIO-Hyacinthus. See **SCILLA**.

LILIO-Narcissus. See **AMARYLLIS** and **PANCRATIUM**.

LILIUM appears to be a name of rather obscure origin; some deduce it from the Greek *λεῖον*, a lily, derived from *λεῖος*, smooth, not rough, also handsome, because the plant is conspicuous for the beauty of its flowers. It has moreover been called *λεῖον*, from *λεῖον*, dust, or pollen, because the flowers seem in general to be sprinkled with a powdery substance, from the abundance of their pollen. *Lilium* is adopted from Pliny and other Latin authors.

Linn. Gen. 163. Schreb. 218. Willd. Sp. Pl. v. 2. 64. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 2. 240. Tournef. t. 195. Juss. 49. Lamarek. Illust. t. 246. Gærtn. t. 83.—Class and order, *Hexandria Monogynia*. Nat. Ord. *Coronarie*, Linn. *Lilia*, Juss.

Gen. Ch. Cal. Perianth none. Cor. bell-shaped, narrower at the base; petals six, erect, lying over each other, obtusely carinated at their backs, more expanding and broader upwards; their tips obtuse, thick, reflexed. Nectary a longitudinal line, tubular, forming a channel in each petal from its base to the middle. Stam. Filaments fix, awl-shaped, erect, shorter than the corolla; anthers oblong, incumbent. Pist. Germen superior, oblong, cylindrical, marked with six furrows; style cylindrical, the length of the corolla; stigma thickish, triangular. Peric. Capsule oblong, six-furrowed, hollow, triangular, and obtuse at the top, of three cells and three valves; the valves connected by a network of fibres. Seeds numerous, incumbent in a double order, flat, outwardly semicircular.

Obs. The nectary, in some species, is bearded, in others naked. In some the petals are totally revolute, in others not so.

Eff. Ch. Corolla of six petals, bell-shaped, each petal marked with a longitudinal nectary. Capsule with valves connected by a network of fibres.

Examples of this beautiful and fragrant genus are the following. The colour of their flowers is either white, yellow, or red. The fourteenth edition of Linnæus's *Systema Vegetabilium* comprises ten species. Willdenow has sixteen, though his first, *L. cordifolium*, belongs to another genus, which Mr. Salisbury, in Tr. of Linn Soc. v. 6. 11, has proposed to call *Sauflurea*. (See **HEMEROCALLIS**.)

L. candidum. Common White Lily. Linn. Sp. Pl. 433. Sm. Prod. Fl. Græc. v. 1. 227. Curt. Mag. 278. Redouté Liliac. t. 199. Woodv. Med. Bot. t. 101. (*L. album*; Rudd. Elys. v. 2. 167.)—Leaves lanceolate, scattered, attenuated at the base. Corolla bell-shaped, smooth on the inside.—This is the *κλῆμα* of Dioscorides, and *κλῆμα* of the modern Greeks. Great doubts existed respecting the native habitat of this well known and elegant plant, till Mr. Hawkins, the friend and companion of Dr. Sibthorp, found it growing wild in that truly classical and celebrated spot, the vale of Tempe. It flowers early in the summer, and has been cultivated in our gardens from time immemorial. Root a large fleshy bulb, from which proceed many succulent fibres. Stem firm, upright, simple, usually rising to the height of about three feet. Leaves numerous, long, smooth, sessile. Flowers large, white, in a cluster at the top of the stem; the petals are of a beautiful shining white on their inside, ridged, and not quite so transparent or luminous on their outside.

Pliny and Ovid have each added their testimony to the general admiration in which this plant has been universally held. The former says, *Lilium Rosa nobilitate proximum est*. The latter has thus poetically ascribed its origin to the milk of Juno:

“Dum puer Alcides Divæ vagus ubera fuxit
Junonis, dulci pressa sapore fuit;
Ambrosiumque alto lac distillavit Olympo
In terras fumum Lilia pulchra dedit.”

Both these flowers have furnished ancient and modern poets with their share of metaphor; either singly

“—Vel mixta rubent ubi lilia multâ
Alba rosâ; tale virgo dabat ore calores.”

Æn. l. xii. 68.

The

LILIU M.

The flowers have a pleasant sweet smell, and were formerly used for medicinal purposes, particularly as an antiepileptic and anodyne. A water distilled from them was used as a cosmetic, and the "oleum liliorum" was supposed to possess anodyne and nerve powers: but the odorous matter of these flowers is very volatile, being totally dissipated in drying, and wholly carried off in evaporation by rectified spirit as well as water; and though both menstrua become impregnated with their agreeable odour by infusion or distillation, yet no essential oil could be obtained from several pounds of the flowers. Hence the Edinburgh College now directs the use only of the roots, which are mucilaginous, and are chiefly employed, boiled with milk or water, in emollient and suppurating cataplasms: it is not improbable, however, that the poultices formed of bread or farina, possess every beneficial quality ascribed to those of lily-root. Gerard recommends them internally in dropries. For this purpose, bread was made of barley meal, with the juice of the roots, and constantly used for a month or six weeks; but Dr. Lewis observes, that there are instances of similar cures by the use of common bread; and that probably, in one case as well as in the other, abstinence from liquids was the remedy. Lewis Mat. Med. Woodv. Med. Bot.

L. bulbiferum. Bulb-bearing, or Orange Lily. Linn. Sp. Pl. 433. Jacq. Austr. t. 226.—Leaves linear-lanceolate, scattered. Corolla bell-shaped, erect, glandular and rough on the inside, downy without.—A native of Italy, Austria, and North America. It flowers in June and July. *Bulb* composed of numerous thick, white, loosely imbricated scales. *Stem* upright, about a foot and half high, striated and angular, smooth, or slightly hairy. *Upper leaves* spreading horizontally, having a roundish pale-green or purplish bulb at their base. *Flowers* large and handsome, of a beautiful red or orange colour, paler on the outside, inodorous.

There are several varieties of this generally cultivated plant, of which the most common is that figured in Curt. Mag. t. 36, but the darker tinted one of Jacquin is handsomest, bearing more bulbs and fewer flowers.

L. superbum. Superb Martagon Lily. Linn. Sp. Pl. 434. Curt. Mag. t. 936. Redouté Liliac. t. 103.—Lower-leaves whorled, the rest scattered. Flowers forming a branched pyramid, reflexed. Corolla revolute. A native of North America, whence it was imported by Mr. Peter Collinson in the year 1738. It flowers from June to August. Wild specimens of this beautiful species are seldom found with above three or four flowers, but they may be brought, by careful cultivation, to bear from twelve to fifteen. *Bulb* white as ivory. *Stem* round, smooth and even, two or three feet in height, branched. *Flowers* large and handsome, one at the end of each branch, red or yellow with dark spots; their smell is disagreeable.

One of the finest figures that can be exhibited of this or any other plant, may be seen in the second number of Dr. Thornton's Illustration of the Linnæan System.

L. philadelphicum. Philadelphia n Lily. Linn. Sp. Pl. 435. Curt. Mag. t. 519. Redouté Liliac. t. 104.—Leaves whorled. Flowers erect. Corolla bell-shaped; petals unguiculate.—Sent from Philadelphia by Mr. John Bartram in the year 1757. It flowers in July. *Bulbs* small, white and scaly. *Stem* rather more than a foot high, bearing two elegant flowers at the summit. Petals red and yellow, spotted towards their base with darkish red or purple.

Among the most common species in the gardens are *L. chalcedonicum*, Curt. Mag. t. 30, which is the Scarlet Martagon so remarkable for its fine colour; and *L. Mar-*

tagon, Curt. Mag. t. 893, the Purple Martagon, or Turk's Cap Lily; both are very hardy—*L. tigrinum*, Curt. Mag. t. 1237, (*L. speciosum*; Andr. Bot. Reper. t. 586.) is however perhaps the most showy species of all. It was introduced from China, by Sir Joseph Banks, in the year 1807, and is found to bear our climate if cultivated in a border of bog earth, flowering in August.

LILIU M. Convallium. See CONVALLARIA.

LILIU M. in *Gardening*, containing plants of the bulbous-rooted flowery perennial kind, of which the species usually cultivated are the common white lily (*L. candidum*); the Cateby's lily (*L. Catebyi*); the bulb-bearing or orange lily (*L. bulbiferum*); the purple martagon lily, or Turk's cap (*L. martagon*); the pomponian lily (*L. pomponium*); the scarlet martagon lily (*L. chalcedonicum*); the great yellow martagon lily (*L. superbum*); the Canada martagon lily (*L. Canadense*); the Kamtschatka lily (*L. Kamtschatkense*); and the Philadelphian martagon lily (*L. Philadelphicum*).

In the first sort the principal varieties are, with striped flowers, or with blotched purple flowers, or with variegated striped leaves, or with yellow edged leaves, with double flowers, and with pendulous flowers. But the first of these varieties is now become common; the purple stain giving the flower a dull colour, the common white is generally preferred. The second is chiefly valued for its appearance in winter and spring; for the leaves coming out early in the autumn, spreading themselves flat on the ground, and being finely edged with a fine yellow band, make a pretty appearance during the winter and spring months, as it flowers earlier than the plain sort. The third is of little value, as the flowers never open well unless they are covered with glasses; nor have they any of the rich odour of the common sort. The fourth came originally from Constantinople; the stalk is much more slender; the leaves narrower, and fewer in number; the flowers not quite so large, and the petals more contracted at the base; they always hang downwards; the stalks are sometimes very broad and flat, appearing as if two or three were joined together: when this happens, they sustain from sixty to one hundred flowers, and sometimes more; this, however, is merely accidental, as the same root scarcely ever produces the same two years together, or in succession.

The third sort has varieties with double flowers, with variegated leaves, with smaller stems, and the bulb-bearing fiery lily, which seldom rises more than half the height of the others; the leaves are narrower; the flowers smaller, and of a brighter flame-colour, few in number, and more erect: they come out a month before those of the common sort, and the stalks put out bulbs at most of the axils, which, if taken off when the stalks decay, and planted out, they readily produce new plants.

In respect to the sub-varieties, they are the great broad-leaved, the many-flowered, the small, and the hoary bulb-bearing lily.

The fourth kind varies with white flowers, with double flowers, with red flowers and hairy stalks, and with imperial divided stalks.

The fifth species has varieties with double red flowers, with white flowers, with double white flowers, with red spotted flowers, with white spotted flowers, with yellow spotted flowers, with early scarlet flowers, and the major scarlet pompony.

And the sixth sort, according to Mr. Curtis, varies in the number of flowers, from one to six, and the colour in some is of a blood-red; also, with deep scarlet flowers, with purple flowers, and with large bunches of flowers.

Of the eighth species there is a variety with larger deeper-coloured flowers.

Method of Culture.—All these sorts are capable of being increased by planting the off-sets of the roots, and by sowing seeds to obtain new varieties.

And the roots of all the sorts afford plenty of off-sets annually, which, when greatly wanted, may be taken off every year in the autumnal season; but once in two or three years is better, according as they are wanted; the proper time for which is in summer and autumn, when the winter is past and the stalks decayed, either separating the off-sets from the mother-bulbs in the ground, or taking the whole up, and separating all the off-sets, small and great, from the main bulbs; the small off-sets being then planted in beds a foot asunder, and three inches deep, to remain a year or two, and the large bulbs set again in the borders, &c. singly. The off-sets in the nursery-beds may also, after having obtained size and strength for flowering in perfection, be planted out where they are wanted for ornament.

But the sowing of seed is chiefly practised for the martagons, to obtain new varieties, which should be done in autumn, soon after the seed is ripe, in pots or boxes of rich light sandy earth, with holes in the bottoms half an inch deep: placing the pots in a sunny sheltered situation all winter, refreshing them often at first with water, and the plants will appear in the spring: when about April, remove them to have only the morning sun all the summer, giving moderate waterings; in August, the bulbs should be transplanted into nursery-beds in flat drills, an inch deep, and three or four asunder; when, as the bulbs will be very small, scatter the earth and bulbs together into the drills, covering them with earth to the above depth: and after having grown in this situation till the August or September following, they should be transplanted into another bed, placing them eight or nine inches each way asunder, to remain to shew their first flowers; after which they may be finally planted out into the pleasure-ground.

And new varieties of the other sorts may be raised in the same way. Likewise, the bulb-bearing varieties may be increased by the little bulbs put forth from the axils of the leaves, without taking up the old bulbs, where it is necessary.

And the same method of planting and general culture answers for all the different sorts and varieties.

It may be noticed, that the most proper time for planting and transplanting them is in autumn, as has been seen, when their flowers and stalks decay, which is generally about September; the roots being then at rest for a short space of time, as well as for procuring roots to plant out. The bulbs taken up at the above season may be kept out of ground, if necessary, till October or November: the white lilies, however, do not succeed, if kept long out of the earth; and all the others succeed best, when planted again as soon as possible. The bulbs of all the sorts are sold at the nurseries.

They should be planted singly, as they soon increase by off-sets into large bunches, disposing them in a semblage in different parts of the borders, and towards the fronts of the principal shrubby clumps; placing them three or four inches deep, and at good distances from one another, intermixing the different sorts, placing some forward, and others more backward, to effect the greater show and variety. And some may likewise be planted in separate beds by themselves, twelve or fifteen inches asunder, either of different sorts together, or each in distinct beds, or in separate rows, &c.

When they have been thus planted out, few of the sorts

require any particular culture, as they are capable of enduring all weather at every season. It is, however, necessary to destroy all weeds; and, as some of them run up with pretty tall slender stalks, to support them with sticks, to preserve effectually their upright position, by which their flowers will appear to the best advantage.

But some of the more tender sorts, as the second, fourth, eighth, and tenth species, should be protected in severe winters, by applying tanner's bark, or some other similar substance over their roots. And they should all, as already stated, remain undisturbed two or three years, or longer; as by remaining, they flower stronger after the first year; and having increased by off-sets into large bunches, many stalks will rise from each bunch of roots, so as to exhibit a large cluster of flowers: it is, however, proper to take up the bulbs entirely every three or four years at least, at the decay of the stalk, to separate the increased off-sets, both for propagation and to disburthen the main roots, and give them room to take their proper growth in. As soon as they are taken up in the autumn, all the sorts should, as already observed, be replanted as soon as possible, especially the white lily sorts, as they soon begin to emit roots.

All the sorts and varieties are valuable, as plants of ornament, for the beauty of their flowers, which have a noble appearance: they are of course proper ornaments for the pleasure-ground; and when the different sorts are properly intermixed, they effect a most elegant variety, succeeding each other in blow upwards of three months. When wanted particularly for shady or close places, the common white lily, orange lily, and common martagons, are the most proper, as they thrive under trees. The orange lily also answers well in small gardens, in the midst of buildings in towns and cities. Besides planting the different sorts for the beauty of their flowers, many of the striped-leaved white lily sorts should be placed towards the fronts of the most conspicuous parts, for the beauty of their leaves in autumn, winter, and spring, which, if disposed alternately with the common white lily, whose leaves are entirely green, a most striking variety will be produced. But the tall-growing sorts are only proper for large borders and clumps, in mixture with other large kinds of the herbaceous plants.

LILIUM lapideum, a name given by the writers, in *Natural History*, to a fossil body found in some parts of Germany; which plainly shews, that it was once a species of star-fish; though the animal be not, at this time, known in its recent state. Klein, who has well considered this body, in compliance to the vulgarly received names of things, calls this the *entrochus ramosus*, or branched *entrochus*; and the resemblance some of its parts have to the common entrochi, shews plainly, that their origin has been the same, and that they are fragments either of this species or of the Magellanic star-fish. The recent fish not being found from which the *lilium lapideum* is formed is no peculiar fate, but is common to it, and to the cornua Ammonis, and many other animal remains.

LILLE, or **LISLE**, in *Geography*, a city of France, and principal place of a district, in the department of the North. Before the revolution, it was the capital of French Flanders. It is situated in a marshy but rich soil, surrounded with walls, and strongly fortified by marshal Vauban. The river Doule crosses it. It is said to contain 170 streets, 30 public places, 8000 houses, and, by the most recent statement, 54,756 inhabitants, on a territory of 77½ kilometres, in 14 communes. Before the revolution it had several religious houses. It was divided into seven parishes, and had seven gates, some of which were admired for the style of their architecture. Its manufactures are those of cloth, candlers,

bankers,

sankeens, stuffs of silk and woollen, cotton, linen of all qualities and designs, lace, ribbons, carpets, hats, stockings, paper, soap, &c. The citadel of Lille has been reckoned one of the best works of Vauban, and, except Turin, the strongest in Europe. N. lat. 50° 38'. E. long. 3° 7'.

LILLEBONNE, a town of France, in the department of the Lower Seine, and chief place of a canton, in the district of Le Havre; 16 miles E. of Havre. The place contains 601, and the canton 8685 inhabitants, on a territory of 135 kilometres, in 20 communes.

LILLERS, a town of France, in the department of the Straits of Calais, and chief place of a canton, in the district of Bethune; 6 miles W.N.W. of Bethune. The place contains 4107, and the canton 14,682 inhabitants, on a territory of 105 kilometres, in 9 communes.

LILLO, GEORGE, in *Biography*, an English writer of tragedies, born in London in the year 1693, was the son of a Dutch jeweller, by an English mother. He was brought up to his father's trade, and carried on the business with great reputation for several years. His first publication, as a literary character, was entitled "Sylvia, a ballad-opera;" but his fame is founded on his tragedies, which are representations of domestic distress in common life, exhibited for a moral purpose. By the choice and management of his stories, he succeeded in rendering them eminently pathetic, and he displayed no inconsiderable knowledge of the human heart. His tragedies are "George Barnwell," "Fatal Curiosity," and "Arden of Feversham." The first of these is, we believe, uniformly brought on the stage about Christmas in every year, and it generally brings crowded houses: the play entitled "Fatal Curiosity" is mentioned by the late James Harris, esq. in his "Philological Inquiries," as a fine example of the gradual unfolding of a scene of horror, not less perfect than that which has been so long and highly applauded in the *Œdipus* of Sophocles. Attempts have been made to revive its reputation, but without success. The "Arden of Feversham" was a posthumous piece. His other performances have long since been forgotten. He died in 1739, at the age of 47, and his works were collected and edited in 2 vols. 8vo. by Mr. Davies, with a short account of his life; to which the reader is referred for farther particulars. See also the new edition of the *Biographia Dramatica*.

LILLO, in *Geography*, a town of Spain, in New Castile; 28 miles E.S.E. of Toledo.

LILLO, a fortress of Brabant, on the E. side of the Scheidt, built by the Dutch in 1584, and ever since garrisoned. This fortress, which guards the passage to Antwerp by large vessels, was taken by the French in 1794; 9 miles N.W. of Antwerp.

LILLO, in *Ichthyology*, a name given by the Rhodians to the labrus.

LILLY, JOHN, in *Biography*, an English writer, was born about the year 1553, and educated at Magdalen college, from whence he removed to Cambridge, after he had taken his degrees in arts. On his arrival in London, he became acquainted with some of queen Elizabeth's courtiers, by whom he was caressed as a poet and a wit; and her majesty, on particular festivals, honoured his dramatic pieces with her presence. He attended the court several years, yet so little did he get by his attendance there, notwithstanding his literary reputation, that he was under the necessity of petitioning the queen for a small stipend to support him in his old age. He died about the year 1600. He was author of several plays, as *Endimion*; *Campaspe*; *Alidas*; acted before queen Elizabeth; the *Maid's Metamorphosis*, &c.

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LILLY, WILLIAM, an English astrologer, was born at Didsbury, in Leicestershire, in the year 1602, and was educated at Ashby-de-la-Zouch. The knowledge he acquired at this place was very scanty, owing to the short time that he was allowed to remain in it. In 1620 he came to London to seek his fortune, and was bound apprentice to a tradesman in St. Clement Danes. In 1624 he became book-keeper to the mauler of the Salters' company, on whose death he married his widow. Being now his own master, and possessed of some fortune, he spent much time in frequenting sermons, lectures, &c. and became attached to the Puritan party. In 1632 he studied astrology under a person named Evans, a profligate clergyman, who, on account of certain immoralities, was obliged to quit a curacy. Lilly in a few weeks obtained of his master all the requisite knowledge of his art, and in a short time excelled him in calculation. The first specimen which he gave the public of his skill in astrology, was an intimation, that the king had chosen an unlucky horoscope for his coronation in Scotland. About the year 1634 he got possession of a book in MS. entitled "Ars notoria," teaching the pretended occult sciences, from which he eagerly imbibed the doctrine of the magic circle, and the invocation of spirits, which he practised for some time, using certain prayers prescribed in it, addressed to angels whom it represents to be instructors of men in these grand *arcana*. Previously to this, few persons, who practised in the astrological art, pretended to go farther than to endeavour to trace out and recover stolen goods; but Lilly treated this part of the mystery with great contempt, and laid claim to the supernatural sight, and the gift of predicting future events, which he well knew how to turn to his own advantage. In 1636 he settled at Hertham, near Walton on Thames, in Surrey, where he remained till 1641, when he came to London, with a number of curious books, in his own art, which he had purchased in the country. In 1644, he published his "Merlinus Anglicus," an almanac, which he continued annually till his death, and several other works which were written on the subjects of his art; devoting his pen and other labours sometimes to the king's party, and sometimes to that of the parliament; raising his fortune by favourable predictions to both parties, at one time by presents, and at another by pensions. Lilly was certainly consulted respecting the king's projected escape from Carisbrook-castle, and by his advice and contrivance the monarch attempted several times to make his escape from his confinement: he procured and sent aquafortis and files to cut the iron bars of his prison windows, but advising and writing for the other party at the same time. In 1648 and 1649, he read public lectures on astrology, for the improvement, as he pretended, of young students in the art, and managed matters so well, and profitably, that in 1651 and 1652, he laid out nearly 2000*l.* in an estate at Hertham. During the siege of Colchester, he and Booker, another astrologer, who was also a licenser of mathematical books, were sent thither to encourage the soldiers, which they did, by assuring them that the town would soon be taken, which proved true in the event. In the year 1650, having predicted in his almanac that the parliamentary government would be overturned, he was summoned to answer for his conduct, but during the interval of four-and-twenty hours, which were allowed him, he got the obnoxious leaves reprinted, and carried before the committee six copies thus altered, which he said were copies of his edition, the others having been printed with a view to ruin his reputation. By this trick and falsehood he escaped with only an imprisonment of thirteen days. In 1655, he was indicted for giving an opinion in the case of

stolen goods, but the evidence being insufficient to convict him he was acquitted. In 1659, he received a handsome gold chain and medal from the king of Sweden, on account of his having mentioned that monarch in his almanac for two successive years with applause. On the restoration of Charles II. he was examined as to the person who decapitated the late king, and declared that it was cornet Joyce. On account of the part which it was known he had taken during the commonwealth, he was glad to sue out a pardon under the great seal, which was granted him. In 1665, when the plague raged in London, he removed to Herisham. After the great fire of London in 1666, he was examined as to the perpetrators of the deed, but he was unable by his art to satisfy his employers. Shortly after this he adopted for a son a person named Henry Coley, a tailor by trade, and gave him the profits of his almanac. Lilly died at Herisham in 1681, when he was about seventy-nine years of age. His works were numerous, the titles of which are given in the Biog. Brit., and also in Hutton's Mathematical Dictionary: the chief of them are "Christian Astrology;" "A Collection of Nativities;" "Observations on the Life and Death of Charles late King of England;" and "Annus Tenebrosus, or the Black Year."

LILLY of Paracelsus. See TINCTURE of Metals.

LILLY Point, in *Geography*, a place of America, in King William County, Virginia, in which is a post-office; 134 miles from Washington.

LILLOAN, a town on the E. coast of the island of Sibu; N. lat. 10 40'. E. long. 123 45'.

LILY, WILLIAM, in *Biography*, a famous schoolmaster and grammarian, was born at Odham, in Hampshire, about the year 1446. He was educated at Magdalen college, Oxford, where he took a degree, and then went on a pilgrimage to the Holy Land. On his return he pursued his studies at Rhodes, which island, after the capture of Constantinople, was the residence of several learned men, under the protection of the knights, its possessors. Here he studied, and made great progress in, the Greek language; but for farther improvement in it, and in the Latin tongue, he visited Rome, and attended the lectures of the most celebrated professors. He now returned to London, and opened a school for the learned languages, rhetoric, and poetry, which he taught on pure classical principles. In 1510, when dean Collet founded St. Paul's school, he appointed Lily the first master, a station which he occupied with singular utility for twelve years. He died of the plague in 1522, or 1523. Lily was much esteemed by his contemporaries, as well for his moral character, as for his literary abilities. He was the author of several Latin poems and tracts, but is best known for the grammar that goes under his name, and is still used in our public schools. This was not wholly of his own composition, having been assisted in it by the labours of cardinal Wolfey and dean Collet. Biog. Brit.

LILY, GEORGE, eldest son of the preceding, was born in London, and educated at Magdalen college, Oxford, after which he was made canon of St. Paul's and prebendary of Canterbury. He was the first person who published an exact map of Britain: he died in 1559, and left behind several works of merit, as "Anglorum Regum Chronices Epitome;" "Regum Anglie Genealogia;" "Catalogus five Series Pontificum et Cesarum Romanorum," &c. He left likewise a MS. life of bishop Fisher, which is deposited in the library of the Royal Society. Biog. Brit.

LILY, in *Botany*. See LILIEUM.

LILY, in *Coronula*, the common name of this well known flower plant. See AMARYLLIS and LILIEUM.

LILY *Agrostis*, in *Botany*. See CRISTUM.

LILY, *Madonna, diffidil, Guernsey, Mexican, and Japan*, names used by different authors for the amaryllis, or lilio-narcissus of Linnaeus and Tournefort.

LILY, *Diffidil*. See AMARYLLIS and PANCRACTUM.

LILY, *Day, or S. Bruno's lily*. See HEMEROCALLIS.

LILY, *Hyacinth*. See SCILLA.

LILY, *May*. See CONVALLARIA.

LILY, *Perfian*. See FRUTILLARIA.

LILY, *Saphr*. See GLORIOSA.

LILY-thorn. See CATECELLA.

LILY of the Valley. See CONVALLARIA.

LILY, *Water*. See NYMPH EA.

LILY, *The yellow water*. See MENYANTHUS.

LILYBETHUM, now *Marfala*, in *Ancient Geography*, a town of Sicily, S. of Drepanum, and near the promontory of the same name, now called Cape Becco. It was the principal fortress of the Carthaginians in Sicily, and the only city that resisted Pyrrhus when he passed into this island in the 475th year of Rome; but having been ineffectually besieged for five years, it was ceded to the Romans after the victory of Lutatius, A. U. C. 511. The ill. *Agades*, the modern Maretimo, which is opposite to Marfala, seems to be the key of that immense harbour. It is formed by rocks, little low islands, tongues of land, and sand-banks, which break the waves on all sides, and form a large semi-circle, within which the sea is always calm. It was from this fort that the formidable fleet commanded by Scipio Africanus sailed, when he set out for Africa in the second Punic war, A. U. C. 548. The beauty of this harbour induced the Saracens to call it "Marfala," signifying, in their language, the "Port of God." The number of inhabitants at Marfala is estimated at 25,000. Of this famous port and impregnable city, the traces that remain are some few ruins of the ancient walls W. of the town, built with enormous masses of stone, which no machine, before the invention of cannon, could shake. In front of these walls were deep ditches, hewn out of the rock, some parts of which still exist. Here is no longer any anchorage for shipping, and the port is only fit for the reception of small barks. It was destroyed, as it is said, by Don John of Austria, who being unable to defend it, would not leave it open to the Africans, who were only at the distance of 50 leagues. At present Marfala has only a small road, to which vessels resort in order to load with tunny, and the ashes of kali, which are made here in great abundance, and form the principal and almost sole object of the commerce of the country. The merchants of Marseilles come hither to purchase it for their soap manufactories.

LIMA, in *Geography*, an audience of Peru, erected in the year 1542, which contains within its jurisdiction one archbishopric and four bishoprics; viz. those of Truxillo, Guamanga, Cuzco, and Arequipa. The archbishopric of Lima comprehends 15 jurisdictions, viz. the circuit of Lima, Chancay, Santa, Canta, Canete, Ica, Pisco, and Nasca, which three places form one jurisdiction, Cuzacama, Guanoeco, Yauyos, Caxatambo, Sarma, Joux, Conchucos, Guaylas, and Guamalies. The diocese of Truxillo contains seven jurisdictions; that of Guamanga nine; that of Cuzco fourteen; and that of Arequipa six.

LIMA, a famous city of the audience of Lima, and capital of the vice-royalty of Peru. This city, called "Ciudad de los Reyes," or the city of the kings, from its having been founded by Don Francisco Pizarro, on the feast of the Epiphany, A. D. 1535, is situated in the spacious and delightful valley of Rimac, whence, by corruption, the name Lima is derived: Rimac being the appellation of an idol to which the native Indians used to offer sacrifices, as the

Vacas

Yncas also did, after they had extended their empire hither: and as it was supposed to return an answer to the prayers addressed to it, they called it, by way of distinction, Rimac, or he who speaks. The situation of this city is peculiarly advantageous, as it is placed in the centre of a valley, the whole of which it commands. Towards the north, at a considerable distance, is the Cordillera, or chain of the Andes; whence some hills project into the valley, the nearest of which, to the city, are those of St. Christopher, and Amancaes. A river of the same name washes the walls of Lima, over which is an elegant and spacious stone bridge, with a gate of beautiful architecture, that forms the entrance into the city, and leads to the grand square, which is large, and finely ornamented. In the middle of it is a noble fountain of bronze, and such objects, useful as well as ornamental, are not uncommon. The form of the city is triangular, the base, or longest side, extending along the banks of the river. Its length is 1920 toises, or $\frac{2}{3}$ ds of a league; and its greatest breadth from N. to S., that is, from the bridge to the angle opposite to the base, is 1080 toises, or $\frac{1}{3}$ th of a league. It is surrounded with a brick wall, flanked with 34 bastions; and in its whole circumference it has seven gates and three posterns. On the side of the river opposite to the city is a suburb, called St. Lazaro, which has lately increased; all its streets, like those of the city, are broad, parallel, and at right angles, forming squares of houses; all well-paved, supplied from the river with streams of water, arched over, so that they contribute to cleanliness and salubrity, without the least inconvenience. The number of streets is said to be 355, and of houses 3941. Towards the E. and W. parts of the city, within the walls, are many fruit and kitchen-gardens; and most of the principal houses have gardens for amusement, which are continually refreshed with water by means of canals. The whole city is divided into five parishes, and abounds with churches, convents, nunneries, colleges, and charitable foundations, which it would be tedious to recount, and it has also a famous university, founded in 1576. All the churches and chapels are large, and adorned with paintings and other decorations of great value. The viceroys of Peru usually reside at Lima, enjoying all the privileges of royalty, and, besides assisting at the courts of justice, and the councils relating both to the finances and war, give every day public audience to all sorts of persons; for which purpose, there are in the palace three very grand and spacious rooms. Under the viceroy there is a number of officers, and of tribunals for the transactions of the business of the city and audience. The Cabildo, or Ayuntamiento, that is, the municipal body of the city, enjoys particular privileges; and the revenue of the capital exceeds 36,000 dollars. Since 1786, there is also a judge of the police, assisted by an able architect, and other officers.

Upon the whole, we may observe, without reciting particulars, that Lima is not only large, magnificent, and distinguished as the capital of the kingdom, by the residence of the viceroy, and the superior courts and offices, but that it has an acknowledged superiority over the other cities in that part of the world, from the institutions that are established for the advancement of literature and the sciences. It is a place where luxury prevails to a great degree; the malls are crowded with handsome carriages; the number of coaches and calashes being computed at 1400. Nevertheless, amusements are rare, and literature is neglected. Little encouragement is given to publications of a kind most likely to interest the inhabitants of the city and its environs. The university of St. Mark is conducted on the plan of the Spanish universities. The theatre is a neat

building; but the exhibitions do not display much taste. Coffee-houses only began to be opened in 1771. Cock-fighting is a favourite amusement on Sundays and festivals; nor are bull-fights unknown.

The number of inhabitants in this city, according to the latest enumeration, amounts to 52,627; the monks and clergy being 1392; the nuns 1585; the Spaniards, in general, 17,215; with 3216 Indians, and 8560 negroes, the rest being Mestizos, and persons of other casts. The rich ecclesiastics, proprietors of entailed estates, military and civil officers, and physicians, advocates, attorneys, and artisans, may amount to 10,000; the rest being slaves or domestics. The want of occupation leads many of the females to vice; and the men are rather inclined to indolence and sloth. The population has declined since the erection of the new vice-royalty of La Plata; and it is likely still farther to decrease, notwithstanding an influx of 1400 persons of all sexes and conditions, who annually arrive as a supply; not to mention the Spanish girls, who, from the province of Piura in the north, and sea in the south, come hither to dispose of their charms either in marriage or love, those provinces being celebrated for female beauty. All the inhabitants of Lima, from the highest to the lowest, are fond of fine clothes, and they indulge their passion to great excess. The women's dress consists of a pair of shoes, a chemise, a petticoat of dimity, an open petticoat, and a jacket, which, in summer, is of linen, and in winter of fluff, to which some add a manticlette. Women of the lowest condition, whose whole stock of apparel consists merely of two chemises and a petticoat, wear bracelets, rosaries, and small gold images, about their necks and arms, to the value of fifty or sixty crowns. The females are, in general, of a middling stature, handsome, genteel, of a very fair complexion, with beautiful hair, and enchanting lustre, and dignity in their eyes. They are naturally gay, sprightly, jocular, without levity, and remarkably fond of music. The temperature of the air at Lima is agreeable; and though the difference of the four seasons is perceptible, they are all moderate, and none of them troublesome. Spring begins towards the close of the year, *i. e.* towards the end of November, or beginning of December; this is succeeded by summer, the heat of which is moderated by the south winds; at the latter end of June, or beginning of July, the winter begins, and continues till November or December, the autumn intervening. As rain is seldom or never seen at Lima, the place is equally free from tempests, and the inhabitants are totally strangers to thunder and lightning; there are, however, other inconveniences and evils to which they are obnoxious. In summer they are tormented with fleas, bugs, and mosquitoes; but the most dreadful calamity to which this country is subject is the recurrence of earthquakes, of which they have had several, which have almost ruined the city. These have occurred in 1582, 1586, 1609, 1630, 1655, 1673, 1687, 1690, 1697, 1699, 1716, 1725, 1732, 1734, 1745, and 1746; the latter being the most tremendous and destructive. As the best security against earthquakes, they build their houses mostly of wood, and the walls of wattleed osiers or canes, covered with clay, and painted. The distempers most common at Lima are malignant, intermittent, and catarrhus fevers, pleuritis, and coarctation; and these rage continually in the city. The small-pox is also known here; and when it occurs proves fatal to many. The wealth of this city is chiefly derived from the mines in the provinces to the north and south; but agriculture produces very much in the vicinity, and the fields supply food for a multitude of horses and cattle. The fertility of the soil was very early improved in ancient times by the care of the Yncas to cult

and arrange trenches in such a manner, as to conduct the water of the rivers to irrigate the soil; and when the Spaniards took possession of the country, they pursued the same plan; thus they watered the spacious fields of wheat and barley, large meadows, plantations of sugar canes, and olive trees, vineyards, and gardens of all kinds, which were rendered very productive. By the earthquake in 1687, the soil was so vitiated, that it became unfit for yielding wheat and barley; but after remaining 40 years in this state of sterility, it again so far recovered itself as in a considerable degree to become fit for grain as before. However, repeated earthquakes have been unfavourable. The fields in the neighbourhood of Lima are chiefly sown with clover, of which there is a very great consumption, as it is the common fodder for all beasts, particularly mules and horses, of which there is an inconceivable number. The bread at Lima is the best in all this part of America, both with regard to its colour and taste. The mutton and beef are also very good; and here is also plenty of poultry, pork, and fish; which latter article is supplied by the Indians of the coast, from the bay of Callao, and the villages of Cherillo and Lurín. The river of Lima, and the coasts, furnish anchovies and various sorts of shell-fish. The wines at Lima are of different sorts, white, red, and dark-red, and of each sort some are peculiarly excellent. They are imported from the coasts of Nasca, Pisco, Lucumba, and Chili, but the latter produces the best. That from Pisco has the greatest sale, and from the same place all the brandies used at Lima or exported are brought. Many of the dried fruits are brought from Chili, and by the trade carried on between the two kingdoms, Lima is supplied with all sorts of fruits known in Spain. At Lima there are no fabrics nor manufactures of any kind. Lima owes much of its magnificence and splendour to its being the capital of Peru, and the general staple of the kingdom. As it is the residence of the government and chief tribunals, it is also the common factory for commerce of every kind, and the centre of the products and manufactures of the other provinces, together with those of Europe, brought over in the galleons or register ships; and distributed from hence through the wide extent of these kingdoms. At the head of the commerce is the tribunal del Consulado, which appoint commissaries to reside in the other cities of its dependencies, extending through all Peru. The chief commerce of Lima is with Valparaiso, Concepcion, and Coquimbo, in the kingdom of Chili; the isle of Chiloe, and Arica, Ilo, and Pisco in the south; towards the north with Truxillo, Pacasmayo, and Payta, in the viceroyalty of Peru; with Guayaquil and Panama in the viceroyalty of New Granada; and with Realejo in Guatemala, and Acapulco, in Mexico. This trade is conducted by 10 ships, 14 merchant-frigates, 19 packet-boats, and a balandra, or small transport-boat; amounting in all to 354,500 quintals of tonnage, navigated by 460 seamen. After the destruction of the sea-port town of Callao by an earthquake in 1747 (see CALLAO), a new town or village was founded, at the distance of a quarter of a league, called "Ballavida." There is a fortress called "San Fernando," with a sufficient garrison to defend the bay, which in the S.W. is fenced by a barren island called "San Lorenzo." Here all the ships anchor about two leagues from Lima. The coasts of Nasca and Pisco send to Lima wine, brandy, raisins, olives, and oil; and the kingdom of Chili, wheat, flour, hard, leather, cordage, wines, dried fruits, and some gold. Every Monday, during the whole year, there is a fair at Callao, whither the traders or proprietors of commodities resort from all parts; and the goods are carried, according to the directions of the buyers,

on droves of mules kept for this purpose by the masters of the warehouses. Copper and tin in bars are brought from Coquimbo; from the mountains de Caxamarca and Chacapoyas, canvas made of cotton for sails and other stuffs of that kind, and Cordovan leather and soap are made all over Valles, the valley in which Lima is situated. From the southern provinces, as Plata, Oruro, Potosi, and Cuzco, is sent Vienna wool, for making hats and some stuffs of a peculiar firmness. From Paraguay, the herb called by that name is sent, of which there is a great consumption. The produce of the sales in the inland parts of the kingdom is sent to Lima in bars of silver, and piguas, which are porous and light masses of silver, being an amalgam of mercury and dust taken out of the mines. The silver is coined at the mint in this city. Lima has also its particular trade with the kingdoms both of North and South America. The most considerable commodity received from the former is snuff, which is brought from the Havannah to Mexico, and after having been there improved is forwarded to Lima, and conveyed from thence to the other provinces. There is no province in Peru, that does not transmit to Lima its products and manufactures; and supply itself from hence with the necessary commodities.

Lima also receives from the ports of New Spain, naphtha, tar, iron, and some indigo for dyeing. The kingdom of Terra Firma sends to Lima, leaf-tobacco and pearls, which find here a good market, as no mulatto woman is without some ornament made of them. The ladies and women of all ranks have an ancient custom of carrying in their mouths a "limpion," or cleanser, of tobacco. The intention of these is, as their name imports, to keep the teeth clean. The limpions are small rolls of tobacco, four inches long and nine lines in diameter, tied with a thread which they untwist as the limpion wastes. One end of this they put into the mouth, and after chewing it for some time, rub the teeth with it, thus keeping them always clean and white. All the timber used in building houses, refitting ships, or constructing small barks at Callao, is brought from Guayaquil, together with the cacao. S. lat. 12° 2' 31". E. long. 282° 27'. See Juan and De Ulloa's Voyage to South America, and Edalla, cited by Pinkerton's Geography. For further particulars, see PERU.

LIMA, a river of Spain, which rises in the province of Galicia, traverses the province of Entre Duero e Minho, and runs into the Atlantic, two miles below Viana. N. lat. 41° 40'. W. long. 8° 30'.—Also, a town of Arabia, in the province of Oman, near the coast; 32 miles S.E. of Julfa.

LIMACHU, a river of Chili, which runs into the Pacific ocean, S. lat. 30° 25'.

LIMACIA, in *Betany*, so named by Loureiro, from *Enax*, a snail, in allusion to the spiral furrows on its nut.—Loureir. Cochinch. 620.—Class and order, *Diacin Hexandria*. Nat. Ord. *Sarmentaceæ*, Linn. *Affragi*, Juss.

Gen. Ch. Male-flowers nearly terminal, crowded together. *Cal.* Perianth inferior, short, of six acute leaves, the alternate ones smaller, arranged altogether horizontally in a triangle. *Cor.* Petals three, triangular, almost erect, longer than the calyx; nectary equal to the calyx, divided into six, roundish, concave, fleshy segments. *Stam.* Filaments six, very short, each placed upon a segment of the nectary, and altogether forming a triangle; anthers of two cells, roundish.—Female flowers axillary, in pairs, on a separate plant. *Cal.* as in the male. *Cor.* Petals six, roundish, curved, unequal; nectary equal to the calyx, divided into six, turbinate, connivent segments. *Pist.* Germen superior, somewhat triangular; style none; stigmas three,

three, many-cleft, spreading. *Peric.* Drupa fleshy, rather kidney-shaped, containing a single seed. *Nut* spirally furrowed like a screw, the kernel simple.

Eff. Ch. Male, Calyx of six leaves. Corolla of three petals.—Female, Calyx of six leaves. Corolla of six petals. Stigmas three. Drupa kidney-shaped, spiral.

1. *L. scandens*. Cay Mè gâ of the Cochinchinese, and found in the woods of Cochinchina.—*Stem* shrubby, climbing, without tendrils, long, much branched. *Leaves* alternate, ovate-oblong, acuminate, entire, smooth. *Flowers*, both male and female, yellowish-green. *Drupa* small, smooth, acid and esculent.

LIMADASI, in *Geography*, a town of Kurdistan, on an island in the lake Van.

LIMANDA, in *Ichthyology*, a name by which some authors have called the flat-fish, which we in English call the *dab*, the *passer asper* of authors.

LIMARIA, a name given by Gaza and such other writers to the thynus or tunny-fish, called the *Spanish mackerel*.

LIMASOVA, in *Geography*, one of the smaller Philippine islands, near Leyta. N. lat. 10 1'. E. long. 125 2'.

LIMASSOL. See LIMESOL.

LIMATAMBA, a town of Peru, in the diocese of Cuzco; 25 miles W. of Cuzco.

LIMATURA *Martis Preparatoria*. See IROX.

LIMAX, in *Natural History*, the slug or snail, a genus of the Vermes Mollusca, class and order, of which the character is;—Body oblong, creeping, with a fleshy kind of shield above, and a longitudinal flat disk beneath; aperture placed on the right side, within the shield; feelers four, situated above the mouth, with an eye at the tip of each of the larger ones.

This genus, of which there are fifteen species mentioned in the *Systema Naturæ*, comprehends those animals that are commonly known by the name of slugs, or naked snails, which commit such depredations in our fields and gardens, especially in wet weather. Of the fifteen species six are common in our own country.

Species.

LEVIS. Body black, and almost without wrinkles. It is found among moss late in the autumn, and is about half an inch long. The body is glossy, with undulate transverse striae on the shield; narrower, and not so much wrinkled as the *ater*, which is the next mentioned.

ATER, or black slug; body black and furrowed with deep wrinkles. Of this species five varieties are enumerated: 1. The colour of this is deep black and pale beneath. 2. Black, with a pale greenish ridge down the back. 3. Black, beneath white; mouth yellowish. 4. Chestnut-brown, beneath white; mouth yellowish. 5. Dusky-brown, with a yellowish mouth and streak each side. This last is common in woods, meadows, fields, and gardens; and is from an inch and a half to five inches in length; it crawls very slowly, and leaves a slime upon whatever it passes over; feelers 14-ways black; the back is convex; the shield rough, with numerous dors; abdomen wrinkled.

ALBUS. This species, which is characterized by the whiteness of its body, contains four varieties. 1. The entirely white. 2. White edged with yellow. 3. White, with an orange margin and head. 4. White, with black feelers; it inhabits woods and groves, and is from a quarter to half an inch in length.

RUFUS. Body, above pale rufous, beneath white; it inhabits shady damp places, and the bottom of hills, is

about an inch and a half long; the body has neither spots nor belts; its feelers are larger than those of the *ater*.

FLAVUS. Body amber-colour spotted with white, and is found in herbage.

MAXIMUS. Body cinereous, with or without spots, there are six varieties, viz. 1. Body immaculate; shield black-blue. 2. Shield spotted with black; body with black longitudinal stripes. 3. Shield and body spotted with black. 4. Body with five whitish streaks, the lower one interrupted. 5. Body with white and cinereous wrinkles, and black spots in a double row. 6. Body edged with white; inhabits woods, gardens, and damp cellars; is from four to five inches long.

HYALINUS, takes its name from the colour of its body, which has a hyaline or glassy appearance; feelers obsolete; with a brown line reaching from the feelers to the shield; this is found in damp mossy places, and is very destructive to the young shoots of kidney-beans; belly with numerous interrupted wrinkles.

AGRESTIS. Rustic slug; body whitish, with black feelers; this species is divided into four varieties, of which the 1, is entirely whitish, immaculate; 2, whitish, with a yellowish shield; 3, whitish, with a black head; 4, whitish, with a cinereous back; 5, whitish, with scattered black specks.

The most curious of the above varieties is the second, that with a yellowish shield, or that which is characterized by Müller, in his *Hill Verm.* "*Limax albidus clypeo flavescente*," or by Gmelin, "*Limax albus, clypeo flavescente*;" it has been figured by Lillier, but more accurately, and with great care, in the fourth volume of the *Linnean Transactions*, in which it is exhibited in a state of repose, as it is seen in its progressive motion on the ground; and also as it is observed suspended from the branch of a tree, &c. both with respect to its upper and under surfaces. This variety is denominated in our own language the *springing slug*, and is commonly about three quarters of an inch long; it inhabits woods and other shady places. It was particularly noticed by Mr. Høy, and described in the first volume of the *Transactions of the Linnean Society*; at first he saw it suspended from the branch of a fir tree, and was not aware that it was a living creature. It was hanging by a single line or thread attached to its tail. This thread was in the upper part extremely fine, but near the animal it became thicker and broader, till at length it exactly corresponded with the tail. Its descent was at the rate of an inch in three minutes, a motion sufficiently slow for the minutest observations. The line by which it descended was drawn from the slimy exudation gradually secreted from the pores that covered its whole body. Apparently there was much exertion required to produce a sufficient supply of the liquid, and to force it towards the tail: it alternately drew back its head, and turned it as far as possible, first to one side, and then to the other, as if to press its sides, and thus promote secretion.

In addition to Mr. Høy's account, we shall give some farther particulars, taken from a curious paper by Dr. John Latham, in the fourth volume of the *Linnean Transactions*; a work that contains abundance of interesting matter, but which is too expensive to have a very general circulation beyond the members of the society. Speaking of the curious property belonging to the springing slug, the doctor says, "that it is a custom not unusual for this species of *limax* to pass from an height securely to the ground, by means of a thread of its own contraction seems manifest; for, on my friend's (Colonel Montague, F.L.S.) putting one of them on the projecting frame of a window, it immediately crawled forward."

forwards till it came to the projecting angle, from whence, without attempting to fix itself by its fore parts to any thing, it became visibly suspended by a thread from its tail. When it had descended two feet, the colonel took it up by the thread, and carried it to a distant room; but trying to fix it afresh, in order more accurately to observe its progress, the thread broke. He then put it on a frame about four feet from the ground; in a few minutes it was again suspended, and observing by his watch, it descended at the rate of three inches and a half in a minute." After repeated trials, the colonel, by means of glasses, was enabled to ascertain that the secretion, of which the thread was formed, was wholly from the under parts, and not from the back and sides, both of which appeared nearly dry, nor did it proceed from any orifice in the tail. This creature seems quite sensible of its abilities, for it extended itself from the bottom of the frame, with its head downwards, till the tail became suspended; and it was by means of an undulating motion of the belly that the flow of the viscous secretion was produced towards the tail, but in doing this the belly was contracted, being furnished with numerous transverse *rugæ*: at the same time the body and tentacula were fully extended, indicating no alarm whatever; the head was occasionally moved from side to side, which gave several turns to the right or left, as the centre of gravity lay; but as it was frequently turned one way as the other, the thread was not in the least twitted. The thread, on first leaving the tail, was five times as broad as it was at the eighth of an inch distant therefrom, but afterwards seemed of an equal size, and considerably smaller than the finest human hair. When a portion of this thread was placed under a microscope, it appeared contracted; it was pellucid and elastic. By another writer on this subject we are told, that by the application of the microscope, the slimy humour will be seen to come out insensibly from the glandular pores of the skin, like clear and minute points; these, by continuing a gentle pressure on the skin, will become small drops, and in the end form a considerable collection of matter. It may be also observed, that colonel Montague found several individuals of this variety that he could not induce to spin, and, as if sensible of their inability so to do, readily turned back when approaching the projected edge; while others at once let themselves down without hesitation; so that it might be known by their motion, when near the brink of the precipice, whether they were endued with the faculty or not. After these animals have spun for some time, their spinning power seems to be for a while lost, but in all those on which experiments have been made, it has been recovered again by keeping them for a few hours among wet mofs.

The fifth variety above-mentioned, or that with feathered black specks, is found in gardens, pastures, and groves, from May till the end of the year, and is the animal which has been recommended to be swallowed by consumptive persons. It is about half an inch in length, and when touched it flicks to the fingers as if dead.

CINERUS. This species is yellowish, with a cinereous belt on the shield and body; it is commonly found in groves, and is about two inches long; body without spots, and beneath it is white.

MARGINATUS. This is cinereous; shield with a dusky break on each side; the body is of a pale bluish colour; it is found on the beech; back with a white ridge, each side of which is bluish-ash; abdomen sometimes spotted black.

RAUCOLATUS. Brown, with black dots on the shield

and lines on the body; it inhabits gardens in Denmark and Germany; it is an inch and a half long.

AUREUS. Yellow, immaculate, with black feelers; it inhabits the groves of Denmark and Norway, is about half an inch long. The body beneath is white, with a black line between the feelers.

FUSCUS. This is of a reddish hue, with a blackish lateral line and back.

TENELOSUS. Greenish, with black head and feelers; is found, early in the spring, in hollows of woods filled with dry leaves; about an inch long; the shield whitish with a yellowish cast.

LANCEOLATUS. Linear-lanceolate and very sharp at each end; the margin surrounded with a membranaceous border; without tentacula or feelers; found on the coast of Cornwall.

LEMAX *Marinus*, in *Zoology*, a name given by some to the *hippatis*, or, as it is commonly termed in English, the *fish-hail*, caught in plenty at the mouths of rivers in Yorkshire, and some other places. See **CYPRINIDÆ**.

LIMAY, in *Geography*, a town of France, in the department of the Seine and Oise, and chief place of a canton, in the district of Mantes; situated on the Seine, opposite to Mantes. The place contains 1520, and the canton 9881 inhabitants, on a territory of 137½ kilometre, in 17 communes.

LIMB, in *Anatomy*, is used to denote certain parts of the human body, proceeding from the trunk. See **EXTREMITIES**.

The limbs, as well as the life of a man, are of such high value in the estimation of the law of England, that it pardons even homicide, if committed *se defendendo*, or in order to preserve them.

LIMBS, *Amputation of*, in *Surgery*. See **AMPUTATION**.

LIMBS, *Artificial*. Under this denomination, surgical writers speak of the various machines and contrivances which have been invented for supplying the place, and in some measure executing the office, of limbs which are naturally imperfect or wanting, or which have been amputated, or otherwise lost. Anciently, it was as much the duty of the surgeon to provide his patient with a wooden leg after amputation, as to cut off the member, which endangered life and could not be preserved. At present, however, the business of furnishing artificial limbs is left almost entirely to the mechanic, though it cannot be denied, that the attention of a judicious surgeon will often be well bestowed in taking care, that the pressure of such machines is contrived to fall as little as possible upon that part of a stump which is most tender, and inclined to ulcerate. The end of a thigh-stump, indeed, can ill bear the effects of pressure, and in this case, it is usual to make the thigh part of the wooden member in the form of a conical box, which is calculated to receive the stump, and at the same time not allow the end of the bone to meet with any material resistance below. The pressure partly falls on the sides of the remaining portion of the thigh, and partly on the pelvis, round which a strap proceeds from the upper part of the machine. The makers of artificial limbs in this metropolis, however, have in general brought their business to great perfection, and such patients as can afford it, may be accommodated with contrivances, which, without being heavy and cumbersome, bear a great resemblance to the natural limb. Artificial hands and arms may also be procured, which have moveable fingers, and by the ingenuity of the mechanism, may be made to perform many little useful offices in grasping and holding things.

LIMBS, *Dislocations of*. See **LUXATION**.

LIMBS,

LIMBS, Fractures of. See FRACTURE.

LIMB, Limbus, the outermost border, or graduated edge, of an astrolabe, quadrant, or the like mathematical instrument.

The word is also used for the primitive circle in any projection of the sphere in plano.

LIMB also signifies the outermost border or edge of the sun or moon, when the middle or disk is hid in an eclipse of either luminary.

Astronomers observe the lower and upper limb of the sun in order to find out its true height, which is that of the centre.

LIMB is also used, among *Botanists*, for the outer edge or border of plants, their leaves and flowers. See PETAL.

LIMBE, in *Geography*, an island in the East Indian sea, about 12 miles long, and 3 broad, near the E. coast of Celebes. N. lat. 1° 18'. E. long. 125° 10'.—Also, a small town or village in the N.W. part of the island of St. Domingo; seven leagues W. by S. of cape François.

LIMBECK. See ALEMNIC.

LIMBERG, in *Geography*, a town of the duchy of Soria; 12 miles S. of Voitsberg.

LIMBERS, in *Artillery*, a sort of advanced train joined to the carriage of a cannon, upon a march. See CARRIAGE.

LIMBER-holes, in a *Ship*, little square holes cut through her floor-timbers, serving to let the water to the well of the pump, which otherwise would lie between those timbers, where the keel rope runs.

Every floor-timber has two limber-holes cut through it; viz. one on each side of the keelson.

LIMBER-boards, are short pieces of plank, which form a part of the ceiling or lining of a ship's floor, close to the keelson, and immediately above the limber. They are occasionally removed, in order to examine and clear the limber-holes.

LIMBER-rope, is a long rope, frequently retained in the limber-holes of a ship, and communicating from one to another, in order to clear them, by pulling the rope backwards and forwards, so as to loosen the sand or dirt by which they may occasionally be choked.

LIMBUO, in *Geography*, a town on the E. coast of the island of Celebes. N. lat. 0° 18'. E. long. 123° 18'.

LIMBOBARYA, a town of Bengal; 30 miles N.W. of Nattore.

LIMBORCH, PHILIP, in *Biography*, a celebrated Dutch divine, was born at Amsterdam in the year 1633. He was educated among the Remonstrants, and had for his instructors among others, Barleius, and Gerard Vossius. Having completed the usual courses of learning, in ethics, philosophy, and the languages, he studied theology under Cancellarius, the successor of Episcopius, in the professorship of that faculty, among the Remonstrants at Amsterdam. Afterwards he went to Utrecht, where he attended the lectures of Gilbert Voetius, and other celebrated divines. In 1654 he undertook the office of minister at Haerlem, from whence he removed to Gouda. In 1660 he published an excellent collection of the correspondence of learned and celebrated men, under the title of “*Epistolæ præstantium, et eruditorum virorum*,” 8vo. In 1684 and 1704 he published new editions of it, greatly enlarged, in folio. In this collection, almost the entire history of the affairs of the Remonstrants may be traced from the time of Arminius down to the synod of Dort. In 1661 he published, in the form of a dialogue, a treatise in defence of toleration, which was exceedingly well received by the friends of liberty. In 1667 he undertook the pastoral charge of the church at Amsterdam, and in the fol-

lowing year he was appointed divinity professor. From this period he wholly devoted his studies to the enquiries connected with his new office, and acquired a high reputation by the manner in which he performed its duties. In the year 1686 he published his system of theology, under the title of “*Theologia Christiana ad Praxin Pietatis ac Promotionem Pacis Christianæ unice directâ*.” It passed very quickly through four editions. In this same year Limborch had a dispute with Orobio, a Spanish Jew, who had escaped from the prison of the Inquisition, and soon after he published the substance of it in a treatise, entitled “*Collatio Amica de Veritate Religionis Christianæ, cum erudito Indæo*.” This treatise very satisfactorily repels the objections which any consistent believer in the Old Testament can advance against the New. He obtained, in 1692, “*The Book of Sentences of the Inquisition of Tholouse from 1307 to 1313*,” which he published, and prefixed to it a history of that horrible and bloody tribunal drawn from the writings of the inquisitors themselves. The title of it is “*Historia Inquisitionis; cui subjungitur Liber sententiarum Inquisitionis Tholosanæ, ab anno 1307 ad 1313*,” 4to. This history is pronounced, by Mr. Locke, to be a work absolutely perfect in its kind; it was translated by Dr. Samuel Chandler into English, in two volumes 4to. with additions by the editor, by Anthony Collins, esq. and by the author. Dr. Chandler prefixed to his edition an introduction, concerning the rise and progress of persecution. In 1694 he converted a young woman to Christianity who had been drawn over to the Jewish religion by a person of whom she had learned the Hebrew language. In 1711 Limborch published his valuable “*Commentarius in Acta Apostolorum et in Epistolâ ad Romanos, et ad Hebræos*.” He died in the month of April 1712, in the seventy-ninth year of his age. A funeral oration was delivered on the occasion by Le Clerc, who, among other things, says, “He was, above all things, animated with the love of truth, and was indefatigable in searching for it, day and night, in the sacred scriptures and the best expositors, and whenever he found it, he adhered to it inflexibly. His piety was pure and ardent, untinged by superstition, or any notions dishonourable to the benevolence of the Deity. As a preacher he was methodical, argumentative, and solid rather than eloquent; and so invariably was he governed by candour, moderation, and prudence, that he never gave offence to any one. In his instructions from his professional chair, he was distinguished by the greatest perspicuity, and the most exact order; to which his memory, which retained whatever he had written, no doubt greatly contributed. His behaviour towards all who had the happiness of being acquainted with him, was so affable, kind, and conciliating, that they saw him with delight, and regretted, when they could no longer enjoy his conversation.” Gen. Biog. Moreri.

LIMBOURG, JOHN PHILIP DE, a physician at Spa, who obtained a great reputation by his knowledge of the properties of the mineral waters, and by the success with which he prescribed them in many obstinate diseases, which had resisted other remedies. He resided at Spa during the season of drinking the waters. He published several works, the principal of which detail the result of his observations on their properties and uses; viz. “*Dissertation sur les Eaux de Spa, soutenue à Leyde, le 7 Août, 1736*,” &c. Liege, 1746, 12mo. “*Traité des Eaux Minérales de Spa*,” Leyden, 1754, 12mo. “*Dissertations sur les Bains d'Eau simple, tant par immersion, qu'en douches et en vapeurs*,” Liege 1757, 12mo. “*Caractères des Médecins, ou l'idée de ce qu'ils font communément, et celle de ce qu'ils devroient être, &c.*” ibid. 1760, 12mo. “*Dissertation sur les Affinités chimiques*,”

chymiques, qui a remporté le prix de Physique de l'an 1753, au jugement de l'Académie de Rouen," *ibid.* 1761, 12mo. "Nouveaux Amusemens des Eaux Minérales de Spa," *ibid.* 1764, 12mo. "Dissertation sur les douleurs vagues, connues sous le nom de goutte vague, et de rhumatisme goutteux, &c.," a prize essay, *ibid.* 1763. "Recueil des Etillets des Eaux Minérales de Spa, de l'an 1764; avec des remarques sur le système de M. Lucas sur les mêmes eaux minérales," *ibid.* 1765. Eloy, Diet.

LIMBOURG, *Duchy of*, in *Geography*, before the revolution, was a province of the Netherlands, bounded on the N. by the duchy of Juliers, on the E. by the electorate of Cologne and duchy of Juliers, and on the S. and W. by the bishopric of Liege; about 30 miles long and 24 broad; but now annexed to France, and forming part of the department of the Ourte. It affords good arable ground, and abounds with a fine breed of cattle. Near the town of Limbourg are found mines of iron, lead, and calamine.

LIMBOURG, late capital of the above-mentioned duchy, now a town of France, in the department of the Ourte, and chief place of a canton, in the district of Malmédy; situated near the river Waze, in a fertile country, on a pleasant mountain. It was formerly fortified in a regular manner, and had a castle, built on a rock, and defended by towers and bastions, constructed of free-stone. When it was ceded to the house of Austria by the treaty of Baden, the fortifications were destroyed. Near it are quarries of different kinds of marble; the adjacent rocks are romantic; the air is healthy, and the inhabitants long-lived. Here is a considerable manufacture of woollen cloth; and in its environs some excellent cheese is made. The town is said to contain 1484, and the canton 12,759 inhabitants, on a territory of 152½ kilometre, in 12 communes; 20 miles E.S.E. of Liege. N. lat. 51° 36'. E. long. 23° 30'.

LIMBRA, a town of Hindoostan, in Guzerat; 35 miles W. of Gogo.

LIMBRY, a town of Hindoostan, in Guzerat; 68 miles W. of Amedabad.

LIMBURG, a lordship and principality of Germany, belonging to the circle of Franconia, but situated in Swabia; extending from S. to N. almost 20 miles, and from W. to E. 18 miles. Also, a town of Germany, seated on the Lahn; 26 miles N. of Mentz. N. lat. 50° 20'. E. long. 8° 3'. — Also, a town and citadel of Germany, called *Habs-Limborg*, which gives name to a county, a fief of the county of Mark, in which it is situated; about 15 miles long and 12 broad; 30 miles E. of Dusseldorp.

LIMBUS, or LIMB, is a term in the *Roman Theology*, used for that place where the patriarchs are supposed to have waited for the redemption of mankind, and where they imagine our Saviour continued from the time of his death to that of his resurrection.

Du-Cange says, the fathers call this place *limbus*, *eo quod sit limbus inferiorum*, as being the margin or frontier of the other world.

LIMBUS is also used by Catholics for the place destined to receive the souls of infants, who die without baptism; who have not deserved hell, as dying in innocence; nor yet are worthy of heaven, because of the imputation of original sin.

LIMBUS *Corollæ*, in *Botany*, the expanded part, or border, of a monopetalous corolla, supported by the tube, and analogous to the *lamina* of each petal in a polypetalous one. See *COROLLA* and *LAMINA*.

LIMBUYAN, in *Geography*, a town on the S. coast of the island of Malacca. N. lat. 12° S. E. long. 123° 36'.

LIML, *lime-stone*, in *Mineralogy*, *Kalkstein*, Germ.

Pierre calcaire, *Chaux carbonatée*, Fr. This species of the carbonates of lime is divided by Werner into four sub-species. 1. Compact lime-stone. 2. Foliated lime-stone. 3. Fibrous lime-stone. 4. Pea-stone.

1. *Compact lime-stone*, is subdivided into common compact lime-stone, and rock-stone.

A. *Common compact lime-stone*; *Gemeiner dichter Kalkstein*, Wern. *Pierre calcaire compacte commune*, Broch. *Chaux carbonatée compacte ou grassière*, Haüy. *Compact lime-stone*, Kirwan. *Tilt kalksten*, Swed.

Among the numerous colours of common compact lime-stone, the most frequent are the various shades of grey, such as smoke-grey, yellowish-grey, bluish-grey, reddish and greenish-grey; it is also seen greyish-white, greyish-black, flesh-red, with some deep tints of red and of yellow; several of these colours often occur in the same fragment, and mostly in such veined, clouded and other delineations which are distinguished by the epithet of *marbled*.

It is mostly found massive, sometimes in rolled, seldom in tabular pieces, frequently with, and almost entirely composed of, extraneous fossils, particularly shells.

Internally it is dull. Its texture is always more or less closely compact, sometimes wax-like; fracture small and fine splintery passing into large and flat conchoidal, and sometimes into even. Fragments indeterminate angular, more or less sharp-edged.

The varieties having a close texture are translucent on the edges.

It is semi-hard, sometimes approaching to soft; brittle; easily frangible.

Specific gravity from 2.500 to 2.700.

It is chiefly composed of lime, carbonic acid, and water; but is seldom without an admixture of some argil and oxyd of iron, and sometimes inflammable matter.

This widely extended substance occurs principally as fletz rock, but it is also found in the transition mountains.

The transition lime-stone is generally more translucent on the edges, and very often exhibits variegated colours, particularly black, smoke-grey, bluish and greenish-grey, and red. It contains, like the fletz lime-stone, petrifications, but mostly of sea animals, the prototypes of which do no longer exist. With regard to the petrification, both in the transition and fletz lime-stone, it is to be observed, that they occur pretty regularly disposed; different strata being generally furnished each with particular genera or even species.

Fletz lime-stone occurs, almost without exception, distinctly stratified; the strata are sometimes very thin, of which we have a remarkable instance in the lime-stone quarries of Sollenhofen, near Pappenheim, in Germany. These strata, which, as Mohs informs us, are very regular and perfectly horizontal, contain the well-known petrifications which are called after that place, but are much less frequently found than is generally imagined.

M. de Bonmon says, that in the Alps of Dauphiné lime-stone is found in strata of no more than one or two inches in thickness, in which case it is not unfrequently mixed with quartz. This lime-stone in tables, called *luyes* in Dauphiné, is employed for enclosing fields: a similar variety is found at Grenoble at the foot of the mountains of Saftinages.

Fletz lime-stone is frequently alternating with subordinate strata of marble, and bituminous marble slate; but in these cases the lime-stone is generally greatly predominating. The exterior of mountains composed of fletz lime-stone is of a peculiar kind; the hills formed by it are seldom conical, but blunt and massy, and intersected by deep valleys.

There are, besides the transition lime-stone, several other formations

formations of compact lime-stone. That called by Werner the *first fletz lime-stone* is the oldest; its lowest stratum is the bituminous and cupriferous marl slate, or the *kupfer-schiefer-fletz*, as it is called by German miners; it extends round a great part of the oldest mountains of Germany, such as the Hartz, the Thuringian forest, Suabia, &c. rests on the old red sand-stone, and is covered by the oldest fletz gypsum, or the variegated sand-stone. It contains, besides the above copper slate strata, several ores of copper, cobalt, heavy spar, &c. being the productions of veins.

The second formation of fletz lime-stone is called *shell-lime-stone*, on account of its abounding in petrifications, which, however, are not peculiar to it, nor do they consist in shells only, for the upper strata contain likewise petrified crabs, vermiculites, species of *asterias*, &c. (See SHELLS, *petrified*, and MARBLE.) It is widely extended, and appears most characteristic in Franconia, Suabia, and Bavaria. This formation is also remarkable, on account of the many caves which occur in it almost in all parts of the world, and many of them filled with the osseous remains of land animals. The most famous of these lime-stone caves are those of Muggendorf and Galenreuth in Bayreuth, at Eichstedt in Franconia, the Baumannshole on the Hartz, those of Dalmatia, Carniola, Hungary, Siberia, &c.

There are some other subordinate formations of fletz-lime-stone; which, however, require to be more closely examined before their characters can be determined with any thing like precision. Of such apparently distinct depositions the following are mentioned by professor Jamieson. 1. A fletz lime-stone, in Poland and Silesia, which alternates with beds of lead-glance and calamine. It was formerly called the calamine formation, and Karsten considers it as subordinate to the first fletz lime-stone, but, according to Werner, it belongs to the second. 2. A deposit of lime-stone between Dresden and Meissen, particularly near Plauen and in the vicinity of Göttingen, which was considered as a third fletz lime-stone formation, but is now classed as a mere variety of the second fletz lime-stone: it is generally sandy, or mixed with clay, and is therefore seldom used as lime, but principally employed as a building stone. It often contains petrifications, such as corallites, ammonites, &c. and sometimes lead-glance is disseminated through it. 3. A lime-stone formation at Weltrau, in Upper Lusatia, containing newer petrifications, such as *pectinites*, *mytilites*, &c.: it alternates with beds of sand-stone, and the whole rests upon alluvial sand. 4. A fletz lime-stone of a reddish-brown colour, frequently containing petrifications; it is horizontally stratified, and contains beds of a variety of alum slate. Also a conchoidal lime-stone of Greece is mentioned as probably constituting a particular formation.

The uses to which compact lime-stone is applied are various; it is principally employed as a building stone, and burnt for making lime and mortar; nor is it less important to the agricultural as a manure, to the miner as a flux for the reduction of ores, to the soap-boiler, tanner, &c.

The fine-grained and variegated varieties of compact lime-stone, many of which are highly valued, are known by the name of *marble*; a term which is more particularly applied to the fine varieties of granular lime-stone, and also given to various mixtures of lime-stone with other substances. See MARBLE.

B. *Roc-stone*; *Rozenstein*, Wern. *Oxiform lime-stone*, Kirw. *Oolite*, Broch. *Chaux carbonatée globulifère*, Haüy. *Mecouite*, *psammite*, &c.

Its colour is generally yellowish-brown, passing into various deeper shades of brown, such as hair-brown, clove-brown; it is also found smoke-grey, yellowish, and reddish-

grey. The colour of the globules is often different from that of the marly mass by which they are cemented together.

It is found massive. It is dull. Fracture fine splintery, a character not easily observable, on account of the fineness of the distinct concretions. Fragments indeterminate angular, blunt-edged.

It consists of spherical, granular, distinct concretions; each of which is generally composed of concentric lamellar concretions, which are either cemented together by a marly substance, or connected by simple contact; the grains vary in size, and are often so minute as to be scarcely distinguishable by the naked eye; the largest are nearly of the size of a pea, but these are seldom seen. In some varieties each globule is an aggregate of several smaller globules.

It is opaque, seldom translucent on the edges.

It is soft and semi-hard; brittle; easily frangible. Specific gravity 2.456 — 2.494, Kirw.

Its chemical character is little different from that of the common compact lime-stone. The variety analysed by Kirwan was composed of 90 parts of carbonate of lime and 10 of alumine, with some oxyd of iron.

This sub-species is much less frequently met with than common compact lime-stone. It occurs, however, in considerable quantities at Brunswick, in Thuringia, particularly in the district of Weimar, in that of Mansfeld, Sangerhausen, Klosterroda, &c. in Tyrol; in England, at Bath, in Derbyshire, at Purbeck.

It occurs chiefly, in more or less considerable beds, in the variegated sand-stone formation, to which it is subordinate, and between the strata of which it is generally interposed with great regularity. It contains no petrifications, nor is it metalliferous.

Roc-stone, being very subject to disintegration, is seldom employed for the purposes of building; but it is in some countries used as a manure. The more compact varieties take a tolerably good polish.

The name of roc-stone is given to this mineral on account of its close resemblance to fish-roses; indeed, the old mineralogists were so far misled by the imitative form of this substance, that they really considered it as the petrified roses of fish.

The origin of the structure of roc-stone is not easily explained; some have considered it as a conglomerate of rolled pieces of lime-stone; others have assigned the same origin to it as to the pea-stone; but Werner considers it as the result of crystallization.

2. *Foliated lime-stone*; *Blättriger kalkstein* of Werner, who divides this sub-species into two kinds: 1. Granular lime-stone. 2. Calcareous spar.

A. *Granular lime-stone*. *Körniger kalkstein*, Wern. *Foliated and granular lime-stone*, Kirw. *Pierre calcaire graine*, Broch. *Chaux carbonatée saccharoïde*, Haüy. *Granular, or saline marble*, *glauary marble*, &c.

Its chief colour is white, often snow-white, greyish, yellowish, and greenish and reddish-white; also bluish, greenish, ash and smoke-grey, and greyish-black; from greenish-white it passes into yellowish and olive-green, and from reddish-white into pearl-grey and flesh-red. Its colours are mostly uniform, but it also occurs sometimes spotted, and with striped and veined delineations; and on their ribs the masses are now and then marked with dendritic figures.

It is massive. Internally it alternates from shining to glistering and glimmering; its lustre being intermediate between pearly and vitreous.

Fracture foliated; sometimes, on account of the smallness of the particles, it appears almost compact and splintery.

tery. Fragments indeterminate angular, not particularly sharp-edged. It occurs almost always in granular distinct concretions, which are coarse, small, and fine-grained.

It is generally translucent; the dark-coloured varieties translucent only on the edges.

It is friable, sometimes hard when mixed with siliceous and argillaceous particles; brittle; easily frangible; seldom elastic.

Specific gravity 2.707 (white Carrara), Muschelbr.;—2.717 (the same), Kirwan;—2.837 (Parian), Briffon;—2.846 (white Saxon), Gellert;—2.836, (elastic var from Campo Lengo), H. de Bellevue.

Pure white granular lime-stone is infusible before the blow-pipe, and only crumbles to pieces. In the charcoal crucible, that of Carrara was found by Klaproth to be burnt to quicklime; while in the clay crucible it was fused into a compact, transparent, hard glass of a light glass-green colour. It instantly strongly effervesces with nitric acid, and when pure is soon dissolved in it without leaving a residue.

Granular lime-stone is almost always of primitive formation; it seldom occurs as transition rock, and scarcely ever as a production of secondary mountains, or if it be found in these, it is never in extensive depositions, but only in beds of not very considerable dimensions. As transition rock it principally occurs on the Hartz; it is found there of a grey colour, and of coarse granular texture.

Primitive granular lime-stone is seldom seen very distinctly stratified; it most commonly occurs in considerable beds in gneiss, mica slate, and clay slate, in which latter the transition lime-stone appears, which, however, principally belongs to compact lime-stone. It is generally simple, but also contains ingredients which are characteristic of it, such as mica, quartz, serpentine, tremolite, hornblende, clay slate, garnets, magnetic iron-stone, blende, &c. Mixed with noble serpentine it constitutes the *verde antico*.

The common varieties are employed for the same purposes as compact lime-stone; the finer are among the most splendid and desirable materials for statuary and architecture, and for the decoration of the interior of houses. See MARBLE, under which article also several of the numerous localities of this sub-species will be given.

Some varieties of granular lime-stone have manifested a considerable degree of flexibility; one of these was discovered by M. Fleuriau de Bellevue, at an elevation of 6000 feet, on Campo Lengo, on mount Gothard. The same phenomenon may be artificially produced by exposing granular lime-stone to a certain degree of heat.

2. *Calcareous spar.* *Calc spar*, Jam. *Kalkspath*, Wern. *Common spar*, Kirw. *Spath calcareus*, Broch.

Its principal colour is white, which is pure and snow-white, or greyish, yellowish, greenish, and seldom reddish; it occurs also olive, asparagus, pistachio and leek-green; greenish-grey, yellowish-grey, honey, ochre, wine, and wax-yellow; flesh red, brown-red, and very rarely rose-red; smoke-grey passing into black; very seldom pearl-grey, and light violet-blue.

It occurs massive and disseminated, also drused and stalactitical, but most commonly crystallized.

The primitive figure of the crystals is an obtuse rhomboid of 101° 32' 13", and 78° 27' 47", according to Hauy; and of 101° 32' and 78° 28', according to Bourron.

The integrant molecule, as observed by Mous. de Bourron, is a trihedral prism with inclined bases. The number of modifications derived from the primitive rhomboid is very considerable; those enumerated in the last mentioned author's very elaborate "Traité de Minéralogie," amounting to no less than fifty-nine.

The figures supposed fundamental by Werner, and from which all the others may be derived, are: the six-sided pyramid, the six-sided prism, and the three-sided prism. The following Wernerian description of the different varieties of calcareous spar is from Janssen's Mineralogy.

1. *The six-sided Prism.*—When perfect it is acute, and three alternate lateral edges are more obtuse than the others. It occurs 1. *Simple*; either erect or inverted. The inverted has three cylindrical concave, and three inwardly bent lateral planes, and on the upper extremity it is flatly acuminate by three planes, which are set on the cylindrically concave lateral planes. 2. *Double*, where the lateral planes of the one are obliquely set on the lateral planes of the other, in such a manner, that the edges of the common basis form a zigzag line, and the more obtuse lateral edges of the one are opposed to the less obtuse lateral edges of the other pyramid. Of this figure the following varieties occur: *a.* The extremity of the pyramid is sometimes more or less deeply and flatly acuminate by three somewhat convex planes, which are set on the more obtuse lateral edges? *b.* The angles of the common base are often more or less deeply truncated; when the truncating planes become so large that they touch one another, the transition into the six-sided prism is formed. *c.* The less obtuse edges are sometimes bevelled, and the extremities sometimes more or less deeply truncated. *d.* If two double six-sided pyramids penetrate one another in the direction of their axis, and one of them is turned around a sixth of its periphery, so that the less obtuse lateral edges of the one crystal come to be opposed to the less obtuse lateral edges of the other, the result is a twin crystal, representing a double six-sided pyramid having three alternate re-entering angles at the common base, where the more obtuse lateral edges are opposed to one another.

2. *Six-sided Prism.*—It occurs usually with three alternate lateral planes broader than the others, and rather acutely acuminate by six planes which are set on the lateral edges, and the acuminate planes meet alternately under more obtuse angles. *a.* The same prism a second time flatly acuminate by three planes, which are set on the alternate obtuse lateral edges of the first acuminations. *b.* When the planes of the second acuminations enlarge so much that those of the first entirely disappear, there results the six-sided prism flatly acuminate by three planes, which are set on the alternate and alternating lateral planes. *c.* The apex of the acuminations is often more or less deeply truncated, which produces the six-sided prism, in which the alternate and alternating terminal angles are truncated. *d.* When the truncation of the apex becomes so large that all traces of the acuminations disappear, the perfect six-sided prism is formed. *e.* When the prism becomes lower, it passes into the six-sided table, which is often extremely thin.

3. *Three-sided Pyramid.*—1. Simple three-sided pyramid, whose summit angle is of various degrees of magnitude, from obtuse to acute. 2. If the angles of the preceding figure are so deeply truncated, that the angles of the truncating planes meet each other, an octahedron is formed. 3. The pyramid is often double; in which case, the lateral planes of the one pyramid are set on the lateral edges of the other. It presents the following varieties: *a.* Flat double six-sided pyramid, which has sometimes convex lateral planes. *b.* If a number of these flat or obtuse pyramids are piled on one another, there is formed a six-sided prism acuminate by three planes, which are set on the alternate and alternating lateral planes. *c.* When this pyramid becomes very obtuse, it gives rise to the lens. *d.* When the summits of the pyramid become less obtuse, and approach to right angles, a figure differing but little from the cube is formed. *e.* When the

the summits become still more acute, an acute double three-sided pyramid is formed. *f.* The acute double three-sided pyramid is sometimes truncated on the lateral edges, sometimes bevelled: in the latter case, when the beveling planes become so large that the original ones are very small, or even disappear, the result is an acute double three-sided pyramid, having its planes length-wise divided; or it is a double six-sided pyramid. *g.* If the summits of the double six-sided pyramid are deeply truncated, it gives rise to the six-sided table, having its terminal planes set on alternately in opposite directions.

Though the preceding description of the different modifications of calcareous spar may possess the merit of speaking to the eye, yet it can by no means supersede the details of a strictly crystallographical investigation; we therefore subjoin a short abstract of the excellent classification given by Count Bournon, in the first volume of his "Traité de Minéralogie" lately published.

All the modifications of crystallized carbonate of lime are by this author divided into, 1, prismatic; 2, rhomboidal; and 3, pyramidal modifications.

I. Prismatic Modifications.

1. *Prism from the edges of the base of the primitive crystal*; or these edges intercepted each by a plane.—Of this, a variety with very short prism occurs in Cumberland and Derbyshire. That with long prism (Chaux carbon. *prismé*, Häüy, pl. 24. f. 10) is likewise found in Cumberland. The variety in which the lateral planes form rhombs, so that the crystal at first sight has the appearance of the garnet dodecahedron, is the scarcest of this modification.

2. *Prism from the solid angles of the base*; these angles of the primitive crystal being intercepted each by a plane.—The chaux carb. *imitable*, Häüy, (ib. fig. 12.) belongs to this modification. It is generally seen in combination with others. Sometimes two of the planes of the pyramid of the primitive rhomboid enlarge at the expence of the third; and sometimes one of them causes, in the same manner, the two others to disappear. Found in Cumberland, Dauphiné, and on the Hartz.

3. *Summit intercepted by a plane perpendicular to the axis*.—This modification seldom occurs in its simple state. The varieties in which this plane is of considerable extent is called chaux carb. *basée* by Häüy (pl. 23. fig. 8.) This is frequently seen united with the preceding modifications; in which case, if the new plane has caused the pyramid of the rhomboid entirely to disappear, the chaux carb. *prismatique*, Häüy, (pl. 24. fig. 14.) is produced, the finest groups of which are found in Cumberland and on the Hartz. Some of the lateral planes of these prisms frequently enlarge, at the expence of the adjoining planes; so that one, two, or even three, entirely disappear. The crystals of the regular hexahedral prismatic variety, from the Hartz, are not unfrequently seen with white opaque surface, and also sometimes to include similar crystals of smaller diameter, which now and then project above the terminal plane of the larger crystal. The prism of this variety is often so short as to represent a thin six-sided table. When both the second and the first modifications are united in the prism, we have the chaux carb. *péridodécédre* of Häüy (pl. 26. fig. 33.)

II. Rhomboidal Modifications.

A. *Obtuse Rhomboids*. Of these, Nos. 5, 6, 8, and 9, have not before been noticed.

4. *Obtuse rhomboid of 114° 19', and 65° 41'*.—One of the most common modifications, and more frequently than all the rest (except the preceding) combined with other

modifications. It is produced by the edges of the pyramid of the primitive rhomboid being replaced each by a plane equally inclining on those by which the edge itself is formed. In its complete state, this modification is the chaux carb. *équiaxe* of Häüy (pl. 23. fig. 2.), which is much more frequently met with than the different passages of the primitive rhomboid into this modification. The planes of this fourth modification are often longitudinally striated; and when they are arrived at their limits, the striae run parallel to the shorter diagonal of the rhomboidal planes.—This is found united principally with No. 2, representing various degrees of elongation of the chaux carb. *dodécédre*, Häüy (pl. 24. fig. 18.); found also as twin crystals in Derbyshire; with No. 1, belonging to the chaux carb. *bifurquée*, Häüy (fig. 17.), chiefly from Cumberland (rare); with Nos. 1 and 2, and with Nos. 2 and 3, chaux carb. *équivalente*, Häüy (pl. 25. fig. 28.), both from Cumberland; with Nos. 2 and 3, and part of the primitive planes, whence it is called chaux carb. *triforme* by Häüy (fig. 26.). The last mentioned variety is from the Hartz; and both the specimen of Häüy and that described by M. de Bournon are remarkable, for having part of the pyramid covered with crystalline matter, which appears to be deposited after the crystal had been completed, and is thus forming a passage into the regular hexahedral prism.

5. *Very obtuse rhomboid of 117° 56', and 62° 4'*.—It is produced by the edges of the primitive rhomboid being replaced each by a plane, which is inclined towards its summit. This has hitherto been found only in combination with other modifications, viz. Nos. 2 and 3. The crystals are all from the Hartz, where red silver ore is sometimes accompanied with them. The variety of calcareous spar, called *en rose*, generally belongs to the complete rhomboid of this modification, as also most of those known by the names of coxcomb and lenticular spar; but they are seldom determinable by the goniometer.

6. *Obtuse rhomboid of 113° and 67°*.—This is easily confounded with the preceding modification. Count Bournon has observed it only in a few instances, combined with the planes of Nos. 1, 2, and 36 (*vide infra*), in crystals from Derbyshire and Cumberland.

7. *Obtuse rhomboid of 107° 3', and 72° 57'*.—This is the result of a decrement of the laminae, similar to that which produces the preceding modification; but the planes thus formed are more inclined on the base of the primitive rhomboid. To this is to be referred Häüy's chaux carb. *quadrirhomboidale*. (Ann. du Mus. d'H. Nat. t. 1. pl. 8. fig. 4.) It is always observed in combination with other modifications, such as with those of Nos. 1, 2, and with those of the primitive crystal. They come from Dauphiné and Derbyshire. This modification has not yet been seen perfect; though nearly so, in a variety which has very narrow planes of No. 1. One variety from Derbyshire, which has the prism of No. 2 combined with this modification, and part of the planes of the primitive rhomboid, might be easily mistaken for prismatic rock crystal, of which it has sometimes the transparency. The planes marked *l* in Häüy's chaux carb. *retrograde*, (pl. 26. fig. 36.) belong to this variety.

8. *Very obtuse rhomboid of 118° 34', and 61° 26'*.—This most obtuse of all rhomboids known to occur in calcareous spar, is the result of a decrement of the crystalline laminae, at the obtuse angles of the planes that form the solid angle of the summit, which is thus replaced by three planes resting on those of the primitive rhomboid. This modification, which is scarce, does not occur in its complete state: besides with planes of the primitive rhomboid, it has been observed

in combination with those of Nos. 1, 3, 5, 8, 41, and 43; most of them from the Hartz. Perhaps some of the very flat lenticular varieties of calcareous spar may be also referable to this modification.

9. *Slightly acute rhomboid of $95^{\circ} 28'$, and $84^{\circ} 32'$.*—This very rare modification is produced by the obtuse angles on the base of the primitive rhomboid being replaced, each by a plane resting on the corresponding primitive planes. It is obvious, that the cleavage of this rhomboid must be different from that of the last mentioned modification, by being on the planes of the summit instead of the base; while that of all the preceding rhomboid, likewise at the base, takes place on the edges. This rhomboid has been observed perfectly in specimens from Siberia; and in combination with the planes of No. 36.

B. *Acute rhomboids.* Nos. 10, 12, 15, 16 and 18—21 of this division are new.

10. *Acute rhomboid of $65^{\circ} 28'$, and $114^{\circ} 32'$.*—The obtuse angles of the primitive rhomboid replaced each by a plane, as in the preceding; but being the result of a more rapid decrement of the laminae, its axis is three times longer than that of the primitive rhomboid. Occurs, though rarely, in Derbyshire, both in its complete state, and in combination with remains of the planes of No. 2.

11. *Acute rhomboid of $45^{\circ} 34'$, and $134^{\circ} 26'$.*—The result of a decrement on the fine angles as in the preceding, but the decrement producing a rhomboid much more acute. It is the *chaux carb. contracta* of Haüy (pl. 23, fig. 5.) one of the most common rhomboids that occur in calcareous spar. It occurs perfect, sometimes with traces of the primitive planes, and in combination with Nos. 1, 2, 3, 4, and 36. Is found in Derbyshire, Cumberland, at Grenoble in France, on the Hartz, &c. When the planes of the rhomboid of this modification are combined with those of the common acute pyramidal dodecahedron, No. 36, they replace the solid angles of the base of this dodecahedron in the form of an elongated trapezoid.

12. *Acute rhomboid of $40^{\circ} 26'$, and $139^{\circ} 34'$.*—Decrement on the same angles as in the preceding, to which it approaches closely. Occurs mostly in its complete state in Derbyshire, and has been seen combined in the same crystal with planes of the primitive rhomboid, and Nos. 1, 14, and 30, in which latter its planes are placed nearly in the same manner as those of the rhomboid of the preceding modification.

13. *Very acute rhomboid of 15° and 165° .*—Decrement on the same angles as in the preceding modifications, but giving origin to a much more acute rhomboid. Count Bournon has observed it in its complete state. It is seldom seen, and it is difficult to preserve it, on account of the great fragility of the fine termination of the crystals. Combinations of the planes of this and No. 4 occur in Derbyshire, on the Hartz, &c. and in Cumberland, generally on crystals of sulphate of barytes; the one called *chaux carb. contracta* (Haüy, pl. 24, fig. 20.) belongs to it. Fine groups of this modification in its complete state have been found in Westmoreland; and in the same specimen, combined with planes of the very acute pyramidal dodecahedron, No. 54.

14. *Slightly acute rhomboid of $87^{\circ} 42'$, and $92^{\circ} 18'$.*—This is the *chaux carb. cuboide* of Haüy, (pl. 23, fig. 7.) It occurs complete, with planes of the primitive rhomboid, and combined with the planes of several other modifications, such as Nos. 1—4, and No. 15, in Languedoc, at Strontian, Bath, in Derbyshire, and on the Hartz. This modification, combined with the planes of No. 3, is the *chaux carb. apophane* of Haüy, (pl. 24, fig. 15.)

15. *Acute rhomboid of $84^{\circ} 26'$, and $95^{\circ} 34'$.*—This rhom-

boid, the preceding, and all the following, are the result of a decrement of the crystalline laminae on the obtuse angles of the base; and the cleavage in all of them takes place at the summit, and on the edges of the crystal. Though combined with most of the other modifications, the planes of this rhomboid have never been mentioned by crystallographers, a circumstance probably owing to their smallness, and their having been confounded with the preceding, from which it is, however, easily distinguished, even without the assistance of the goniometer. It is sometimes found in a complete state on the Hartz, and at Strontian in groups, accompanied with stilbite and cross-stone, or harmotome, and in combination with the planes of Nos. 1—5, and also with the remains of those of the primitive rhomboid.

16. *Acute rhomboid of $81^{\circ} 19'$, and $98^{\circ} 41'$.*—This is oftener seen in its complete state than combined with the planes of other modifications, such as those of Nos. 1, 2, 3, 4, and 36; it also occurs with traces of the primitive rhomboid. Most of these were brought from the island of Ferroe, and from Scotland; the former mostly in groups, with stilbite zeolite, the others with analime zeolite. The variety in which it is combined with No. 4, came from Castagna-moro, in Italy. Their gangue, in the above places, is a wacke like rock.

17. *Acute rhomboid of $75^{\circ} 31'$, and $104^{\circ} 29'$.*—This is the *chaux carb. inverse* (Haüy, pl. 23, fig. 3.), so called because this rhomboid is, as it were, an inversion of the primitive. Next to No. 14, it is the most common of all the modifications of calcareous spar; but a circumstance worth remarking is, that it scarcely ever occurs in any other but shell lime-stone; while the reverse prevails with regard to the primitive rhomboid which, in its perfect state, is seldom found in any but the older formations of lime-stone. The name of *marialique*, given to this rhomboid by Ronré de Pisle, is derived from the just mentioned mode of occurring. The complete rhomboid frequently occurs in veins at Bath, in Derbyshire, and lining hollows of shell-marble in several other parts of Britain. In still greater perfection it is found, together with various combinations of the planes of other modification, in the shell lime-stone of Conson, near Lyons, and in those of Vougy, near Roanne, in Forez; in the former of these places it is generally seen in the interior of siliceo-calcareous geodes; in the latter in geodes of black, earthy, and compact black manganese, with manmillary internal surface. It has been observed by M. de Bournon combined with the planes of the primitive rhomboid, and with those of Nos. 1 to 4, and Nos. 11, 14, 36, 37, and 49. That with narrow remains of the primitive planes is Haüy's *chaux carb. unitaire* (pl. 23, fig. 9.); that with remains of the primitive planes, and those of the prism No. 2, has been described by the same crystallographer under the name of *chaux carb. unibinaire* (Ann. du Mus. Par. vol. i.); that with the planes of the same prism No. 2, and with those of No. 3, is Haüy's *chaux carb. persiflante* (pl. 25, fig. 29.); the same with additional remains of the planes of No. 4, is his *chaux carb. coordonnee*; and a variety in which this rhomboid is combined with narrow planes of Nos. 1, 2, 3, 4, and 37, is described by him under the name of *chaux carb. quadruplante*. (Ann. du Mus. vol. i.)

18. *Acute rhomboid of $70^{\circ} 18'$, and $109^{\circ} 42'$.*—This rhomboid is very rare, and has been seen in combination only with the planes of the prism No. 2, accompanied by planes of Nos. 23, 37, 39, and of the primitive rhomboid. These crystals occur in Cumberland and in Derbyshire.

19. *Acute rhomboid of $61^{\circ} 12'$, and $118^{\circ} 48'$.* This has been observed by count Bournon, in its complete state, in 2

mafs of brown iron-ftone; and alfo in combination with the planes of the primitive rhomboid and thofe of Nos. 1, 2, 3, 4, 11, and 36. The cryftals exhibiting this modification are, with a few exceptions, all from Derbyfhire.

20. *Acute rhomboid of 55° 34', and 124° 26'.*—This rhomboid, which has been obferved complete, and in combination remains of the primitive planes, and thofe of Nos. 2 and 3, is of ftill rarer occurrence than the preceding. Found in Derbyfhire and Cumberland. The preceding, and the next modification, fometimes exhibit, underneath their pyramidal edges, the planes of the primitive rhomboid, which, efpecially when of a different tint from the reft, are vifible through the fubftance of the cryftal; a phenomenon produced by a fuperpofition of cryftalline matter on the cryftal already formed.

21. *Acute rhomboid of 50° 54', and 129° 6'.*—This occurs both fimple and combined with other modifications, fuch as Nos. 1, 2, 3, 4, 11, 17, and 46, in the Hartz, in Cumberland, and more frequently in Derbyfhire. It is often feen to accompany ftalactitical varieties of calcareous fpar.

22. *Very acute rhomboid of 37° 31', and 142° 29'.*—This is the chaux carb. *mince* of Haüy (pl. 23, fig. 6.) It is, like the preceding, not unfrequently met with, particularly as accompanying ftalactitical lime-ftone; it occurs as often in a complete ftate as combined with the planes of other modifications, among which are Nos. 2, 3, 4, 7, 11, 14, and 46. They are principally found in Derbyfhire. The variety which is combined with the planes of No. 4, has been defcribed by Haüy under the name of *ministe* (Ann. du Mus. vol. i.); and that with the planes of No. 11, and remains of the primitive planes, is called by the fame cryftallographer chaux carb. *tri-rhomboidale* (Min. pl. 25, fig. 17.); that with additional traces of the planes of No. 7, is his chaux carb. *quadrirhomboidale* (Ann. du Mus. vol. i.). When the planes of this variety, and thofe of Nos. 11 and 3, are united at the extremities of the prismatic modification No. 2, it is Haüy's chaux carb. *annulaire* (ibid.)

23. *Extremely acute rhomboid of 12° 6', and 165° 54'.*—This is the moft acute of all the rhomboids that belong to calcareous fpar. It is feldom feen in its complete ftate, both on account of its minutenefs and its extreme fragility; M. de Bournon has, however, obferved it feveral times on the groups of calcareous fpar from the Hartz, which are confidered as filiform and indeterminable. The combination of the planes of this with thofe of No. 4, is named chaux carb. *dilatée* by Haüy (pl. 24, fig. 21.), which occurs alfo as made; that with traces of the planes of Nos. 3 and 17 is the fame cryftallographer's chaux carb. *hyperacide* (pl. 25, fig. 30.); and that with Nos. 4 and 7, his chaux carb. *retrograde* (pl. 26, fig. 36.) It occurs alfo with the planes of feveral other modifications. This rhomboid might eafily be miftaken for that of No. 13, which is, however, the refult of quite a different decrement of the cryftalline laminae, and confequently has a different cleavage.

III. Pyramidal Modifications.

The feveral pyramidal dodecahedrons belonging to this divifion, are here diftinguifhed from each other by the meafure of the folid angle of their fummit, taken on two oppofite edges of the pyramid.

A. *Pyramidal obtufe dodecahedrons*—The modifications of this fub-divifion of pyramidal dodecahedrons are, upon the whole, very rare, and almoft peculiar to England, where they occur in Derbyfhire, Cumberland, and Durham. When the planes of feveral of thofe modifications are combined in the fame cryftal, their narrownefs, together with the very obtufe

angles they form with one another, fometimes produces curvilinear planes, efpecially when they are, at the fame time, combined with the planes of feveral of the rhomboidal modifications.

The following ten modifications, with the exception of Nos. 27 and 30, have not been noticed before.

24. *Obtufe pyramidal dodecahedron of 134° 28'.*—This modification (as well as thofe that follow), is the refult of a retrogradation of the cryftalline laminae, along, and parallel with, the edges of the pyramids of the primitive rhomboid, replacing each of thefe edges by a double plane or bevelment. Three of the edges in each pyramid of this modification muft, therefore, be exactly in the fame direction with thofe of the primitive rhomboid. It has not been obferved either in its paffage from the primitive rhomboid, or as complete dodecahedron, but only in combination with very fhort planes of the prifm No. 2 (from Cumberland); with thofe of Nos. 2, 4, and 36, in a pyramidal cryftal from Derbyfhire; and with thofe of Nos. 2 and 35, from the fame county.

25. *Obtufe pyramidal dodecahedron of 126° 51'.*—This modification, if it exifted in a complete ftate, would exhibit pyramids with planes forming ifofceles triangles, and confequently with all the angles of the common bafe on the fame level. M. de Bournon has but twice obferved this modification; and in both cafes combined with the planes of feveral other modifications, among which thofe of the prifm No. 2 are the moft apparent. From Derbyfhire.

26. *Obtufe pyramidal dodecahedron of 124° 36'.*—This is of much more frequent occurrence than the preceding, from which it differs effentially, in having fcalene triangles. The complete dodecahedron comes from Derbyfhire; a combination of its planes with thofe of No. 2 from Cumberland. In Derbyfhire it is alfo found combined with the planes of feveral other modifications, of which thofe of Nos. 2 and 36 are the moft characteristic.

27. *Obtufe pyramidal dodecahedron of 121° 26'.*—The planes that terminate Haüy's chaux carb. *fonftrodive* (pl. 26, fig. 37.) belong to this modification. They are alfo feen in his chaux carb. *furcompofée* (pl. 28, fig. 50.), in which five modifications are combined. Cryftals with planes of this dodecahedron are common in Derbyfhire and Cumberland, where it occurs combined with the planes of feveral other modifications. The complete dodecahedron is fcarce.

28. *Obtufe pyramidal dodecahedron of 118° 26'.*—Has not yet been found in a complete ftate. The fimpleft combination is that with the very fhort planes of the prismatic modification No. 2. But it generally occurs together with the planes of feveral other modifications, fuch as with Nos. 4, 7, 11, 27, 28, and 36, and in fome of thefe alfo, with remains of the planes of the primitive rhomboid. Found principally in Derbyfhire and Cumberland.

29. *Obtufe pyramidal dodecahedron of 117° 25'.*—Differs but little from the preceding. It has not been found in a complete ftate, nor are its planes often feen combined with thofe of other modifications; among thofe figured by M. de Bournon are Nos. 2, 15, 17, and 36. The cryftals which exhibit its planes are moftly from Derbyfhire.

30. *Obtufe pyramidal dodecahedron of 115° 17'.*—Its planes are represented in Haüy's chaux carb. *dijointe* (pl. 26, fig. 38.), in which it is combined with thofe of Nos. 2 and 36. In the fame author's chaux carb. *binénaire* (Ann. du Mus. vol. i.) it is feen without the planes of the prismatic modif. No. 2, but with thofe of No. 30; and his chaux carb. *additive* (ibid.) is the bifonare, augmented by the planes of No. 4. Thefe cryftals are faid to come from Derbyfhire. M. de Bournon has not himfelf feen cryftals with planes of this modification.

31. *Obtuse pyramidal dodecahedron of 100° 24'.*—The planes produced by the retrogradation of the crystalline laminae replace the edges of the primitive rhomboid, but instead of being parallel to them, as in the preceding modifications, they become narrower towards the summit of the rhomboid. The two pyramids of this dodecahedron are, like those of No. 25, composed of isosceles triangles, whence the angles of their base must be upon a level. It has not yet been observed in its complete state; but in a variety composed of its planes and those of Nos. 35 and 2, M. de Bournon has seen it terminate the crystal in a very regular manner. It has also been observed in a crystal in which the planes of No. 2, and in another in which those of No. 36, are predominant. The crystals exhibiting the planes of this modification are rare, and have been found only in Derbyshire and Cumberland.

32. *Obtuse pyramidal dodecahedron of 101° 6'.*—This has not been seen complete, but in combination with the planes of several other modifications producing very complicated crystals. They occur in Derbyshire, but rarely. The cleavage of this dodecahedron takes place at the base on the less obtuse edges.

33. *Obtuse pyramidal dodecahedron of 95°.*—The crystals in which are seen the planes of this modification occur but seldom, and are still more complicated than those with the planes of the preceding modification. One of the two crystals figured by M. de Bournon comprehends 72, and the other no less than 84 planes, of which those of the prismatic modification, No. 2, are the principal ones. They were found in Derbyshire. The cleavage of this dodecahedron is the same as that of the preceding modification.

B. *Acute pyramidal dodecahedrons.*—The following modifications, with the exception of Nos. 34, 36, 39, 48^s and 50, are all new.

34. *Acute pyramidal dodecahedron of 88° 53'.*—The planes of this dodecahedron are the result of a decrement of the crystalline laminae along the edges of the base of the primitive rhomboid: the cleavage at the summit on the more obtuse edges. Their planes are marked in Haüy's figure of his chaux carb. *ligiminte* (pl. 27 fig. 49). Besides in this combination, (in which the planes of No. 36, are the most prominent,) M. de Bournon has observed them with the planes of Nos. 2, 29, and 34, in two crystals from Cumberland, where also the complete dodecahedron has been found. The planes of this modification are of rare occurrence.

35. *Acute dodecahedral pyramid of 78° 40'.*—This is far less scarce than the preceding modification, with which it agrees in the nature of the decrement and the cleavage. Has not yet been observed in its complete state. Its planes are represented in Haüy's figure of chaux carb. *ascendante* (pl. 27, fig. 44, n), in which they are combined with those of Nos. 2 and 11. Another crystal has been described by Haüy, under the name of *sousquadruple* (Ann. du Mus. vol. ii.), which differs from the latter in having also traces of No. 28. The dodecahedron has not been seen in its complete state, but our author possesses crystals in which the two pyramids are separated from one another only by short planes of the prismatic modification No. 2. Besides this, its planes have been observed in combination with some other modifications. These crystals have been found in Derbyshire.

36. *Acute pyramidal dodecahedron of 48° 22'.*—This is Haüy's chaux carb. *mitigative* (pl. 40, fig. 70), a modification which, both in its complete state, and in conjunction with the planes of other modifications, is of most frequent occurrence in the crystals of calcareous spar. We shall mention the more interesting varieties.

When, in the progress from the primitive rhomboid into this dodecahedron, only small planes of the former remain at the top of the pyramid, it is the chaux carb. *linaire* of Haüy (pl. 24, fig. 11.) The complete dodecahedron is still more common than this; it is sometimes found with planes of the pyramids unequal, and not meeting in a point; also as macle. Combined with small planes of No. 2, it is Haüy's chaux carb. *bifalterne* (pl. 25, fig. 23); which likewise occurs as macle. When the planes of the prismatic variety are more considerable than in the just-mentioned variety, and, consequently, hexagonal, it is the chaux carb. *prism* of Haüy (pl. 25, fig. 24); this is very common. If, in addition to the latter, small planes of No. 4, are seen, it is the chaux carb. *analogique prism* of Haüy (pl. 26, fig. 35); from which the chaux carb. *analogique disjointe* (Haüy, pl. 26, fig. 38.) only differs in the magnitude of the planes of Nos. 4 and 36. The combination of Nos. 2, 4, and 36, is also sometimes seen in the shape of that beautiful macle called "heart-shaped calcareous spar," and explained and figured by M. de Bournon. The prism of No. 2, having planes of this 36th modification, together with remains of the primitive planes at the summits of the pyramid, is Haüy's chaux carb. *linaire* (pl. 25, fig. 26.) In combination with the prism of No. 1, and with Nos. 1 and 37, this dodecahedron is seldom found; in the latter the line which separates the pyramidal planes from the prism is sometimes imperceptible, so that the crystal appears composed of curvilinear planes.

A variety, remarkable on account of its simplicity, is the chaux carb. *analogique* (Haüy pl. 26, fig. 34.); it is likewise composed of the planes of this modification, and those of Nos. 2 and 4, forming altogether a crystal of 24 trapezoidal planes, not unlike those of the leucite, except that in the former the planes are of three different dimensions.

This modification is also often seen in combination with the planes of No. 11; the variety in which these latter have much increased in size at the expense of the former, is Haüy's chaux carb. *linaire* (pl. 25, fig. 25.); the same crystal is also observed as macle. A similar variety, but which contains also narrow planes of Nos. 4 and 17, is the chaux carb. *doublante* of the same crystallographer, (pl. 27, fig. 47.)

The pyramidal variety of this modification with planes of Nos. 17 and 11, is Haüy's chaux carb. *prism* (pl. 27, fig. 41.); and a similar one, but with the planes of No. 2 instead of 11, is the same author's chaux carb. *emouffée* (pl. 26, fig. 40.); the latter occurs also as macle.

Many more combinations of the planes of this modification, with those of others, are described and figured by count Bournon; among others a crystal, composed of seven modifications, contains, in all, sixty planes, and another, composed of eleven modifications, exhibits no less than 96 planes. The same author has illustrated this modification by 129 figures.

37. *Acute pyramidal dodecahedron of 40° 14'.*—Though the dodecahedron of this modification is considerably more acute than that of the preceding modification; yet it appears to have hitherto been confounded with it. It has been found in combination with the planes of the primitive rhomboid, and those of Nos. 36, 2, and 11, and also in its complete state. The crystals exhibiting this modification are pretty large. They have been found only in the Dauphiné Alps of Loisan, and in Derbyshire.

38. *Pyramidal dodecahedron of 37° 5'.*—This might easily be mistaken for the dodecahedron of the preceding modification. It has not yet been observed in its complete state, but

in combination with the planes of Nos. 2, 3, 15, 17, 22, and with remains of the planes of the primitive rhomboid. Has been found in Hungary, and other places; but does not appear to occur in England.

39. *Pyramidal dolomite* of 29-5°.—The complete double form occurs in Germany; nearly completely, with planes of No. 17 at the points of the pyramids, it is Hädy's *chaux carb. subulnaire* (pl. 25, fig. 22); with the summit intersected by N. 3, and with trapizoidal planes of No. 2, it constitutes the fine crystallographer's *chaux carb. subulnaire* (ib. fig. 31.); its planes are also seen in his *chaux carb. zéolite* (pl. 29, fig. 39.) in combination with those of No. 1, and of No. 17, which latter are the characteristic planes. Also the variety described by Hädy under the name of *quartziforme*, (Ann. du Mus. vol. ii.) has small planes of this 39th modification, which has hitherto been found principally in Germany.

45. *Acute pyramidal Lohschtron* of $26^{\circ} 34'$ —This dodecahedron is not unfrequently seen in its complete state, but its points, on account of their great fragility, are generally broken. It occurs in Germany, from which country, and from Derbyshire and Cumberland, are also procured groups of crystals, including the planes of this modification, in combination with others, such as Nos. 1, 2, 3, 17, 19, 21, 22, 30, and 35.

31. *Acute pyramidal dodecahedron of 15 53'.*—This is the last, and at the same time the most acute, of the series of pyramidal dodecahedrons produced by a decrement along the edges of the base of the primitive rhomboid, and consequently with cleavage at the summit on the more obtuse edges of the pyramid. This dodecahedron occurs complete, but, on account of its great fragility, is generally seen in a broken state; sometimes two opposite planes of the pyramid, having increased in size, so that they meet no longer in a point, give rise to coniciform pyramids. Nor is it uncommon to see four opposite planes in the same case. Such crystals bear great resemblance to certain varieties of arragonite, from which they are, however, easily distinguished by their much greater fragility, and by their lamellar structure. It has been observed with vestiges of the primitive planes, and in combination with those of several other modifications: in one crystal there are no less than 60 planes, being the result of seven different modifications. The crystals exhibiting planes of this modification are mostly found in Cumberland, Derbyshire, and on the Hartz.

42. *Acute pyramidal dodecahedron* of 67° 55'.—With this begins the series of those dodecahedrons which are the result of a decrement of the laminae at the acute angles, on the life of the primitive rhomboid. Hence the cleavage takes place at the summit on the less obtuse edges. Is found in its complete state, and combined with the planes of Nos. 36, and 36 and 2, in Derbyshire; but belongs to the more feeble modifications of calcareous spar.

43. *Acute ditetrahedral pyramid* of $62^\circ 36'$ —This has been found in a complete state in Derbyshire, where, as well as in Cumberland, it occurs also combined with the planes of several other modifications, for example, in some instances, very complicated crystals, such as that of fig. 476 in the work before us, the 102 planes of which are the result of eleven modifications.

44. *Acute dodecahedral pyramid* of $61^{\circ} 47'$.—Though the solid angle of the summit of this dodecahedron differs but little from that of the preceding modification, yet there is a great difference in the inclination of their planes: in the preceding dodecahedron these meet each other under three angles of $158^{\circ} 22'$, and three others of $95^{\circ} 40'$, while in this 44th modification they meet three of them under an angle of 140°

42', and three under one of 112° 44'. The complete decahedron of this modification is scarce, but occurs in Derbyshire. In combination with the planes of other modifications, particularly with Nos. 2 and 14; 3, 14, and 47; 2, 4, and 50, it is found in Derbyshire and Cumberland; and combined with planes of several other modifications, count Bourne has seen it among the crystals of calcareous spar that accompany the silver ores of Potosi; one of these crystals, the result of eight modifications, has 46 planes.

Hall's chaux carb. *summe* 1. des Min. N^o. 1860. n^o. 1.
approches very near this modification in the measurement of
its angles.

45. *Acute pyramidal dodecahedron of 56° 30'*.—Might easily be mistaken for the dodecahedron, No. 36, in which, however, the cleavage takes place on the more outside edges. The dodecahedron in its complete state has been found in Derbyshire, where this modification occurs in combination with the planes of several others; the most complicated among them is a crystal, produced by ten modifications, five of which belong to rhomboid, and four to dodecahedrons, which, together with the planes of the prism No. 2, form a crystal of 84 planes.

46. *Acute pyramidal dodecahedron of 49° 23'.*—Resembles the dodecahedron, No. 43, with regard to the inclination of its planes to each other; but it is much more acute. On the other hand it approaches near the dodecahedron, No. 56, in the measurement of the solid angle of its summit; but in this the inclination of the planes is different, not to mention the difference in the cleavage. This dodecahedron in its complete state is very scarce, it has, however, been found in Derbyshire and Cumberland; the combinations of its planes with those of other modifications, such as Nos. 1, 2, 3, 4, 6, 17, 36, and those of the primitive rhomboid, are more frequently met with in those parts of England.

47. *Acute pyramidal dodecahedron of* $45^{\circ} 2'$.—This appears to be peculiar to the same places, in which the crystals with the planes of the preceding modification are found. The complete dodecahedron is seldom seen. It is most frequently found in combination with the prism No. 2: the angles of three alternate edges being very obtuse, its pyramid appears almost triangular. These crystals are in general very transparent and beautiful.

48 *Acute pyramidal dodecahedron of 44° 30'.*—This is but little more acute than the dodecahedron of the preceding modification; but the planes of the latter meet each other, three under an angle of 163° 50', and three under one of 84°; while in this 48th modification the same planes meet three under 150° 8', and three under 57° 12'. The dodecahedron in its complete state has not yet been found. Its planes occur in crystals from Cumberland and Derbyshire, in combination with those of Nos. 2, 14, 32, 36, and 45.

48*. *Acute pyramidal dodecahedron of 41° 31'*.—The planes of this modification are those marked *x* in the figures of Haidy's chink carb. *prismatic* (pl. 27, fig. 42.), *all-faces* (ib. fig. 46.), and *complané* (ib. fig. 43.)

49) *Trigonal trisphenoidal*, rhedron of 50 9. — The dodecahedron of this modification in its complete state is from Hungary. Combined with the planes of several other modifications, it occurs principally in Derbyshire; one of the crystals from thence, figured by count Bournon, is composed of 90 planes, being the result of nine modifications.

50. *Acute pyramidal dodecahedron of 25° 25'*.—To this probably belong the pyramidal planes of Huüy's *chaux carb. acutangule*. This modification has hitherto been principally found on the Hartz, it occurs however also, combined with the planes of several others, in Derbyshire and other parts

of England; the crystals that exhibit its planes frequently accompany it. It is a crystalline carbonate of lime. The complete dodecahedron has not yet been found.

51. *Acute pyramidal dodecahedron of 14° 30'.*—The planes of the very acute pyramids of this modification are of rare occurrence; and in its complete state the dodecahedron has not been seen at all. The crystals from Derbyshire, on which its planes have been observed, are the result, some of six, others of seven and eleven, different modifications.

52. *Acute pyramidal dodecahedron of 18° 26'.*—Though this and the two following dodecahedrons are, like those of the preceding modifications, the result of an intermediate decrement of the crystalline laminae on the acute angles of the planes at the base of the primitive rhomboid, yet they differ from the latter in the cleavage, which takes place on their more obtuse edges. This dodecahedron has not yet been found in its complete state; in combination with the planes of several other modifications, of which those of No. 36 are the most considerable, it is found in Derbyshire.

53. *Acute pyramidal dodecahedron of 16° 35'.*—M. de Bournon has observed the planes of this modification only in two crystals from Strony, where they sometimes accompany red silver ore. This is undoubtedly the feeblest of all modifications of calcareous spar, and one of the few that are not found in England.

54. *Acute pyramidal dodecahedron of 14° 4'.*—This is the most acute of all dodecahedrons hitherto observed in calcareous spar. It differs but little in this respect from that of No. 51; but independently of the considerable difference in the respective inclination of their planes to each other, the cleavage of the former is on the less obtuse edges, while that of this modification takes place on the most obtuse edges. M. de Bournon has observed the planes of this modification in two varieties only; the one is the dodecahedron in its complete state; the other exhibits its planes combined with those of No. 13, which latter happens to be the most acute of all rhomboids hitherto observed of this substance. Both varieties were found in Westmoreland.

55. *Acute pyramidal dodecahedron of 34° 12'.*—This dodecahedron, like those of Nos. 25 and 31, is composed of isosceles triangles. Count Bournon has observed this rare modification in a few crystals from Derbyshire, in combination with the planes of the primitive rhomboid, and those of Nos. 2 and 4.

IV. Dodecahedral prismatic Modification.

56. *Dodecahedral prism formed at the solid angles of the base.* (not before described). Its planes are produced by a retrogradation of the crystalline laminae on the solid angles, so as to replace each of them by two planes which meet under an angle of 142° 2'. Its planes are found combined with those of the hexahedral prism No. 2, which give the crystal the form of a prism of 18 sides; in other crystals which, besides the just mentioned planes, comprise also those of No. 1, the prism is composed of 24 sides. It has been likewise found in combination with the planes of six different modifications, four of which belong to dodecahedrons, one to the prism of No. 2, and one to No. 56, producing in all 66 planes. Another variety has been observed by Count Bournon, which, in addition to the planes of the last-mentioned variety, contains also those of the prism No. 1, and is consequently composed of 72 planes. This modification, which has been found in Cumberland, is rare, but it is not improbable that its planes may be those of several of the curvilinear varieties already mentioned, but which cannot be determined by the goniometer.

The crystals of calcareous spar are variously aggregated,

and often so deeply imbedded, that their summits only are visible. They occur of all degrees of magnitude, from minute to 14 inches in length; their surface is generally smooth, sometimes streaked or drused. Externally from shining and splendid, to dull, sometimes pearly; internal lustre from splendid and specularly splendid, to shining and glistering; it is mostly a vitreous lustre, the intensity of which is generally in proportion with the transparency of the crystal.

Fracture foliated, rarely curved foliated; fragments rhomboidal. The massive is generally found in large-grained distinct concretions, but also sometimes in testaceous, wedge-shaped, and diverging, more or less streaked prismatic concretions.

Transparency both of massive and crystallized calcareous spar is various; the former is however generally only translucent, while the crystals are mostly semi-transparent and transparent; and these possess the double refraction in a high degree.

It is semi-hard, between gypsum and fluor spar, or, (as Count Bournon characterises its hardness,) just scratched by common brags. It is brittle, easily frangible.

Specific gravity 27.17 as a mean. Bourn.

Some varieties, especially that of brownish-yellow colour, and part of those found in the shell marble of Derbyshire, are phosphorescent when laid on a hot coal. The same quality has been observed, by Schumacher, in varieties from Norway.

Its chemical characters agree with those of the preceding sub-species. The purest Iceland spar is composed of

Lime	55.0	55.5
Carbonic acid	34.0	44.
Water	11.0	0.5
	100 Bergm.	100.0 } Phillips Phil. Mag. xiv.

This sub-species is found in most parts of the world; but most abundantly it occurs in England (where almost all modifications have been found), in Saxony and France. Certain crystal-forms appear to be peculiar to certain countries or localities; but this requires farther observations.

With regard to the Iceland spar it should be remarked, that this very pure massive variety of calcareous spar, is far from being peculiar to that island; at Pergine, in Italy, as we are told by Buch, the same occurs in mica slate, as masses sufficiently large to be cleft into rhomboids of upwards of two feet in length.

Calcareous spar is, almost without exception, the production of particular repositories; it is never seen to form independent beds or strata. It occurs venigenous in the rocks of almost all formations; in the oldest; in Switzerland and the Pyrenees, it is accompanied with feldspar, rock-crystal, &c. Also frequently in various metalliferous veins in gneiss, mica slate, clay slate, sienite, porphyry, more seldom in granite, frequently in grauwacke, and with ores of cobalt and copper, in the older fletz lime-stone. The newer fletz lime-stone is sometimes traversed by veins entirely composed of calcareous spar.

The minerals usually accompanying calcareous spar are granular and compact lime-stone, brown spar, quartz, feldspar, barytes, fluor spar, clay slate, chlorite, iron and copper pyrites, spathose iron, brown iron-stone, galena, blende, grey copper ore, malachite, &c.

3. Fibrous lime-stone.

This sub-species is divided into two kinds, *a*, common, and *b*, stalactitical fibrous lime-stone (*Kalkstein*, Wern.)

A. Common fibrous lime-stone Gemiciner safriger Kalkstein, Wern. *Satin spar*.

Its

Its colours are white, greyish, reddish and yellowish-white.

It occurs massive.

Internally it is between glistening and shining, with a pearly or satiny lustre.

Cross-fracture compact splintery; longitudinal fracture straight or wavy, fibrous (which may be considered as indeterminable crystals) are either strongly adhering to each other, and parallel, or partly detached, and tapering; they have also been seen reticularly aggregated. Fragments in most varieties splintery, also flattened fibrous; strongly translucent. Hardness rather less than that of calcareous spar, which it resembles in the remainder of its characters.

Its constituent parts were found by Mr. Pepys to be

Carbonic acid	47.6
Lime	50.1
Water and loss	2.3

100.0 Phil. Mag. xñ.

It is a product of veins.

The finest variety of fibrous lime-stone is that of Cumberland, to which the name of fatin spar is peculiarly applicable. It forms veins or trunks of a few inches thick, in a calcareous clay; the falbands or lifts of these small veins are thin layers of a blackish clay slate mixed with iron pyrites. This variety, which has sometimes a beautiful pale rose red tint, and perfectly pearly lustre, is cut and polished, and employed for inlaid and other ornamental works; when cut en cabochon, it sometimes passes for white cat's-eye, a name which is also sometimes erroneously, sometimes fraudulently, given to pieces of fibrous gypsum, cut in the same manner.

M. de Bourbon has described a pretty variety of this substance from Matlock in Derbyshire; it forms a very light, cellular mass, in which the fibres, of a yellowish-grey colour, cross and decussate one another so as to form the same kind of net which is seen in some fibrous zeolites. A variety with detached parallel fibres, which forms small veins of an inch or two in thickness, is mentioned by the same author as occurring in shell lime-stone; its fibres, of a yellowish-brown colour, are very delicate, and separable from one another by the slightest touch. A variety with detached diverging fibres is found at Schemnitz in Hungary.

B. *Stalactitical fibrous lime-stone.* *Kalkfinter*, Wern. *Stalactite* or *Sinter*.

Its more common colours are snow, greyish and yellowish-white, which latter passes into wax and honey yellow, and yellowish-brown; less common are the green varieties of colour, such as siskin, pistachio, asparagus, mountain, and verdigris green, which latter passes into sky blue; sometimes, though rarely, it is flesh, or peach-blossom red, and reddish-brown. When several of these colours occur in the same piece, they are in stripes, sometimes running into each other, at other times perfectly distinct.

It occurs massive, tubular, reniform, globular, botroidal, coralloidal, stalactitic, and tuberoso. Its surface is generally rough, or drusy, with minute indeterminable crystals; internal lustre commonly glimmering, and pearly.

Fracture from very delicately to coarse fibrous; fibres generally straight, stellularly diverging, or parallel. Fragments coniform and splintery, also indeterminately angular. It generally occurs in curved lamellar distinct concretions, parallel to the external surface.

It is more or less translucent, passing into semi-transparent. The remaining characters are those of calcareous spar.

Specif. grav. 2.325—2.876, Brissou; 2.741 (yellowish-
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white from Poland), Kirwan. This must of course vary according to the different degrees of purity.

Stalactitical fibrous lime-stone is generally found in caves, crevices, and old shafts, in transition, and flint lime-stone, hanging from and covering the roofs, wall, and floors of the caves, and thus producing groups of figures, which fancy readily transforms into statues, pillars, pulpits, fountains, &c. The most celebrated stalactite caves are, the grotto of Antiparos in Greece, the Bauman's hole on the Harz, the caves of Baden, those of Orenburg and Nerthinsk in Siberia, those of Matlock in Derbyshire, of Yorkshire, Auxelles, d'Arcy, de la Balme in France, &c.

The massive variety of this substance, produced by the trickling down from the roof and walls, and covering the floor of caves, is sometimes distinguished from stalactite by the appellation of *stalagmites*.

Sometimes the conical or cylindrical stalactites are terminated by a small crystal.

The common varieties are used for burning to lime; the finer sorts are employed by the statuary and mason, in countries where they occur in large masses. They are called *marmo alabastrino* by the Italians. See MARBLE.

The beautiful coral-like calcareous substance, called *ferri*, and commonly referred to stalactitical fibrous lime-stone, is a variety of *arragonite*.

4. *Pea-stone.* *Erbsestein*, Werner. *Pierre de pois* or *Pisolite*, Broch.

Its principal colour is yellowish, reddish, and greyish, less frequently snow-white; the yellowish passes through yellowish-grey into cream yellow and yellowish-brown.

It occurs commonly massive, but also reniform and botroidal.

Internally it is dull. Fracture even. Fragments indeterminately angular.

It is composed of spherical distinct concretions, which are again composed of thin concentric lamellæ. These globules are generally connected either by a calcareo-ferruginous cement, or they are detached; their size varies from that of a pea to that of a hazel-nut.

It is opaque, seldom rather translucent on the edges. Soft; brittle; easily frangible.

Specific gravity 2.396, Wiedenmann.

Its chemical characters and constituent parts appear to be those of the preceding sub-species.

The principal locality of pea-stone is Carlsbad in Bohemia. A handsome variety, consisting of detached globules, which are generally composed of fine granular distinct concretions, is found at the baths of St. Philip in Tuscany, and known by the name of *confetto di Tivoli*. Pea-stone is also said to occur in Hungary and Silesia.

Several opinions have been broached to account for the origin of these globular concretions, each of which is furnished with a nucleus of various dimensions, but generally very minute; it is sometimes a small angular or rounded grain of quartz, or a particle of slate; and even small fragments of granite have been seen in the centre of these globules. This circumstance points out the only possible manner in which these concretions can have been produced. The small bodies which serve as nucleus to each globule, must have been raised by, and kept floating in the agitated water of the springs, which being highly impregnated with calcareous particles, gradually deposited round each of them the concentric laminae; the globules thus produced afterwards sunk to the bottom, where, according as circumstances permitted it, they either remained unconnected, or were cemented into solid beds, such as they are seen near the hot springs of Carlsbad.

The similarity which some writers find between the pearl-stone and the variety of compact lime-stone, called roe-stone, is not found in reality.

Lime may be obtained in a state of absolute purity, by several processes from the native substances containing this earth. The analysis of the carbonates of lime is by far the most simple, especially when no other earth or metallic oxyd is present. This is pretty much the case with several of the marbles, particularly the white or statuary marble. If the lime in any of these substances be combined with no other acid but the carbonic, let 100 grains in fine powder be dissolved in muriatic acid. If there be any residuum, it may be considered as flex, or some salt of lime not decomposable by the muriatic acid, and must be set apart. Add to the muriatic solution as much pure ammonia as will make it smell of this alkali, and all the earths, excepting lime, with metallic oxyds, if there be any, will be precipitated, leaving the lime in solution. If no substance be suspected which is soluble in ammonia, the lime may be considered as separated from the other substances, and if such a suspicion should exist, the substance may be separated by adding only just as much ammonia as will make the solution neutral. The lime may be precipitated from the acid with carbonate of potash, or that salt commonly called the sub-carbonat, by which a carbonate of lime is obtained. This white powder, being separated, must be exposed to a strong heat in a platina crucible, to separate the carbonic acid, which leaves the lime in a state of purity. The precipitates by the ammonia may consist of magnesia, iron, and sometimes manganese. The magnesia and manganese will be dissolved by adding a solution of super-carbonat of potash, leaving the oxyd of iron behind, which must be washed and dried. The manganese may be precipitated by the hydro-sulphuret of potash in a state of sulphuret of manganese, which being washed, dried, and exposed to a strong heat in a platina crucible to expel the sulphur, will leave the pure oxyd of manganese. The magnesia, which is yet held in solution by the excess of carbonic acid, may be finally precipitated by pure potash. The precipitate, being separated, may be exposed to a strong heat in a platina crucible, which will give this earth in a state of purity. The resulting substances, on being weighed, will not amount to the original weight of the lime-stone; for, independent of the loss by analysis, allowance must be made for the loss of carbonic acid and water. The total amount of the latter substances may be known, by exposing a given weight in powder in a platina crucible. The loss by weight will be carbonic acid and water. If the carbonic acid alone be required, let a given weight in powder be taken, and let a quantity of dilute sulphuric acid, amply sufficient to saturate all the substances, be accurately weighed; then let the acid and powder be mixed together, and stirred till the effervescence ceases: afterwards weigh the mass; the loss of weight will be carbonic acid. The same may be ascertained by putting the powder into a gas bottle, and adding muriatic acid by degrees from an acid holder, and then collecting the gas in lime-water. The carbonate of lime so collected being weighed, 45 of carbonic acid may be allowed for every 100 of the carbonate.

The example given is supposed to be the most complicated of the carbonates of lime. If flex be a component part, it will be separated in the first solution, and must be washed and dried. Manganese is seldom found in lime-stone. It is said to constitute the property which some lime has of setting under water.

The native sulphat of lime or gypsum may be analysed by the following process. Let a hundred grains of the

crystallized salt, in fine powder, be exposed to a red heat for some time: the loss by this treatment is the water of crystallization. Let the powder, after weighing, be boiled for some time in a solution of pure carbonate of potash, by which is obtained a carbonate of lime, and a sulphat of potash, the latter being soluble, and the former insoluble. To the sulphat of potash, when separated, add muriat of barytes, and the sulphuric acid will be precipitated combined with the barytes. For every 100 of this salt, allow 33.3 of acid, by which the proportion of sulphuric acid will be known.

The insoluble matter first produced will consist of carbonate of lime, and perhaps iron. By adding to this the super-carbonat of potash, the whole of the lime will be dissolved, but the oxyd of iron will be left behind.

The lime which is dissolved by the super-carbonat of potash may be precipitated in the state of carbonate, and made pure by a strong heat in a platina crucible, to drive off the carbonic acid.

Phosphate of lime is analysed by dissolving the native crystals in nitric acid, and adding to the solution acetat, or nitrat of lead, till no more is precipitated: the substance is the phosphat of lead, which being separated and weighed, will determine the quantity of phosphoric acid, by allowing 18.4 of acid for every 100 of the phosphat of lead. The lime which is dissolved in the nitric acid may be precipitated by carbonate of potash.

The flux of lime may be analysed by first boiling it in a state of fine powder with carbonate of potash, or soda, by which a flux of potash or soda is obtained, from which the fluoric acid may be again precipitated by acetat or nitrat of lead, from which the proportion of fluoric acid may be obtained.

The first residuum, which is carbonate of lime, and generally oxyd of iron, must be treated as in the analysis of sulphat of lime, to separate the oxyd of iron from the lime.

The native borat of lime contains more magnesia than lime; for its analysis, see the *Borat of Magnesia*.

Chemical Properties of Lime.—To obtain lime in a pure state, the most perfect crystals of the carbonate should be put into a covered vessel, and exposed to a strong heat, considerably above redness, for several hours. The crystals will retain their shape, but will have lost their transparency, and become beautifully white. By this process the carbonic acid and water of crystallization are expelled, leaving the lime in a state of purity.

The lime thus obtained has a caustic alkaline taste, and like bodies of those qualities, to a certain degree, destroys the texture of the skin, and in other respects acts upon animal substances in general: it also changes vegetable blues to green. Its specific gravity is various; according to Kirwan it is 2.3. In this state it is called quick-lime. Its hardness, immediately after it is produced from the carbonate, is not much diminished; but if exposed to the air for a certain time, it falls into an impalpable powder, which appears of a more splendid white than in the solid state.

In assuming this form by exposure, it is found to be heavier by one-third of its original weight. For this fact we are indebted to Mr. Dalton, who terms lime in this state an *hydrat of lime*.

If it be exposed to the air a longer time, it combines with carbonic acid, and would ultimately acquire the original weight of the carbonate.

When water is poured upon newly burned lime, it quickly swells with a hissing noise, absorbing the water with great avidity, while much heat and even light are evolved.

These

These phenomena do not cease till it has absorbed one-third of its weight: in this state it is called *slacked lime*.

Many other substances are capable of furnishing lime in a state of tolerable purity. Of these are the stalactite of Derbyshire, chalk, white marble, and some of the other marbles.

Lime is not fused by the greatest heats hitherto produced, although it is susceptible of fusion by very slight admixture of some earths and metallic oxyds.

The change which takes place in all these bodies which afford lime by burning, was not explained before the discovery of carbonic acid by Dr. Black. The peculiar qualities of quick-lime were supposed by Boyle and by Newton to arise from the fire fixed in it by the process of burning. Others supposed its causticity to arise from the presence of an acid formed by the heat. Dr. Black, however, demonstrated that the qualities of lime were not to be attributed to the presence of any substance in lime, but to the absence of water and carbonic acid, the latter of which he at the same time discovered.

If lime be added to water at 60°, it dissolves about .005 of its weight. It appears from the experiments of Dalton, that cold water dissolves more lime than hot; a property not common to other bodies. According to this ingenious chemist, water at 60° dissolves $\frac{1}{13}$ of its weight; at 130, $\frac{1}{24}$ part; and at 212°, $\frac{1}{137}$ part.

The solution of lime in water is commonly called *lime-water*. When lime-water is exposed to the air, it soon becomes covered with a pellicle, exhibiting the prismatic colours, which gradually thickens into a crust, and by its weight falls to the bottom of the liquid. This has been called the cream of lime. It is produced by the lime combining with the carbonic acid of the atmosphere, by which it becomes insoluble, and is separated from the water.

The same separation takes place by breathing through lime-water, from the presence of the carbonic acid afforded by respiration.

Lime combines with several of the combustible bodies, forming peculiar compounds. When two parts of lime and one of sulphur are heated together in a crucible, they unite in forming a reddish mass, which is the sulphuret of lime. When this compound is moistened with water, the latter is decomposed. One portion of the hydrogen of the water unites with a portion of sulphur, and escapes under the form of sulphuretted hydrogen gas. Another portion combines with a part of sulphur and lime, forming a triple compound of sulphur, hydrogen, and lime, called an hydroguretted sulphuret of the earth, while the oxygen of the decomposed water, with the remainder of the sulphur and lime, forms the sulphat of lime.

The hydroguretted sulphuret of lime is of a greenish-yellow colour. If exposed to the air for some time, it gradually absorbs oxygen, and is converted into sulphat of lime. If, however, it be kept in solution in water in a close vessel, some of the sulphur gradually precipitates, leaving in solution the hydrosulphuret of lime. See *Sulphuretted Hydrogen*.

The hydroguretted sulphuret of lime has the property of dissolving charcoal as well as some metals, and metallic oxyds.

The hydrosulphuret of lime is formed by passing sulphuretted hydrogen gas through lime-water. This gas unites with the lime, forming a compound of a disagreeable bitter taste.

Phosphuret of Lime.—This substance may be formed as follows: into an earthen tube about 12 inches long, or a glass tube coated with equal parts of sand and pipe-clay,

and closed at one end, put some pieces of phosphorus, so as to lie at the closed end of the tube. Let the remainder of the tube be filled with bits of newly burned quick-lime, about the size of large peas, and then stop the end of the tube with a chalk or dry clay stopper, not fitting very tight. Let the tube be now passed through two holes of a portable furnace, the furnace being about six inches in diameter. One of the holes must be a little below the other, so as to give the tube a small inclination to the horizon, the open end being highest. Let the middle part of the tube be heated red-hot, and then draw gradually the end containing the phosphorus into a heat sufficient to sublime the phosphorus. The vapour of the latter will now pass through the red-hot lime, a great portion of which will combine with it, forming the phosphuret of lime. If the vapour of the phosphorus come too rapidly it passes by the loose stopper, but so soon as the whole has been sublimed, let the end be stopped more closely; and let the tube be withdrawn, keeping it well stopped till it is perfectly cold. The whole of the contents of the tube may now be shaken out, and the darkest coloured pieces selected, which must be kept in a well stoppered dry bottle.

The phosphuret of lime, thus prepared, is of a deep brown colour.

When thrown into water it does not dissolve, but bubbles of gas are seen to proceed from it, which coming to the surface burst, and inflame spontaneously, producing a beautiful ring of white smoke.

These phenomena are occasioned by the presence of a substance called phosphuretted hydrogen gas, which has the singular property of taking fire at the common temperature. The water is decomposed by the phosphuret. The hydrogen combines with a portion of the phosphorus, forming the gas above-mentioned, while the oxygen of the same combines with the remainder of the phosphorus, forming phosphoric acid, which with the lime forms phosphat of lime. Besides this, a portion of the gas first combines with the phosphuret, forming an hydroguretted phosphuret, which, if taken from the water before it is decomposed, and wiped dry, retains the gas. On pouring muriatic acid upon it the gas is liberated, and instantly inflames.

Lime does not combine with any other of the inflammable bodies, but it combines with several of the metallic oxyds.

When any of the oxyds of lead are boiled with lime and water, a portion of the oxyd is dissolved. The solution, on evaporation, affords small crystals.

This compound has the property of staining wool, hair, nails, horn, and some other animal substances, of a deep and agreeable brown, which by exposure to the air disappears. This colour appears to be the brown oxyd of lead combined with the substance. An acid instantly dissolves it, and the colour disappears.

Lime also dissolves the red oxyd of mercury, of the solution affording yellow crystals.

Lime has the property of combining with some of the other earths and metallic oxyds, forming mortars of different qualities. Dr. Higgins, in his book upon cements, proposed the following as the best composition for common mortar: three parts of fine washed sand, four parts of coarser sand, one part of newly slacked lime made up with as little water as possible, which he recommends to be moist water. Mortar, thus formed, becomes very hard in a little time, and continues to become harder for a great length of time. Hence has arisen the mistake, of the ancients being in some secret of making mortar, which is not known to the moderns.

A great improvement has lately been made in making

cements by combining lime with oxyd of iron and manganese. An iron ore abounding with clay, a calcareous matter, and pyrites, have been introduced under the name of "Parker's cement," from the name of the inventor and patentee. After burning and grinding to powder, it has the property of setting rapidly when mixed with water, and even under water. This rapid induration can be explained, only by supposing a great affinity to exist between the different earths and metallic oxyds in its composition.

Lime had long been suspected to be a compound body; but it is only lately that this fact has been verified by experiment. From the general resemblance of the earths to the oxyds of many of the metals, Lavoisier supposed them to be oxyds of metals, which had to great an affinity for oxygen as not to be reduced by ordinary means. Several unsuccessful attempts were made to realize this conjecture by different philosophers.

In the late experiments of Mr. Davy, in which he discovered the fixed alkalies to consist of metallic bases united to oxygen, this philosopher was led to suppose that the earths, at least those having alkaline qualities, might be compounds of peculiar bases united to oxygen; and in this conjecture he seems not to have been misled.

Mr. Davy did not succeed in obtaining the metalloid of lime in a pure state, as in the instances of potash and soda. He fused a portion of lime and potash together, and exposed this compound to the action of the Galvanic battery, in the same way he had done potash and soda. He obtained by this means a metallic substance, which differed from the metal of potash in being less fusible, and took fire as soon as it was formed. He succeeded better by moistening the lime, and mixing it with red oxyd of mercury. These were placed upon a plate of platina, connected with the positive end of the battery. A cavity being made in the mixed mass, a globule of mercury, weighing about 60 grains, was placed in it, and a connection formed between the mercury and the other end of the battery by means of a platina wire. By this means, the lime underwent decomposition; its metallic base combining with the mercury. This amalgam was then distilled in a glass tube, filled with the vapour of naphtha; by which the mercury, to a certain extent, was expelled, leaving a white mass of a metallic appearance, and of the colour of silver. This substance, which no doubt was the basis of lime, had so great an attraction for oxygen, that Mr. Davy could not succeed in examining its properties before it was burned and reconverted into lime. He has given it the name of *Calium*.

Salts of Lime.—Lime combines with the different acids, forming peculiar compounds called salts.

It possesses a stronger attraction for the acids than alumina, magnesia, or any of the metallic oxyds: hence the existence of aluminous, magnesian, and metallic salts are incompatible with lime. Several of the salts of lime are found native in great abundance, particularly the carbonate and sulphate. We rarely find a mineral water free from some of the salts of lime. They are mostly, however, the carbonate, sulphate, and muriate; the rest of the native salts being insoluble in water.

Sulphate of Lime.—This salt may be formed by dissolving lime in the maritine or nitric acid, and adding sulphuric acid to the clear solution, till the precipitation ceases. The substance which falls to the bottom is the sulphate of lime, in a state of white powder. It abounds so plentifully in nature, that it is never manufactured for sale. The native crystals are right-angled prisms, with rhomboidal bases. It is also found sometimes in crystals of the form of four

and six-sided prisms, which are generally very transparent. In some specimens these crystals are very small, giving the mass a fibrous appearance. It occurs in Derbyshire, in large semitransparent masses, mostly abounding with yellowish-brown streaks, occasioned by the presence of iron. Great quantities of this salt is worked into ornaments, and used also in sculpture.

This salt is soluble in 460 parts of water at 60°.

It is not altered by exposure to the air, at the common temperature: if, however, it be heated to ignition, it loses its water of crystallization, and falls into a fine white powder. This powder, if left in the air, would re-absorb the water, and assume its chemical qualities. When this powder, newly calcined, is mixed with water to the consistence of pulp, it soon begins to stiffen, becomes warm, and in a little time becomes very hard. During this state it expands with great force, so as to break very strong vessels. It admits of the most delicate casts being taken by means of it. The sudden expansion, at the time it is losing its liquid form, forces it into the most minute cavities. It is employed by artists for making casts of busts, and different ornaments. The same properties render it of great value to the manufacturers of pottery and porcelain. It is used in some countries for making the floors of upper rooms, as a substitute for wood. In the laying of these floors, some idea may be given of its expansive force when setting. Thin slips of wood, of a thickness equal to the expansion of the floor, are placed between the wall and the pulpy mass, till the time it begins to assume the solid form. These slips are then instantly removed, to make room for the expansion. If this precaution were not taken, so great would be the force, as to push out the wall in that part.

Sulphate of lime is composed, according to Bergman, of 46 acid, 52 base, and 22 water, in the 100. Kirwan's analysis gives 59 acid and 41 base in the 100. Wenzel makes it 59.84 acid and 40.16 base.

Dalton makes the atom of lime 24, and sulphuric acid

$13 + 3 \times 7 = 34$: hence, $\frac{24 + 34}{34} = \frac{100}{58.6}$, which gives 58.6 acid, and 41.4 base, = 100.

This salt is said to be used in America as a manure with much success; but has not been used in this country.

Sulphite of Lime.—This salt may be formed by adding sulphurous acid to the nitrate or muriate of lime. A white powder is precipitated, which is sulphite of lime. This salt is soluble in 100 parts of water. It is slightly efflorescent in the air, and ultimately is converted into sulphate. When heated, some sulphur is sublimed, and it assumes the state of sulphate. This salt is composed of 48 acid, 47 lime, and 5 water, = 100. It has not been applied to any use.

Nitrate of Lime.—The nitrate of lime may be formed by adding powdered carbonate of lime to nitric acid, till the effervescence ceases. When the solution is evaporated to the consistence of syrup, and placed in a very cold situation, small needle-shaped crystals, after some time, will appear: the shape of these is six-sided prisms. This salt is crystallizable, but with difficulty, owing to its great solubility; or, in other words, to its great affinity for water; and when the crystals are formed, they soon attract moisture from the air, and disappear.

When the solution is evaporated to dryness, and the heat continued a short time, the mass acquires the property of glowing in the dark. This salt is known by the name of Baldwin's phosphorus.

When a stronger heat is applied, up to ignition, the salt is decomposed; the acid is resolved into nitrous gas, oxygen,

gen, and nitrogen. It might be employed, like nitre, to obtain a tolerably pure oxygen for experiments of combustion. Its decomposition by heat also furnishes an elegant method of procuring lime in a state of purity. The analysis of this salt by Richter gives, in the 100, 63.9 acid, and 36.1 base. That of Kirwan gives, in the 100, 54.44 acid, 32 base, and 10.56 water. Dalton makes the atom of nitric acid $5.4 + 2 \times 7 = 19.4$, and concludes the soluble

nitrats to be super-salts: hence, $\frac{10.4 \times 2 + 24}{19.4 \times 2} = \frac{100}{58.6}$,

which gives 78.6 acid, and 41.4 of lime, = 100.

Muriat of Lime.—This salt is generally formed in manufacturing the carbonat of ammonia. The muriat of ammonia is mixed with carbonat of lime, in a vessel which is exposed to a heat capable of fubliming the carbonat of ammonia, which leaves behind the muriat of lime. It may be also formed by adding carbonat of lime to muriatic acid. When the solution is evaporated to the consistence of syrup, and set in a cool place equal to 32° , it crystallizes into fixed prisms, terminated by pyramids. These crystals, however, soon deliquesce, from their great attraction for moisture, and assume the liquid form. Reduced to a state of dryness, it is used for the purpose of drying different gases.

Water at 60° dissolves four times its weight of this salt; while at 100° , it dissolves in any proportion. It dissolves in alcohol in a great proportion, producing heat. When the dry salt is mixed with snow, it produces great cold, and is employed to great advantage in freezing mixtures. When it is exposed to heat above ignition, some of the acid escapes, reducing it to the state of submuriat. In this state it has the property of shining in the dark, and has, in consequence, been called the phosphorus of Homberg. It is composed, according to the analysis of Bergman, of 31 acid, 44 base, and 25 water, in 100. Kirwan makes it 42 acid, 50 base, and 8 water; and Wenzel, 51 acid and 49 base. Dalton makes an atom of muriatic acid 22; then lime being

24, $\frac{24 + 22}{22} = \frac{100}{47.83}$: hence we have, from these data,

47.83 of acid, 52.17 of base.

Oxymuriat of Lime.—It appears that such a salt does not exist, except in the dry state. When it is thrown into water, it is converted into the muriat, and oxygen escapes.

The salt, which the bleachers call the oxymuriat of lime, is in fact the hyper-oxymuriat. It is made by passing the oxymuriatic acid gas through a mixture of lime and water, in a Woulfe's apparatus. (See LABORATORY.) The lime is at length taken up, and the liquid becomes colourless. It is decomposed by the muriatic acid, affording oxygen and oxymuriatic acid. It is used in bleaching to a great extent. See BLEACHING.

Phosphat of Lime.—This salt constitutes the basis of bones, and is a component part of most animal substances. It may be prepared by adding muriat or nitrat of lime to phosphat of soda; or, cheaper, by dissolving the earth of bones, which is a mixture of the subphosphat and carbonat of lime, in muriatic acid, and adding pure ammonia to the solution. The phosphat of lime will be precipitated alone, leaving the excess of lime dissolved in the acid. This salt is in the form of powder of a white colour; the native salt, which has been described, being alone capable of the crystalline form.

Several of the acids, but particularly the sulphuric, decompose this salt, by taking a part of the lime, and leaving it in the state of superphosphat. Phosphat of lime is com-

posed, according to the analysis of Klaproth, of 32.5 of acid and 69.5 base. Fourcroy and Vauquelin make it 41 acid and 59 base; Richter, 45 acid and 55 base; and Ekeberg, 39 acid, 36 base, and 25 water. By Dalton's hypothesis, the phosphoric acid is $9 + 2 \times 7 = 23$: then, $\frac{23 + 24}{23} = \frac{100}{48.9}$, making the acid, in 100, 48.9 acid, the base being 51.1.

Superphosphat of Lime.—When sulphuric acid is added to the phosphat of lime, the former being one-third of the latter by weight, a portion of fulphat of lime will be formed, which will be precipitated, leaving the superphosphat dissolved. It may also be formed by dissolving 47 parts of the phosphat in 23 parts of real acid.

This salt crystallizes by evaporation, in brilliant plates, having a pearly appearance. The taste of these crystals is strongly acid. Indeed it was once taken for the phosphoric acid, and was distilled with charcoal, to obtain phosphorus. This salt is now decomposed by the acetat of lead; and the phosphat of lead is used for that purpose, which is found a great improvement in the preparation of phosphorus.

When this salt is heated in a crucible at a little more than a red heat, it fuses; and, on cooling, assumes the appearance of a transparent glass, which has been called phosphoric glass. Its composition, according to the analyses of Fourcroy and Vauquelin, is 54 acid and 46 lime.

Fluat of Lime.—This salt is not a product of art, but is found native in Derbyshire, and other counties abounding with lead. Its crystals are in the form of cubes.

When this salt is coarsely powdered, and laid upon a hot plate, a little short of ignition, it gives a beautiful blueish light, not much unlike the flame of burning sulphur in common air. The artificial fluat also possesses this property.

When the fluat of lime is exposed to a strong heat, it melts, and, on cooling, becomes transparent. The facility with which it fuses, and renders other earthy substances fusible, is taken advantage of in the reduction of lead, and other metals. Hence it has derived its name from acting as a flux.

This salt is decomposed by the nitric and sulphuric acid, by seizing the lime, while the fluoric acid gas is disengaged. Guy Lussac and Thenard have lately shewn, that the gaseous form of its acid is caused by the presence of silic; since, when it is disengaged from any base where silic is not present, the acid assumes the liquid form. See SILEX.

Its analysis, by Klaproth, is 32.25 acid and 67.75 base; by Dr. Thomson, 32; acid and 67½ lime.

Borat of Lime.—This salt may be formed by mixing the muriat of lime with a solution of borat of soda. The salt is precipitated in the state of white powder, which is insoluble in water: few of its properties are known.

Carbonat of Lime.—This salt, in the native state, is the most abundant of all the calcareous salts.

Although the primitive forms of the crystals of it are rhomboidal prisms, this figure has been to differently arranged as to form a numerous variety of secondary forms. The neutral salt of this species is insoluble in water; but it becomes soluble, to a certain degree, with an extra dose of acid.

The carbonat of lime may be formed by adding carbonat of potash to muriat of lime. It consists of 45 acid and 55 lime.

According to the experiments of sir James Hall, when the carbonat of lime is exposed to a red heat, in a close vessel, such as a gun barrel, it melts; and, on cooling, is found

found to retain its original properties, with the exception of losing something less than 4 or 5 per cent. of carbonic acid.

Supercarbonat of Lime.—When the supercarbonat of potash is added to muriat of lime, a portion of lime will remain on solution, which is not the carbonat of lime, but a supercarbonat. This salt is very frequently found in mineral waters, especially in lime-stone countries, and in countries abounding with marble.

A carbonat of potash being added to a solution of this salt, takes one dose of acid from it to form a supercarbonat, and the carbonat of lime is thrown down. When the supercarbonat of potash is added, no change takes place. When lime-water is added to water dissolving the supercarbonat of lime, the lime of both assumes the state of carbonat, and fall down together.

When the supercarbonat of lime is exposed to a boiling heat for some time, the second dose of acid is expelled, and the remaining carbonat is precipitated. This salt, however, is not immediately decomposed by boiling, but requires to boil for some time.

Acetat of Lime.—If carbonat of lime be added to the acetic acid, an effervescence will take place, and the lime will be dissolved in the acetic acid, forming acetat of lime. If the solution be evaporated, it affords small crystals of a white colour, having a silk appearance.

It has a bitter acid taste.

It is composed of 65.11 acid and 34.89 lime.

Oxalat of Lime.—This salt is formed by dropping the oxalat of ammonia into any solution of lime. It appears to be the most insoluble of all the salts of lime. It is in the form of white powder, and is composed, according to Bergman, of 48 acid, 46 lime, and 6 water.

Tartrat of Lime.—If carbonat of lime be added to a solution of the supertartrat of potash, the excess of tartaric acid combines with the lime, which falls in the state of insoluble powder. It is from this insoluble tartrat that the tartaric is obtained, by means of sulphuric acid.

Citrat of Lime.—This salt, like the last, is formed by adding the carbonat of lime to citric acid in the lemon juice. The salt is the insoluble powder which falls to the bottom. It is from this salt that the citric acid is obtained pure, by the superior affinity of sulphuric acid.

It consists of 62.66 acid and 37.34 lime.

Prussiat of Lime.—The prussiat of lime is formed by dissolving lime in the prussic acid. It is decomposed by all the acids, and is of little permanence. The salt commonly, but improperly, called by this name, is a triple salt, containing both lime and iron. It is made by adding 56 parts of lime water to two parts of Prussian blue, well washed in hot water, boiling them for some time till the lime is saturated. The solution is of an olive colour, and affords crystals by evaporation. The solution of this salt is a valuable test for iron in mineral waters.

The rest of the salts of lime are not of any importance, as far as we at present know.

The arseniats and molybdat of lime are insoluble in their neutral state: the former is soluble in excess of acid.

Succinat of Lime is difficultly soluble.

Benzolat of Lime is soluble, and may be obtained in crystals.

Chromat of Lime is soluble and crystallizable.

Suberat of Lime dissolves in hot, but little in cold water.

Camphorat of Lime is sparingly soluble.

LIME, in Agriculture, a soft friable substance, obtained

by calcining or burning various calcareous materials, such as chalk, marble, lime-stone, shells, &c.

This is a substance which is in different states, according to the particular circumstances under which it exists. When newly made, from its great power of destroying the texture of bodies, it is termed caustic or quick lime. It is also sometimes called shell-lime or shells. In this state, when used as manure, it operates with the greatest violence, dissipating and robbing the soils, to which it is applied, of their moisture and other fluid matter: but after being exposed to the atmosphere for some time, from its property of quickly absorbing moisture and carbonic acid from it, it becomes mild or effete, and is termed carbonat of lime. When applied to land in this state, it acts with much more mildness, only promoting the resolution of the matters in which it comes in contact, by forwarding the natural process of putrefaction. It has also less tendency to produce a mortary hardness in the poorer sorts of clayey soils. But besides these differences, there are others arising from the substances which are combined with the calcareous matters employed, as has been lately shewn by the ingenious experiments of Mr. Tennant, stated in the second part of the Philosophical Transactions for the year 1799. Having been informed that two kinds of lime were used in agriculture, which differed greatly in their effects,—one of which it was necessary to use sparingly, and to spread very evenly over the land, as it was said that a large proportion of it diminished the fertility of the soil, and that, wherever a heap of it had been left on one spot, all vegetation was prevented for many years; and that of this kind of lime, 50 or 60 bushels on an acre were as much as could be used with advantage; while of the other sort of lime, a large quantity was never found to be injurious, and that the spots which were entirely covered with it became remarkably fertile, instead of being rendered barren:—having analysed those two kinds of lime, he found that the latter consisted solely of calcareous earth; but that the former contained two parts of magnesia, with three parts of calcareous earth. He afterwards proved, that though vegetable seeds would grow equally well in both these kinds of lime-stone, when simply reduced to powder; yet that, when they were calcined so as to become lime, and both of them strewed about the tenth of an inch thick on garden mould, the magnesian lime prevented nearly all the seeds which had been sowed from coming up, while no injury was occasioned by the calcareous lime, when used under the same circumstances.

It may be noticed, that this valuable discovery seems in some measure to explain the cause of the variety of opinion that has been maintained respecting the application of lime, which some have supposed to be of little or no advantage, and even injurious to land; which has been owing probably to their having employed the magnesian lime, or used it in too large proportions.

This philosophical inquirer first found magnesian lime near the town of Doncaster, and afterwards at York, at Matlock in Derbyshire, at Breeden in Leicestershire, and at Worklop in Nottinghamshire. He asserts, that the cathedral and walls of York are built with this magnesian lime-stone; and that at Matlock the magnesian and calcareous lime-stones are contiguous to each other, the rocks on the side of the river Derwent, where the houses are built, being magnesian, and on the other side calcareous. He found also, that in this situation the magnesian lime-stone was incumbent on the calcareous: for, in descending into a cavern formed in that rock, he found a separate vein of calcareous lime-stone, which was full of shells, but contained no magnesia.

nesia: and concludes, that, in general, the magnesian lime-stone may be easily distinguished from the calcareous, by its solution in acids being much slower, and that it contains generally very few shells; but that these, when present, are impregnated with magnesia.

In the Philosophy of Agriculture it is remarked also, that all lime-stone may be divided into three kinds: first, the rocks which remain, where they were formed from shells beneath the ocean, except that they were afterwards elevated by sub-marine fires: secondly, into alluvial lime-stone, as those which have been dissolved in water, and simply precipitated, as the beds of chalk, which contain only the most insoluble remains of sea animals, as the teeth of sharks; and, thirdly, those which, after having been dissolved and precipitated, have been long agitated beneath the sea, till the particles have been rolled so against each other, as to acquire a globular form, which is said to resemble the roe or spawn of fish, and which contain very few shells, or none, as the Ketton stone, and that which he has seen on Lincoln heath, extending almost from Sleaford to Lincoln. Now, says he, as the salts of the sea consist of only two kinds; common salt, or muriat of soda, and vitriolated magnesia, commonly called Epsom salt, which, in the sea-waters surrounding this island, are found at a medium to exist in the proportion of one-thirtieth part of common salt and one-eightieth part of vitriolated magnesia, compared to the quantity of water; and, secondly, as these salts are believed by many philosophers to have been formed by vegetable and animal matters, which principally grew upon the surface of the dry land, after it was raised out of the primeval ocean; and that, in consequence, the saltiness of the sea was posterior to the formation of the primeval rocks of lime-stone; we may understand why those lime-stone strata, which have not been dissolved or washed in sea-water since the sea became salt, are not mixed with magnesia. The chalk, he supposes, must have been dissolved and precipitated from water, as it exactly resembles the internal part of some calcareous stalactites which he has in his possession; yet there is no appearance of its component particles having been rubbed together into small globules, and may not, therefore, have been removed from the situation where it was produced, except by its elevation above the surface of the ocean. But that alluvial lime-stone, which consists of small globules adhering together, called Ketton lime-stone, and of which there appears to be a bed 10 miles broad from Beekingham to Sleaford in Lincolnshire, and 20 miles long from Sleaford to Lincoln, he suspects may probably consist of magnesian lime-stone; which is also said in that country to do no service to vegetation: for this alluvial lime-stone, by having evidently been rolled together beneath the sea, by which the small crystallized parts of it have had their angles rubbed off, is most likely to have thus been mixed with the magnesia of the sea-water, which, as has been observed, is said to contain one-eightieth part of its weight of vitriolated magnesia.

It is further remarked, that at the lime-works at Ticknal, near Derby, there appears a stratum of alluvial lime-stone, like Ketton lime-stone, which they do not burn for sale, over the bed of the calcareous lime-stone, which they get from beneath the former, and calcine for sale. It is probable, he thinks, that the superior bed may contain magnesia, which has rendered it not so useful in agriculture. It is still more probable that alluvial lime-stone has acquired its mixture of magnesia from the sea-water; as magnesia, in its uncalcined state, will precipitate lime from water, as observed by Dr. Alison, who thence proposes to render water pure and potable, which has been long kept at sea free from

putridity by having lime mixed with it, by precipitating the lime by the addition of mild magnesia.

The lime from Breedon is magnesian, that from Ticknal (which is sold) is calcareous, he believes; and some farmers in the vicinity of Derby assert, that two loads of Breedon lime will go as far, that is, will apparently do as much service to their land, as three loads of Ticknal lime. Breedon lime, he is also informed, is preferred in architecture, and is said to go further in making mortar; which, he supposes, means that it requires more sand to be mixed with it. In the Account of the Agriculture of the Midland Counties, lime made at Breedon, near Derby, is said to be destructive to vegetables, when used in large quantities; and in Nottinghamshire it is asserted, that the lime from Critch, in Derbyshire, is so mild, that thistles and grafs spring up through the edges of large heaps of it, when laid in the fields. Dr. Fenwick of Newcastle observes, that the farmers in that country divide lime into hot and mild; which Mr. Tennant believes to mean magnesian and calcareous lime.

By experiments which were made by Mr Tennant, by sowing seeds of colewort on various mixtures of calcined magnesia with soil, and of calcareous lime with soil, he found thirty or forty grains of lime did not retard the growth of seeds more than three or four of calcined magnesia: hence, what can we conclude, but that, as they both injure vegetation in large quantities, they may both assist vegetation in small ones? and that this is more probable, as the farmers believe that they find both of them useful, though in different quantities; and as the magnesia would form Epsom salt, if it met with vitriolic acid, which Dr. Home found, from his experiments, to be friendly to vegetation, when used in very small quantities. More accurate observations and experiments are, however, Dr. Darwin thinks, wanting on this subject.

The most certain way to know whether any sort of stone be fit for making lime is to drop upon it a little aquafortis, spirit of sea-salt, or oil of vitriol. All stones on which the above, or any other strong acid, effervesces or rises in bubbles, are calcareous stones, or will burn to lime; and the stronger the effervescence is, the fitter they are for that purpose.

And as in the use of calcareous matter as a manure, much depends upon its being brought into a fine powdery state, it should always, where fuel can be obtained at a moderate expence, be prepared by burning, as that is the easiest and most efficacious mode of reducing lime-stone to powder that ever was invented, and therefore ought always to be adopted where necessity does not prevent it. Reducing lime-stone to powder by calcination is also, he remarks, attended with this farther advantage to the farmer, that it considerably diminishes his expence of carriage. Pure lime-stone loses about two-thirds of its weight by being thoroughly burned; so that the man who is obliged to drive this manure from a great distance, will find a very considerable saving by driving it in the state of shells; but if it were reduced to a powder by mechanical triture, he could not be benefited by this circumstance. Many persons choose to drive lime-stone from a considerable distance and burn it at home; but it is obvious they then subject themselves to a very heavy charge in carriage, which would be avoided by an opposite conduct. This, therefore, ought never to be practised but where other circumstances may counterbalance this unfavourable one. But as lime-stone is often in its native state mixed with sand in various proportions, and as sand loses nothing of its weight by calcination, it must happen that those kinds of lime-stone which contain the largest proportion of sand will lose least in calcination, and of course afford the weightiest lime-shells.

Hence

Hence it is obvious, that those who are under the necessity of driving lime from a great distance ought to be particularly careful to make choice of a kind of lime-stone as free from sand as possible, and to drive it in the state of shells, as they will thus obtain an equal quantity of manure at the least expence of carriage that is possible; and the lightest shells ought, of course, to be always preferred. When lime is flaked, that which contains most sand falls most quickly, and absorbs the smallest proportion of water. What is pure requires a very large proportion of water, and is much longer before it begins to fall. Hence it happens that those who drive sandy lime-shells in open carriages, must be very careful to guard against rain, because a heavy shower would make the whole fall, and generate such a heat as to be in danger of setting the carts on fire; whereas pure lime-shells are in no danger of being damaged by that circumstance. The writer has seen a cart loaded with such shells, which had been exposed to a continued shower of rain, as violent as is ever known in this country, for more than three hours, and seemed hardly to be affected by it in the smallest degree. He ought, he says, to observe, however, that his experiments were confined to only one kind of pure lime, so that it is not from hence demonstrated that all kinds of pure lime will be possessed of the same qualities. Lime-shells formed from the purest lime-stone require more than their own weight of water to flake them properly; whereas, some kinds of lime-shells that contain much sand do not require above one-fourth part of that quantity. He has found, by experiment, that pure lime-shells cannot be flaked with less than about one-fourth more than their own weight of water. When flaked in the ordinary way, the same lime-shells took more than double their weight of water.

Hence it is much worse economy, in those who have pure lime-shells, to flake and carry them home in the state of powdered lime, than it is in those who have only a sandy kind of lime-shells to make use of.

It is farther suggested that it is even, on some occasions, more advisable for those who have very sandy lime, to drive it in the state of powdered lime than in that of shells; for, as it is dangerous to give that kind of lime-stone too much heat, lest it should be vitrified, those who burn it can never be certain that the whole of the stone will fall to powder when water is added, till they have actually tried it; nor do they think it a great loss if some part of it should be imperfectly burned, as it requires much less fuel on a future occasion than fresh lime-stone; and therefore they much rather choose to err on this than on the opposite extreme. But should any one attempt to drive this poor sort of lime in the state of shells, he would be in danger of carrying home many stones that would never fall; which would more than counterbalance the benefit he would derive from the want of the small quantity of water that is required to flake it. On these accounts it is supposed it may be admitted as a general rule, that those who can have access to lime-stone which is free of sand, will save a great deal in the carriage of it by driving it in the state of shells; and that, on the contrary, it will be most economical, to those who can only get lime of a very sandy quality, to drive it in the state of powdered lime. Hence it follows, that the practice which now prevails, of carrying shell-lime by water from one part of the country to another, is only an imaginary saving, obtained at a very high risk, to those who drive shells of a sandy quality; but a real and unequivocal advantage of very high importance to the community at large, if these shells are obtained from a pure lime-stone. These observations relate only to the saving of carriage to the farmer; which, however, is an article of great importance to him.

But there are some other particulars that may also equally affect him in this way, and in the application of the lime to his ground. A vague opinion in general prevails in every part of the country, that one sort of lime may be more valuable than another; but it does not appear that farmers have hitherto had any rule to direct them in the choice of different sorts of lime; some esteeming one sort strongest, as they term it, and some valuing another sort more highly, without being able to assign any satisfactory reason for the preference they give in either case. It is of importance that this matter should be elucidated. Although it does not always happen, yet, in many parts of the country, the real nature of lime is so little understood, that the weightiest lime is preferred as a manure to that which is lighter; because it is imagined the first has more substance, and will therefore produce a more powerful effect upon ground than the finest and lightest lime. But there seems to be no reason to think there is any difference in the specific gravity of different parcels of pure calcareous matter when fully calcined; therefore, if there is any difference in the weight of various sorts of lime, it must arise entirely from a variation in the quantity or gravity of some extraneous matter that is mixed with the lime; and as sand is almost the only extraneous body that is ever found in lime-stone, and is always of much greater specific gravity than pure quick-lime, it follows, that the weighty lime only owes its superior gravity to a larger proportion of sand that is mixed with it. But sand is of no value as a manure; so that he who voluntarily purchases this kind of lime in preference to the other is guilty of a great degree of folly; which will be the greater if he has likewise to drive it from a considerable distance.

However, those farmers who have access to only one sort of lime-stone, must be contented with it, whatever may be its quality. But such as have an opportunity of choosing may be benefited by the observation, that pure lime-stone, when fully calcined and flaked, is reduced to a fine white impalpable powder that feels soft between the fingers, without the smallest tendency to grittyiness; while such lime as contains sand is never so fine nor so soft, but feels gritty when rubbed between the fingers. See Anderson's Essays.

Action, Quantity, and Application of Lime.—The author of Modern Agriculture remarks, that there are few districts where lime is not either in general use, or partially introduced as a manure. With respect to the use of lime, or the benefit derived from it as a mean of fertilizing the soil, some are of opinion that it promotes vegetation, by stimulating, or forcing the soil with which it is incorporated to exert itself: others imagine it promotes vegetation by enriching the soil, and thereby adding to the quantity of vegetable food. Various other opinions, different from these, and in some instances opposite to each other, have been entertained respecting the manner in which lime operates upon land; but all that we yet know with certainty on the subject, is collected from practice and experience, whereby it is proved that lime somehow or other operates so as frequently to produce exuberant crops on soils which, before the application of that manure, were comparatively of little value; and farther, that on all soils which are treated properly after being thoroughly limed, its beneficial effects are discernible by the most cursory observer. Various other modes in which this substance may be useful as a manure, may be seen under the terms *Calcareous Earth*, and *Phosphorus*.

The proportion or quantity of lime applied to the acre seems hitherto, the same writer observes, fixed by no certain rule, either in regard to the nature of the different soils, the modes

modes of cropping afterwards adopted, or the superior quality of one kind of lime-stone beyond another.

It has been remarked, that some require that it should be applied in such small quantities as thirty or forty bushels to the acre; and aver, that if more is used the ground will be absolutely ruined; while others maintain, that ten times that quantity may be applied with safety. A great variation may no doubt be produced, in this respect, by a difference in the nature of the soil, in the state of culture it is under at the time, in the quantity of calcareous matter with which it may have been formerly impregnated; and perhaps a variation may sometimes arise from other circumstances that have never yet been attended to. A difference will likewise arise from the quality of the lime that is applied, and from the manner in which it is employed, some kinds of lime containing, perhaps, ten times more calcareous matter than others: and a very great difference may proceed from the mode of applying the lime itself. For it is common to hear those who have had little experience of lime as a manure, recommend very great caution, lest too great a quantity be employed, for fear of burning the soil, as they express it. This idea of burning has been evidently adopted from what is experienced by applying caustic lime to animals or vegetables in large quantities, as it often corrodes and shrivels them up, and produces other effects, which greatly resemble those of fire; but it cannot produce any such effects, unless there are vegetables growing upon the soil at the time. In that case the vegetables might indeed be corroded by the lime, if rain should fall immediately after it was spread when newly slaked; but as it loses this fiery corrosive power in a few days after it is spread, nothing of that kind can be expected to happen to the soil. Accordingly, we never hear of crops being burnt up with too great a quantity of lime in those counties where it has long been used as a common manure, although it is there often employed in much larger quantities than in other places where it is more rare. The writer has himself had the experience of lime in all proportions, from one hundred to above seven hundred bushels to the acre, upon a great variety of soils; and has always found that its effect in promoting the fertility of the soil has been in proportion to the quantity employed, other circumstances being alike. The expence, in most cases, prevents farmers from employing this manure in greater quantities than those above-mentioned; but accidental circumstances clearly shew, that if it were applied in much larger quantities, the effect would only be to promote the luxuriance of the crop in a higher degree. A gentleman of his acquaintance, in whose veracity he can confide, happening to be from home when a large field was limed, and having no occasion for the whole quantity of lime that had been brought for that purpose, and laid down in one corner of the field, his servants, without driving it away, mixed what remained with the soil, although the lime lay there about four inches thick over the whole surface. The effect was, that for many years afterwards, the grain in that place was so immoderately luxuriant, that it fell over, and rotted before it came to the ear. After many years this luxuriance abated a little, so as to allow the grain to ripen; but it was there always much more luxuriant than in any other part of the field. An accidental experiment, nearly similar to this, fell under his own observation. It happened that the servants of another farmer laid, by mistake, a few heaps of lime upon a grass field that he did not intend should be broken up at the time. The mistake was soon discovered, and no more lime was laid down at that place; and the few heaps (about a bushel in each) were allowed to lie neglected, without being

spread. The field was pastured upon for seven or eight years after that, before it was converted into tillage; and the heaps were by that time become so flat, and so far sunk into the ground, that they could hardly be discovered. Before it was ploughed up, the whole of the field was limed, and this part of it equally so with the rest; nor were the old heaps touched till the plough went through them in tilling the field, when the lime was there turned up, with only a very small mixture of soil. The consequence was, that at every one of these heaps, a tuft of corn sprung up with such luxuriance as to be entirely rotted before harvest; and for many years afterwards, these tufts could be distinguished from the other part of the field at a very great distance, like so many buttons on a coat; and perhaps continue so to this day. From these experiments, as well as other considerations, there seems to be reason to conclude, that on soils which do not naturally abound with chalk, or other calcareous matter, there is less danger in giving too much lime than in applying too little, except in those cases where an over luxuriance is to be apprehended previously to such limings.

It has been stated by a late agricultural writer, that in the counties of Lanark and Westmoreland, from one hundred to five hundred bushels of lime-shells, after being reduced to powder, are applied to the English statute acre; and that the bushel of lime-shells, or calcined lime-stone, generally yields from two and a half to three bushels of powdered lime; the price of which at the kilns varies from fourpence to sixpence; the general average over the kingdom being rated at fourpence halfpenny the bushel. In the county of Nottingham, the ordinary quantity does not exceed seventy or eighty bushels. In the counties of Cumberland in England, and West Lothian, Fife, Perth, Angus, Mearns, &c. in Scotland, from one hundred to one hundred and fifty bushels is the usual quantity; and this last may be stated as the general average quantity commonly used in all the other parts of the island.

It is asserted to have been often heard urged as an objection to the use of lime as a manure, that although it does indeed promote the fertility of a soil in a higher degree at first, yet, in the end, it renders it much more sterile than formerly; on which account, they say, it ought not to be at all employed. This, like many other objections to useful practices, takes its rise entirely from the avarice and unskilfulness of those who complain. It is chiefly heard of in those parts of the country where it is not common for a farmer, after once liming a poor soil, to take fifteen or sixteen crops of oats successively, without any other dressing or alteration of crops. It must be a good manure that enables these soils to produce such a number of successive scourging crops of any sort: but it would be a marvellous one indeed, if it should prevent those fields being exhausted by them. But is it not well known, that in all the richest and best improved parts of the country, lime has been long employed as a manure? Yet, so far are those soils from being rendered sterile by it, that it is doubtful if any art, without the assistance of lime, or some calcareous matter, could ever have brought these fields to their present degree of fertility. Those, therefore, who complain of the hurtful effects of lime as a manure, proclaim what they ought to conceal; that they have had in their possession a treasure, which might have enriched their posterity, but which in their own life-time they have idly squandered away.

We are, however, not only unacquainted with the mode in which the lime operates upon the soil, but we are even in a great measure ignorant of the actual changes that are produced upon the earth after this manure is applied. Is

is often asked, How long the effects of lime may be perceived on the soil? And, if by this question it be meant to ascertain the length of time that the effects of lime will be perceptible in promoting the luxuriance of the crop after one manuring, it is no wonder that very different answers should be given, as the effects must vary with the quantity or quality of the lime employed, the nature of the crops that follow, and many other circumstances, which it would be impossible to enumerate. But if it be viewed in another light; if lime be supposed to alter the soil, so as to render it susceptible of being affected by other manures in a more sensible degree, so as to make it capable of producing crops that no art could otherwise have effected, and to admit of being improved by modes of culture that would not otherwise have produced any sensible benefit, the answer to the question would be more easy, as in this light, it is pretty plain that its effects will be felt, perhaps, as long as the soil exists. It is believed farmers are seldom accustomed to consider lime, or other calcareous manures, in this point of view; although, when it comes to be inquired into, it is not doubted but this will be found to be by far the most valuable effect of these measures. A few facts will best illustrate the meaning. In Derbyshire the farmers have found, that by spreading lime in considerable quantities upon the surface of their heathy moors, after a few years the heath disappears, and the whole surface becomes covered with a fine pile of grass, consisting of white clover, and the other valuable sorts of pasture grasses. This shews that lime renders the soil unfriendly to the growth of heath, and friendly to that of clover. It is found by experience, that in all porous soils which are not exposed to too much dampness, in every part of Scotland where lime has not been employed, heath has a natural and almost irresistible propensity to establish itself. In those parts of the country where lime has been much used as a manure, we find that the fields may be allowed to remain long in grass, without becoming covered with that noxious plant. Again, it is well known by those who have been attentive, and have had opportunities of observing the fact, that peas of any sort can never be successfully cultivated in any part of the country where the soil is not of a very strong clayey nature, or where lime or other calcareous manures have never been employed. If the ground be made as rich as possible with common dung, although the peas in that case will vegetate, and grow for some time with vigour; yet, before they begin to ripen, they become blighted, usually die away entirely before the pod is formed, and but rarely produce a few half-formed peas. But if the ground has ever been limed, although, perhaps, at the distance of thousands of years before that period, it never loses its power of producing good crops of peas, if it is put in a proper tilth for carrying them at the time. Again, in countries that have never been limed, the kinds of grass that spontaneously appear, if left to themselves, are the small bent-grass and feather-grass. In places where lime has ever been used, the ground, if exhausted, produces fewer plants of these grasses; but in their stead white clover, the poa and fescue grasses, chiefly abound. The soil in either of these cases may become equally poor; that is, may produce equally scanty crops: but the means of recovering them will be somewhat different. In the first case, a fallow seldom fails to prove beneficial. In the last, it is often of no effect, sometimes even hurtful. In the last, a moderate dressing of dung produces a much more sensible and lasting effect than in the other. In the last the quality of the grass, as well as its quantity, rather improves by age. In the first these circumstances are reversed. Several other observations might be made, tending to shew that

ground, which has been once impregnated with calcareous matter, acquires qualities from that moment which it did not possess before, which it ever afterwards retains, and never returns exactly to its former state. In addition to this it is observed, that although lime has such powerful effects on the soil, it does not seem ever to incorporate with the mould, so as to form one homogeneous mass; but the lime remains always in detached particles, which are larger or smaller in proportion as it has been more or less perfectly divided when it was spread, or broken down by the subsequent mechanical operations the soil may have been made to undergo. Hence it happens, that in ploughing, if there chance to be any lumps of calcareous matter in a dry state upon the surface, they naturally tumble into the bottom of the open furrow as soon as the earth is edged up upon the mould-board, so as to fall into the lowest place that has been made by the plough before the furrow-slice is fairly turned over. In consequence of this circumstance, it must often happen that, in the course of many repeated ploughings, more of the lime will be accumulated at the bottom of the soil than in any other part of it; and as the plough sometimes goes a little deeper than ordinary, the lime that on these occasions chanced to be deposited in the bottom of these furrows, will be below the ordinary staple of the soil, it will be useless for the purposes of the farmer. It is commonly thought that the lime has sunk through the soil by its own gravity, although it is certain that lime is specifically lighter than any soil, and can only be accumulated at the bottom of the mould by the means above described: others think that the lime is chemically dissolved, and afterwards deposited there; but this idea is not corroborated by the facts that have been already brought to notice. The following directions are applicable in either case. To obviate this inconvenience, it belongs to the farmer, in the first place, to be extremely attentive to have his lime divided into as small particles as possible at the time of spreading; for, if these are sufficiently small, they incorporate so intimately with the mould, as to be incapable of being easily detached from it. On this account, as well as others, it is always most advisable to spread the lime when in its dry powdery state, immediately after slaking, before it has had time to run into lumps. It is also of importance to plough the soil with a more shallow furrow than usual when lime is put upon it, especially the first time it is ploughed after the lime has been spread upon its surface; because, at that ploughing, the lime being all on the surface, a larger proportion of it is turned into the bottom of the last made furrow than at any succeeding ploughing; and therefore more of it will be buried beneath the staple than at any other time, if the furrow shall have been very deep. This circumstance becomes more essentially necessary in ploughing grass ground that has been newly limed; because, in this case, the lime is less capable of being mixed with any part of the soil than in any other. It also becomes extremely necessary, in all succeeding times, to guard as much as possible against ploughing to unequal depths. See Anderson's Essays.

In the work on the present state of husbandry in Great Britain, it is suggested as probable, that the propriety or impropriety of repeated limings depend more on the nature of the soil, and the modes of management afterwards adopted, than on any other circumstance connected with it; and that, as in some districts it is repeated two or three times in the course of twenty years, while in others a repetition of liming, except in mixture with other substances, is found injurious, it is impossible to account for such variations in the practice or its effects on the soil, without observing, in the first place, that although there has been as yet no general rule established,

by which a farmer can determine what quantity of lime is best suited to a particular soil, yet in practice, a greater quantity is laid on strong, dense, stubborn soils, than on those of a more friable nature. In the second place, that the diversity of measures by which lime is sold at the different kilns, is often so great, as to leave it doubtful whether a farmer in one part of the island, who applies three chaldrons to the acre, does not use less than he who, in another district, applies two. And in the third place, that the quality of lime-shells is so extremely different, that in some cases the farmer who lays five chaldrons on the acre, does not apply a greater quantity of effective manure than another who limes an acre with three only. And from various circumstances which have been already noticed, in speaking of calcareous earth, as well as from the great and general advantage of this substance on all soils and situations, except such as are previously replete with calcareous matter, or too moist, the writer of the "Philosophy of Agriculture" conceives, that its effects can only be understood from the idea of its actually supplying the nutrition of vegetables. This is still further confirmed, by its contributing so much to the amelioration of the crops, as well as to their increase in quantity, as noticed by millers and bakers. If it be applied in a large quantity, it likewise kills animals in the soils, and also small vegetables, and from the destroyed and decayed animals and vegetables, the soil is rendered more fertile, by being impregnated with mucilage. The superabundant lime is useful as it becomes mild calcareous earth, by attracting carbonic acid from the atmosphere, and afterwards gradually affording it to plants. By the fermentation it brings on, and the fineness of its particles, the texture of the earth is opened and divided.

It is evident that light sandy lands, containing only a small portion of vegetable matter, should not be overdone with lime, unless we can assist them liberally with animal manures. Its great excellence on a sandy soil is its mechanically binding the loose particles, and preventing the different parts of the manure from escaping out of the reach of the crop. On clay, by means of the gentle fermentation which lime produces, the stubborn soil is opened; the manure readily comes into contact with every part of it, and the fibres of the plants have full liberty to spread. It is often said that lime answers better upon sand than clay; but let the farmer treble the quantity, and he will be convinced that lime is better for clay than sand. Clay well limed becomes a marl, falling in water, and fermenting with acids: the air, rain, and dews are freely admitted, and the soil retains the nourishment of each. In consequence of a fermentation raised in the soil, the fixed air is set at liberty, which in a wonderful manner promotes vegetation. It is the nature of lime, in its active state, to dissolve vegetable bodies. Upon this principle we may account for the wonderful effects it produces in the improvement of black moor-land, which consists of dissolved and half dissolved vegetable substances. And it may be observed in general, that the greatest quantity should be used upon the deepest and richest soils, and the least upon those that are thin and light. On strong clays and deep loams there is a substantial body for it to operate upon; consequently, a considerable quantity will be required to pervade and give due activity to the whole; but as the soil is lighter, the quantity must be less, and the after-management in regard to crops extremely cautious. In liming a single field, an attention to the quantity will often be found necessary: the soil of the higher parts being for the most part light and free, and that of the lower more deep and compact, where the ground is unequal. On some soils, particularly where the bottom is chalk, lime-stone, or marl, lime will be pernicious, especially if the soil be thin.

Whatever be the method in which lime produces its beneficial effects upon land, it should always be reduced into as fine a powder as possible, and spread out with the greatest equality upon the soil, as by these means it will be more equally blended with it, and be more extensively useful in promoting the growth of crops.

Considering lime as a substance operating upon the living substances in the soil, as well as mechanically upon the soil itself, we perceive the necessity of applying a sufficient quantity at once, in order to produce these effects: for, if the quantity employed be small, and the soil deep, its effects will be scarcely perceived. Many farmers imagine that lime will not answer upon their lands, because they have laid it on in small quantities, whereas in all probability they would have found a larger dose highly beneficial. On clay, four or five hundred bushels are laid on for wheat, but it can scarcely be expected to answer the expence. On moss, bog, moor, &c. to be reclaimed from a state of nature, the more is laid on the better it is. The beneficial effect of lime on sandy land may be explained from its binding quality. But when such lands are first broken up from their state of heath, the vegetable matter is acted upon and reduced to manure by the corrosive power of the lime. On such lands, the first crop of rye has more than paid the expences. By attracting water, lime has a tendency to lay land dry. By insinuating itself between the particles of clay, it destroys their adhesions, breaks the stiffness of the soil, and gives readier access to the operation of manures, and to the extension of the growing roots of plants. By attracting carbonic acid, or fixed air and water, and by its corrosive properties, it destroys the texture of bodies, and reduces vegetable matter to a state of manure. It unites strongly with oils, and renders them miscible with water. By being destructive to insects and vermin, it may also contribute to preserve the springing corn from their ravages.

Dr. Anderson, however, suggests, that, from writers on agriculture having long been in the custom of dividing manures into two classes, *viz.* enriching manures, or those that tended directly to render the soil more prolific, however sterile it may be, among the foremost of which was reckoned dung; and exciting manures, or those that were supposed to have a tendency to render the soil more prolific, merely by acting upon those enriching manures that had been formerly in the soil, and giving them a new stimulus, so as to enable them to operate anew upon that soil which they had formerly fertilized: in which class of stimulating manures lime was always allowed to hold the foremost rank; it would follow, that lime could only be of use as a manure when applied to rich soils; and, when applied to poor soils, would produce hardly any, or even perhaps hurtful effects. He acknowledges that he was so far imposed upon by the beauty of this theory, as to be hurried along with the general current of mankind, in the firm persuasion of the truth of the observation, and for many years did not sufficiently advert to those facts that were daily occurring to contradict it. He is now, however, firmly convinced, from repeated observations, that lime and other calcareous manures produce a much greater proportional improvement upon poor soils than on such as are richer; and that lime alone, upon a poor soil, will, in many cases, produce a much greater and more lasting degree of fertility than dung alone. In direct contradiction to the theory it is added, that he never yet met with a poor soil in its natural state, which was not benefited in a very great degree by calcareous matters, when administered in proper quantities. But he has met with several rich soils that were fully impregnated with dung, and therefore exactly in that state in which the theory supposes that lime would

produce the greatest effect,—but upon which lime, applied in any quantities, produced not the smallest sensible effect.

The author of *Phytologia* suggests the idea of its supplying actual nutrition to vegetables, which seems probable, as it contributes so much to the melioration of the crops, as well as to their increase in quantity—wheat from land well limed being believed by farmers, millers, and bakers, to be, as they suppose, thinner skinned: that is, to turn out more and better flour; which it is supposed is owing to its containing more starch and less mucilage. Hence is perceived another very important use of lime in the cultivation of land, which may be owing to its forwarding the conversion of mucilage into starch, that is, to its forwarding the ripening of the seed, which is a matter of great consequence in this climate of short and cold summers. Mr. Young, from various minutes made in his Eastern Tour, concludes, that lime agrees with almost all soils; that it fails, however, on a thin loam or lime-stone; that it seems inefficacious on old pasture; that it has a strong effect in killing weeds; but that the greatest effect is on heath and moor-lands; where, as in the peak of Derbyshire, it converts waste soils into fine pastures, without tillage: but the sort is a strong stone lime, burning soft and foamy, and the quantity laid on is very great, rising to three hundred and sixty or even one thousand bushels. There is great reason to attribute much of the benefit to quantity: in wastes especially, too much can hardly be laid on, because dissolving the roots of heath and other spontaneous growth requires a powerful agent. Of their strong lime three hundred and sixty bushels are probably equal to five or six hundred bushels of chalk lime. What then are five or six quarters, which is no uncommon quantity, laid upon an acre?

And the mode of using lime, in improving their heaths or moors, is first to pare the ground in the beginning of March, about an inch and a half thick, to turn it about in dry weather, when dry to gather it into heaps, and burn it into ashes, to spread them even over the ground, to set on their lime, to spread and harrow it altogether, to plough the ground very thin, and to sow it with turnips or rape: then the spring following to sow with oats or barley, and good grass seeds: another good dressing with lime after the first crops of seeds is got; and then it may lie for pasture. Spreading the lime in a flaked state is by far the best method. The summer months are preferred, because fewer coals are necessary for burning; in other respects, the winter months are just as good for laying the lime upon the ground, provided it be done in dry weather.

But in its application upon fallows it is found to produce the best effects when laid on early in the season, and well incorporated with the soil while it is dry and powdery.

And the assistance of this manure has been highly useful in the cultivation of turnips; whole districts, formerly useless, having been made to produce not only good crops of them, but also valuable ones of corn and broad clover. Its greatest utility would seem to be upon light soils for these crops; as, where lime is the principal manure, they seldom sow turnips, clovers, peas or beans, except upon lands that have been previously limed. Instances of this sort are often met with upon the uplands; where, if any of the broad-leaved crops are sown, where a part has been limed, and a part not, the parts where the lime has been laid will produce, it is said, a valuable return, while that which has been dugged only will hardly repay the expense of seed and labour. The methods of using lime upon turnip-lands are various. Some farmers lay it on only before the last ploughing, and plough it in without harrowing: they also lay it in heaps, hot from the kiln, without being flaked. But

probably the sooner it is laid upon the land, and the more perfectly it is mixed and incorporated with the soil before the seed is sown, the more certain and extensive will its effects be found.

But the application of this substance upon clover-ley for oats is a mode of practice which ought not to be attempted. It is generally laid on in this way in the autumn, and ploughed down in the spring, but the crops seldom repay the expense.

This substance is also used as a top-dressing in spring upon grass, or wheat and other grain; but upon the latter it is said to be dangerous, unless the lime be made into a compost with dung or earth; in this form it will not only be safe but highly useful, except upon coarse meadows abounding with rushes, and other trumpery, which it destroys by absorbing the superabundant moisture which supports them.

But upon light soils, if several white crops be taken in succession after liming, the land will be worn out; a white and green crop should be taken alternately. Upon clay lands a summer fallow is sometimes indispensable; in that case the lime should be laid on in July or August, and completely harrowed in before ploughing: two or three ploughings at least are required to incorporate it well with the soil, and a suitable harrowing after each should likewise be given.

However, about Perth in Scotland, according to the Report of that county, the quantity laid on stiff land, by skilful improvers in the low country, is from forty to fifty bolls to the acre; on light land, with a gravelly subsoil, thirty or thirty-five bolls are accounted a sufficient dose. In some parts of the carse or clay land, which is not easily stimulated, they lay on eighty or ninety bolls. It is sometimes laid on fallows, immediately before the seed furrow; on barley and grass seeds, either before or after the barley is sown; and in some cases with the preceding crop, where turnips are cultivated, to prepare the ground for barley. Lime is in some instances mixed in compost dung-hills, in others it is spread on the green sward, before the land be broken up from grass. One infallible maxim with regard to lime is, that the longer it is kept near the surface, at least within reach of the plough, until it be intimately mixed with the soil, and its virtues imbibed, so much the better. The first liming of land has always a more powerful effect than it has at a future but no distant period, the quantity being equal. Quick lime intended for wheat, after a fallow, or for barley and grass seeds, might be ploughed in with a very shallow furrow, before the seed is sown: for oats after ley, it ought to be laid on during the preceding autumn; and for pasture or a top-dressing, early in the spring or autumn, rather than in summer or in winter; because, if the summer be dry, the grass is burnt up by the lime, and in winter its virtues are lessened by the frost, nor does it so powerfully attract the influence of the air. It is common, but perhaps difficult to be accounted for, when lime is spread on short heath or other barren ground, which has a dry bottom, to see white clover and daisies rising spontaneously and plentifully, the second or third spring afterwards, where not a vestige of either, nor even a blade of grass, could be discovered before it was applied. Dr. Darwin remarks that he has been informed, that if a spadeful of lime be thrown on a tussock, which horses or cattle have refused to eat for years, they will for many succeeding seasons eat it quite close to the ground; which is owing, he suspects, to the grass containing more sugar in its joints, or to the less acidity of all its juices.

Where lime is to lie in a heap for any length of time, it should

should be covered with earth, to preserve it from the air and rain. It has been observed, that the benefit of lime is not apparent in a dry summer, and that it does not act fully as a manure, till it has been thoroughly flaked in the soil, by continued rains. In Essex an excellent practice prevails, of forming a compost of lime, turf, and ditch earth, at the gate of every field, ready to be applied as a manure when wanted. Twenty bushels of lime mixed with forty bushels of sand form an excellent top-dressing for an acre of wheat, if laid on early in the spring. But lime, as first noticed, is apt to subside beyond the depth of the common furrow; deep ploughing in this case is the only remedy applicable. In some midland counties a fallow is seldom made without being dressed with lime, under an idea that it mellows the soil, and makes it work well, while in tillage; and sweetens or improves the quality of the herbage when laid down to graze. For this purpose it is fetched eighteen or twenty miles. And two sorts of lime are in use in some districts, as about Derby. The Breendon lime, burnt from a very hard stone, and of singular strength as manure; and the common lime, burnt from common stones, and called Ticknall or Walsall lime. The load-heaps are generally watered as they are thrown down from the waggon; and always turned over to complete the falling more effectually. If a quantity of lime be fetched in autumn or early in winter, to be used in the spring, when team-labour is more valuable, it is thrown up into a regular roof-like heap or mound, and thatched as a stack; a small trench being cut round the skirts to catch, with an outlet to convey away, rain water. Thus the heap is prevented from running to a mortar-like consistence by the snows and rains of winter, and thereby rendered more useful as manure.

In the Rural Economy of the Midland Counties it is noticed, that a turnip fallow was manured with Breendon lime, in general five quarters to an acre; part had double that quantity, and part had none. The turnip crop received no obvious advantage, but its effects on the barley were evident. The part not limed was the worse crop, nearly in the proportion of four to three. But the part limed with ten quarters to an acre was the best crop. Whence the common notion, that more than five quarters of Breendon lime to an acre is ruinous to crops, seems to be ill founded. And in the Economy of Norfolk, lime is said to be in good repute, though not in general use as a manure; different opinions being entertained respecting the value of it. This difference of opinion will ever remain, while general conclusions are drawn from particular incidents. It is used by many judicious farmers, even after marle, with success. Upon hot burning soils it is generally found of the greatest efficacy, and is perhaps the most effectual cure of scalds or burning patches of land that has yet been discovered; from these and other circumstances lime is there considered as a cold manure. The general method of applying lime is to let it fall in large heaps, and to spread it out of carts upon fallowed ground either for wheat or barley. The quantity set on is about three chaldrons an acre; the price 9s. or 10s. a chaldron. (Now much higher.) From experiments made on turnips, barley, and wheat, it appears that lime does not act as a manure until it has been thoroughly flaked in the soil; and it seems as if the rains of summer were necessary to promote its operation. But in some parts of Yorkshire lime is used invariably on every species of soil; and in most cases with great success. On the higher and more dry lands its utility is evident. At Malton it is laid on the calcareous quarry soil with success. Its use to the loose sandy soils is fully established. The prevailing crop is wheat on fallow. It is also pretty gene-

rally set on for rape, turnips, or other crops, after sod-burning, and spread among the ashes. It is also sometimes set on for barley. But its effect on the first crop, except of wheat or rape, is seldom perceptible.

But the benefit of lime to graze is a matter of dispute; it is even thought by some to be detrimental. It seems, however, to be a generally received idea, that lime laid on graze is not thrown away; for, whenever the land is turned up again, its benefit to corn will have full effect. The methods of liming are various. The worst is laying it in large heaps, and suffering it to run to a jelly before it is spread. Next to this, is setting it about the land in small hillocks; for, although they are spread before they approach to a state of mortar, yet this method is injudicious. Lime falling in the open air breaks into small cubical masses, which being once buried in the soil, remains in it for ages, without being mixed intimately with it. Lime ought therefore to be spread in a state of perfect powder. It is therefore the practice of judicious husbandmen to set lime upon the land in load-heaps, and spread it over the soil out of carts, as soon as it is sufficiently fallen. Or the load-heaps are turned over, not so much to finish the falling, as to gain an opportunity of burying the granular surface of the heaps; by which means, the fragments are at least lessened, if not reduced to powder. In the moor-lands the heaps are interlayered and covered up with moist turf or peat-mould, which bringing on a rapid fall, the whole is set on fire, and the surface kept free from granules by a covering of dry ashes. The heaps, therefore, whether great or small, should be covered up with soil, either of the field they are set in, or that of lanes or ditches carried to them for the purpose; and if a speedy fall be required, water thrown over this covering. If lime be used on fallows for wheat, it is generally spread in July, harrowed in as fast as it is spread, and ploughed under with a shallow furrow, as soon as convenient. The usual quantity is three or four chaldrons to an acre.

And "much depends upon the mode of applying the lime to the soil after calcination, according to Dr. Anderson. If it is spread as soon as it is flaked, while yet in a powdery state, a very small quantity may be made to cover the whole surface of the ground, and to touch an exceedingly great number of particles of earth; but if it is suffered to lie for some time after flaking, and to get so much moisture as to make it run into clods, or cake into large lumps, it can never be again divided into such small parts; and, therefore, a much greater quantity is necessary to produce the same effect, than if it had been applied in its powdery state. But if the soil is afterwards to be continued long in tillage (as these clods are annually broken smaller by the action of the plough and harrows), the lime must continue to exert its influence anew upon the soil for a great course of years: it will produce an effect nearly similar to that which would be experienced by annually strewing a small quantity of powdered lime over the surface of the soil; but as the lime must, in the first case, be paid by the farmer altogether at the beginning, which only comes to be successively demanded in the other case, this deserves to be attended to, as it may become a consideration of some importance where lime is dear, and money not very plentiful."

And it is constantly an object worthy of attention to remove the shells as soon as possible after the lime is drawn from the kiln; for it is known from experiment, that a ton of lime exposed twenty-two days to the air after calcination, is augmented in weight to thirty hundred weight, and some kinds of lime even to thirty-five; which is little less than double.

In order to understand the goodness of lime, it is remarked by the same writer, that the lime from pure lime-stone is always of a bright white, when perfectly calcined without a tendency to any colour. When it has any colour it proceeds from the sand, or other uncalcareous matters in its composition. There are, however, some sorts of sand that are of such a pure whiteness, as not to debase the colour of the lime in the smallest degree; but these are rare; and there are some matters that alter the colour of the lime a good deal, without debasing its quality in any considerable degree; but these are still more rare than the former. Hence it follows, that the best lime for the purpose of the farmer, is that which is lightest, softest to the touch, and whitest. Softness to the touch is not, however, it is conceived, an unequivocal proof of the purity of the lime. He has seen one kind of lime that contained a large proportion of an uncalcareous impalpable powder, that was as soft to the touch as the purest lime; but this was a singular exception to the rule that is very general. The more they deviate from either of these tests of purity, the worse they are for the purposes of agriculture. But if the lime-stone loses much of its weight in calcination, and the lime-shells are extremely light; if the shells require a very large proportion of water to slake them fully; if it is long before they begin to fall: if the lime-stone is not apt to run (or be vitrified) in the operation of burning; if it falls entirely when it gets a sufficient quantity of water, after it has been properly calcined; if it swells very much in slaking, and if the lime is light, fine to the touch, and of a pure white, it may be concluded that it is extremely good, and may be used in preference to any other lime that is inferior to it in any of these respects. These rules are perfectly sufficient to decide as to the comparative value of any two kinds of lime that may be proposed to one another, and may be relied upon as sufficiently accurate for the ordinary purposes of the farmer.

There are other methods by which the qualities or goodness of lime may be ascertained with exactness, but which are best performed by an expert chemist.

Proper Season for using Lime. In respect to the most proper time of using lime to lands, there seems some difference of opinion among farmers, as well as to the state in which it should be used; some supposing the best time to lay it on dry soils intended for turnips, is in autumn, while others think the beginning of summer, as May and June, better. Some, likewise, contend that it should be applied before it has been slaked; while others think it may be employed when even in a state of considerable moisture. The writer of the Farmer's Calendar, after putting the question, whether lime burnt in January should be then used or kept till spring, observes, that "there are two motives for burning stone or chalk; one is, for the sake of reducing the material to powder, for accuracy in spreading; the other is, for the application of a caustic body destructive of living vegetables. For the former purpose, the lime had better be kept; for the latter, it is usually laid on in such large quantities that it is not very material at what season it is spread, provided it be done fresh from the kiln. It will have a greater effect in spring and summer, but the superiority is not such as to induce delay from a time in which the teams have little to perform, to a season in which there is much work for them." And he further states, that "the grand effect of this manure is on uncultivated waste land. On moors, mountains, bog, and boggy bottoms, the effect is very great, but the quantity applied is considerable. The more the better. In Derbyshire, as far as 600 bushels an acre have been used; or 20 one horse cart

loads of 30 bushels: such a dressing, when the space to be improved is large, demands the employment of regular teams to be kept continually at work. In such undertakings, it is idle to be nice about the season of applying the manure; convenience demands that the work should go on at all seasons, but in the counties where lime is most used, the common season is summer, and on fallows."

And there cannot be any doubt but that it is the best practice to apply it either in the spring, summer, or early part of the autumn, and in a state as little moist as possible, as, under such circumstances, it may not only be laid on with the greatest convenience, but be spread out in the most even and regular manner, which is a point of considerable importance in this husbandry, and be laid on with less injury from treading the land, than could otherwise be the case.

The above writer also states, that "liming is, in many districts, connected with paring and burning, and it is one of the best methods of applying this manure. From a peck to a bushel, according to its plenty, is added to, and mixed with, every heap of ashes, and they are then spread together. The effect generally is considerable, but proportioned to the soil. The greatest effect of this manure is upon land that has been long in a state of nature; and particularly upon all peat soils, moors, mountains, and bogs. But upon all on which it is known to have effect, it is well applied in the ashes of paring and burning."

But though the application of this substance properly belongs to the occupiers of lands, it is necessary that the proprietors of them should render it as easy and convenient as possible, "either by searching for raw materials, opening quarries, and erecting kilns upon the estates under their care, or by bringing, from a distance, materials, fuel, or lime itself, at the least possible expence, through the means of improved roads, rail-ways, or water-carriage." And that the same principle holds good "with respect to marles, and other gross substances, to be used in their raw state; as the advantages arising therefrom will always, eventually, find their way into the rent-roll."

Doctor Anderson thinks it may be necessary to observe, that when farmers employ a great deal of lime, it sometimes happens that their horses' feet are burnt by it; which is extremely troublesome, and sometimes proves even fatal to the poor animals: a method of preventing or remedying that inconvenience will, therefore, be of use. The best method of preventing any inconvenience of this sort is to spread the lime, when in its powdery state, upon the field as evenly as possible, and to allow it to lie in that state some time before you begin to plough it. If the lime has been in fine powder, it will have become perfectly effete in a week or so; after which time it will be as little corrosive as any kind of common earth, so that the horses may work among it with perfect safety. But if it has been suffered to run into clods before it was spread, these, if not broken small, will be longer in absorbing their air, and, of consequence, will remain longer in an acrid state, so that the ploughing may, in that case, be deferred for a week longer, nor will it be even then so perfectly safe as the other. But if it becomes necessary at any time to plough in the lime immediately after it is spread, take care, says he, to do it only when the soil is perfectly dry; and in leading your horses to the plough, take care to prevent them from going through any wet place, so as to wet their hoofs or ankles; for lime acts not at all upon any dry substance; but when it is in its acrid caustic state, it will corrode the hair and flesh in a moment, if it has access to water. As soon as the horses are unyoked, keep their feet dry till you have got them

them carefully brushed, so as to wipe away all the dry powdery lime that may adhere to them; and if the least shower should fall, unyoke your horses immediately, and take them off the field. With these precautions, they may work among lime for any length of time, without receiving any damage whatever.

However, in case of any accident, by which a horse or man that is working among lime should be scalded by it, it is always advisable for every farmer who has work of that kind going forward, to keep a tub of very four milk, or whey, in some place ready to wash the part affected well with, which will quickly destroy the poignancy of the lime, and prevent the mischief that would otherwise arise from it. The sourer the milk or whey is, the better it will be for this purpose; it ought, therefore, to be long kept. For want of this, vinegar may produce the same effect, or very stale urine will be of use; but the milk or whey is the cheapest and best remedy, and ought always to be in readiness where lime husbandry is going on to any extent.

LIME, in *Botany*. See LEMON.

LIME-*Ammoniacal*, a kind of phosphorus, invented by Mr. Homberg, and made of sal ammoniac and lime. See *Ammoniacal PHOSPHORUS*, and LIME, *supra*.

LIME, *Bird*. See BIRD-lime.

LIME, *Brook*. See BROOK-lime.

LIME, *Burning*, a term signifying the process of converting lime-stone, chalk, marble, shells, and other calcareous substances into lime, by means of heat, in kilns properly constructed for the purpose. See KILN.

In these cases, the calcination is effected by different sorts of fuel, in different situations, but principally by fossil-coal, peats, or woods; these being laid in layers, alternately with those of the calcareous materials, in the kilns, and the process of burning continued for any length of time, by repeated applications of fuel and calcareous matters at the top, and drawing out the lime from below occasionally as it is burnt.

But mineral coal, or culm, are unquestionably the most convenient and suitable materials for effecting this business, where they can be procured in plenty, and at a sufficiently cheap rate, as they burn the stone, or other calcareous matter more perfectly, and, of course, leave fewer cores in the calcined pieces than when other sorts of fuel are employed for the purpose.

However, Mr. Dodgson has had much success in burning lime by the use of peats; as he states, in the *Farmer's Magazine*, that he is "convinced, from experience, that lime-stone can be burnt to better purpose, and at less expence, with peat than with coal. When coal is used, the lime-stones are apt, from excessive heat, to run into a solid lump, which never happens with peat, as it keeps them in an open state, and admits the air freely. The process of burning, also, goes on more slowly with coal. No lime can be drawn for two or three days; whereas, with peat, it may be drawn within twelve hours after fire is put to the kiln; and in every succeeding day nearly double the quantity of what could be produced by the use of coal. The expence is comparatively small. A man and a boy will dig as many peats in one day as will burn 60 Carlisle bushels of lime, (the Carlisle bushel is equal to three Winchester ones,) and the expence, including drying, will not exceed four, or, at most, five shillings; while the coal necessary for burning the same quantity of lime would have cost twelve shillings at the pit. The wetness of seasons is no argument against the use of peats, as they can be stacked near the kiln, when half dry, at any time of summer; the moisture will be exhaled from

them during winter, and they will be in a fit state for burning in the months of April or May. He lives in the north-eastern district of Cumberland, where the farmers, in general, burn their own lime; and though there is coal in the immediate neighbourhood, he gives a decided preference to peat, for the reasons above-mentioned." And it is well known, that this kind of fuel has been occasionally used in many parts of the kingdom for the same purpose, from a very early period, without any complaint of the want of success.

In the practice here stated, no particular form of kiln was found necessary, nor any particular sort of management in the process of calcination; the proportion of peat depending upon the nature of the lime-stone employed, and other circumstances.

It has been considered by Mr. Marshall, that "the manufacture of lime is an art of which the manager of an estate ought not to be ignorant." And he conceives, that "he ought to have, at least, a sufficient knowledge of its theory, to enable him, when occasion requires, to superintend or direct its practice. For it seldom answers, unless where materials are plentiful and fuel cheap, for every tenant upon an estate to manufacture his own lime. A full-sized kiln accumulates a stronger heat, with a given proportion of fuel, than a small one of the same form," which is without doubt a great saving.

It is supposed, that "the chief or sole intention of burning lime-stone for manure, appears to be that of reducing it in the readiest and cheapest manner to an impalpable powder. For experience sufficiently shews, that quick lime is injurious, rather than beneficial, to vegetation; and that burnt lime-stone does not operate as a manure until it has regained the fixed air, of which the fire deprived it. If it could be reduced by mechanic powers to powder of equal fineness, its effect, as manure, would doubtless be the same as that of dead lime (effete). It is in the perfect solution which well-burnt lime-stone has received, by the expulsion of its fixed air in the fire, so as to have completely loosened its texture, and unbound its every atom, that we are to look for its prompt effect and the shortness of its duration, comparatively with unburnt calcareous substances. Hence the main point to be attended to is to expel the whole of the air. For, unless this be accomplished, the solution becomes imperfect; the stones, instead of completely dissolving into impalpable atoms, break into granules, or flakes; leaving, perhaps, a firm core in the centre, to encumber, rather than to fertilize, the soil" on which they are applied. "There is, however, an opposite extreme to be avoided, and with greater care. For an unburnt stone may be returned to the kiln, but one which, by too intense a heat, is vitrified, or changed to a state of impure glass, is not only rendered useless, but has incurred an extraordinary waste of fuel. Consequently, stones that are prone to vitrification ought to be broken down into small pieces; otherwise, the fire is required to be so intense, that the surface becomes vitrified, before the air from the centre can be expelled." And "another suggestion, respecting the proper size of the stones to be burnt, may have its use. Where fuel is weak, or dear, the materials require to be broken into smaller fragments, than where a strong fire can be kept up at a small expence; while, under the latter circumstance, and where the stone is not prone to vitrification, much of the labour and expence of breaking may be saved, by using an extra quantity of fuel, and keeping up a strong fire in the kiln," or place where it is burned; the form or construction of which depends partly on the qualities and value of the materials, and partly on the kinds of fuel that are made use of, and the

the differences of their prices at the places where they are employed. See KILNS.

It is useful that the process of burning lime should go on during January and February, as well as most of the winter, and also in the summer months. Perpetual kilns are wrought in many districts, especially the northern ones, and in Ireland; the lime, when not taken away, being preserved, in sheds erected for the purpose, from the wet. The usual mode of managing with them is, for the farmers to contract for some sort of measure, according to the custom or practice of the particular district; being careful that it is well burnt, and of a proper quality in other respects. The differences in the expence of burning will depend on the abundance or scarcity of fuel, and the convenience of the stone for carriage.

LIME, *Calx, Calx viva*, in the *Materia Medica*, &c. is prepared by breaking a pound of lime-stone into small pieces, and heating it in a crucible in a very strong fire for an hour, or until the carbonic acid is entirely driven off, so that on the addition of the acetic acid, no bubbles of gas shall be extricated. Lime may be made by the same process from shells previously washed in boiling water, and cleared from extraneous matters. In the former pharmacopœias lime was ranked among the articles of the *Materia Medica*, and taken as prepared for its uses in the arts; but in the last London Pharmacopœia particular directions are given for obtaining it in a purer state. Two varieties of the carbonate are selected from which it may be prepared, *viz.* lime-stone and shells of oysters; the latter of which contains the least foreign admixture; but even the former, thus prepared, will be much purer than that which is usually made from chalk. According to Kirwan, carbonate of lime consists of 45 parts of carbonic acid and 55 of lime: but from whatever combination it be obtained, lime is always the same substance, possessing the same characters, and producing the same effects, though it may be different with regard to the proportion of heterogeneous matters with which it is mixed; and, therefore, the distinctions which were formerly made between its medical qualities, as obtained from different sources, were superfluous, and will not, in the present state of science, be likely to be renewed by the introduction of more than one. To the perfection of the lime it is necessary that the carbonic acid should be entirely expelled; but in the preparation of ordinary lime this is done very imperfectly; for to all common purposes it is sufficient if it be burnt so as to flake on the addition of water; on the other hand, it may also be noticed that where lime-stone is employed, the heat may be urged too far and be too long continued. The pure earths will not vitrify by heat, but many earthy admixtures readily will; and as most lime-stones contain some portion of other earths, they may, under these circumstances, vitrify, and form a coating over the surface of the lumps, which will defend them from the action of water, and thus prevent their slaking or solution; so that lime may thus be over-burnt. The pieces of stone used for burning should be as nearly as possible of equal size. If half its weight of water be poured upon lime, it swells and falls into a white powder, much heat is evolved, part of the water rises in steam, and part combines with the lime; this is called slaked lime, and in this state carbonic acid from the air easily attaches to it. When perfectly dry it may be kept in bottles for any length of time without alteration; but to obviate any chance of its being impure from the above cause, it is usual to direct its being employed newly prepared. Lime newly slaked, and to which more water is added, ought not to effervesce on the addition of an acid.

Lime is much used by tanners, skinners, &c. in the preparation of their leather; by soap-boilers for dissolving the oil, and facilitating its union with the alkaline salt; and by sugar-bakers for refining their sugar.

It is also of some medicinal use; being applied externally in defecative and epulotic medicines.

It is used also as a depilatory; and has been sometimes made into an unguent with honey for rheumatic and other obdurate fixed pains of the joints or limbs: this unguent is much commended by Fuller, who observes, that it is almost caustic. As an absorbent earth, it is anti-acid, and capable of absorbing the acid matters which are produced in digestion from the weakness of the stomach, in diseases proceeding from a spontaneous acid, so well described by Boerhaave. It is the fitter in these diseases, which are commonly the effect of the inactivity and weakness of the fibres, as it possesses a tonic quality, which other absorbent earths have not. Besides, persons afflicted with these diseases are subject to much wind, which is, perhaps, nothing else but gas; and quick lime is very capable of absorbing that fluid. As quick-lime is also drying, a little caustic, and consequently cicatrizing, it may contribute to cure certain ulcers, especially those of the soft parts. Accordingly, several able physicians have preferred it successfully for internal suppurations, and in the phthisis pulmonalis. Moreover, the property which quick-lime has of attenuating viscid matters, and of decomposing ammoniacal salts, has been advantageously applied to dissolve stones in the bladder and kidneys. But the best method of administering quick-lime internally has been thought to be by giving the lime-water; because this water is supposed to possess all the medicinal virtues of quick-lime, and because the earthy particles are thus reduced to the greatest fineness, and are, consequently susceptible of the most perfect distribution. However, this should be administered with great caution, and much diluted; and, after all, it is doubted, whether the lime-water, thus diluted, has all the medical qualities which might be expected from quick-lime. Macquer.

LIME, *Carbonat of*, a term applied to lime when slaked or in the state of lime-stone: when thus saturated it is in the least active condition. See **LIME-STONE**.

LIME, *Cream of*. See **CREAM**.

LIME Effete, that which has been slaked by the air and moisture of the atmosphere after long exposure.

LIME-Galls, in *Natural History*, a sort of galls or vegetable protuberances, formed on the edges of the leaves of the lime-tree in spring time; they are very common in the plantations of limes, and are irregularly shaped, but usually oblong and rugged, and of a reddish colour; they occupy only the edges of the leaves, and are of a red colour, sometimes very beautiful. As these are very plentiful, M. Reaumur was of opinion, that they might be of service in the dyeing trade; he made trial by rubbing them on some parts of his linen, and found that they gave a very beautiful red colour, which did not come out in the first washings afterwards. It is extremely probable, that there wants only inquiry to prove that we have many valuable productions of this kind, which, though disregarded at present, might prove of great use in the several mechanical arts as well as in medicine.

These galls of the lime-leaves are formed by a worm, which inhabits them during its term of life, being found in them of all sizes, from the most minute to that of the full growth, which is about half an inch in length; but when its period of life, as a worm, draws near, it deserts this habitation, and goes elsewhere to pass into its chrysalis state. See **GALLS**.

LIME Husbandry, a term used to signify that sort of management which relates to the application of lime on land. See **LIME**.

LIME-Kiln, a sort of kiln, constructed for the purpose of burning lime. Kilns of this nature are formed in a variety of different ways to save expence, and answer to the particular nature of the fuel. See **KILN**.

LIME, Quick, a term applied to lime in its most powerful or caustic state, before it has been rendered mild by the absorption of carbonic acid gas, or fixed air, from either the atmosphere or the soil.

LIME-stone, in *Agriculture*, a kind of calcareous stone, which is capable of being converted into lime by means of calcination. It would seem from the remarks that have been already made, in speaking of the nature of lime, that this sort of stone exists in different states of purity, and consists of different sorts of substances in different situations, from which much diversity in its effects, when converted into lime, is produced; some sorts being more proper for the purposes of agriculture, while others are better adapted to those of building, &c. See **LIME**.

It may be worthy of remark, that all such sorts of lime-stone as contain impurities, such as clay, sand, or stony matter in their compositions, are more proper in general for the purposes of agriculture, than for those of building. Where lime-stone is plentiful and fuel scarce, it might be employed for the purpose of husbandry with great advantage in its uncalcined state, after being pounded or ground into a fine powdery form, by means of mills or other machines. And it is stated in the Survey of the County of Perth, that in Rannoch, a district of that county very remote from coal, a machine was erected by the late commissioners of annexed estates for this purpose, which was driven by a stream of water. Mr. Stewart, of Crosmount, who saw the machine, the pounded lime-stone, and its effect on the land, favoured the author with the following remarks; "There were two pounders, and a third was afterwards added, all from Carron, at a small expence. The pounded lime-stone was carried from the machine by a small run of water to three different ponds, one above the other. The upper pond contained the grossest particles, and the lower pond the smallest or finest parts of the lime-stone, which resembled clay or marl from its smoothness." The middle pond contained that which, it would appear, Mr. Stewart thought to be properly pounded; because he adds, "the run of water might have been stronger, which would have enabled the mill to double the quantity grinded, which would serve the purpose of manure equally well, if not better, than by being pounded so very small. All that was pounded before the machine was carried off by a flood, or the most of it, was used by colonel Alexander Robertson, uncle to the present colonel Robertson of Struan, who had a farm in the neighbourhood of the mill. The effects of it were visible upon the ground, which were shewn by the colonel to different gentlemen, and approved of. It seems, however, that before its virtues could be fully ascertained by repeated and varied experiments, a torrent in the brook that drove the mill carried all the machinery away, or at least deranged it so that it was never restored. There is, it is supposed, little doubt of its beneficial effects on land; or of its effects being more powerful, in one shape or other, than those of the same quantity of calcined lime-stone, because the virtues must be in proportion to the quantity of calcareous earth in each. Any given quantity of raw lime-stone loses one-third of its weight when burnt into shells. Nothing is here dissipated except the water; all the calcareous earth remains. It is also found, that any

given quantity of shells produces double that quantity of powdered or flaked lime. Therefore, a quantity of raw lime-stone, a bushel for instance, has double the quantity of calcareous earth which is in a bushel of flaked lime: consequently its influence as a manure must be double. What is commonly supposed, and the writer thinks with probability by those who used both kinds, without making any accurate experiments, is that the effects of the raw lime-stone are slow, but more lasting; of the calcined lime, more immediate, but less durable.

And it has been stated in a periodical work, that "the difference between lime-stone, fresh from the rock, and that which has been calcined, consists in the former possessing, as one of its principal component parts, a very considerable proportion of fixed air or carbonic acid, a principle of which it is entirely deprived in the burning, if the operation is properly conducted; a circumstance well worth the attention of proprietors, as, in that state, its beneficial effects consist chiefly in the power it possesses of neutralising acids, or decomposing metallic oxyds; but upon the animal or vegetable substances it meets with in the soil, it can produce no alteration." For "many years ago, an attempt was made by lord Kames to use unburnt lime-stone as a manure; the success of which, it is believed, has not been recorded; indeed, the trial would probably, it is supposed, prove abortive, if made upon meads, or moorish lands, which, owing to the great quantity of vegetable matter they contain, cannot possibly be benefited by any substance possessing less activity than quick or caustic lime."

A machine for this use, that admits of being wrought by steam, wind, water, or the power of horses, is represented in *Plate Agriculture*, in which *a* represents a beam, supported by four strong posts joined together by transverse pieces of wood, as seen in the figure, and at the top sufficiently separated to allow the wheel to work; *b*, a wheel with a groove on the circumference, sufficiently deep to receive the beam *a*, with a large iron spindle or axis, moveable in a bush made of bell metal; *c*, a weight of a conical shape, of cast iron; the base studded with knobs or protuberances, about two inches long, or a diamond shape, terminating in a blunt point, and about five inches in circumference at the bottom; *d*, the face of the weight or pounder, which is hidden from view in the cut; *e*, a circular building sunk below the surface of the ground; the bottom prepared by a stratum of clay, well tempered, and mixed with a proportion of burnt lime-stone, powdered without being slacked, and forge ashes beat very small. When this is properly dried, a bed of sand, about 18 inches in thickness, is laid about it, and paved with common paving stones, of the kind used for streets; which, after being well beaten down, is covered with another bed of sand of the same thickness, which should be paved in the same manner, and afterwards well beaten down. The foundation of the building should be, at least, six feet below the common surface; which allows 18 inches for the clay, 30 inches for the two beds of sand, and 18 inches for the two courses of pavement. And the "circumference should consist entirely of hewn stone, at least the uppermost three feet of it; the stones of which should be strongly battled together with iron, and secured on the outside with numerous wooden posts drove into the earth, and different courses of pavement, extending at least six feet all round, carefully laid and well beaten down. A floor prepared in this manner, if it is not used too soon, will resist any force that can be let fall upon it. The lime-stone laid into it should not be too small, and should have a light bedding of sand, in soil, to give it stability. The building may be of any size, according to the powers

powers of the machinery, and the weight of the heater." Others have suggested, that the pounding of lime-stone may be greatly facilitated by a very simple contrivance; merely that of kindling a fire upon the surface of the rock, or round any quantity of the lime-stone after it is quarried, and exposing the stone to the heat of it for ten or twelve hours. During the heating, a great deal of it flies to pieces, and the remainder very readily gives way to the stroke of the hammer. It is also supposed, that considerable advantage may be derived from a machine of this kind, in reducing burnt lime-stone to a powder, before it is slaked by the action of the air or moisture, as, in that state, its operation upon the substances it meets with in the soil is much more considerable than after it has absorbed the fixed air; and when employed in building, it cements immediately, and may be used with equal advantage in the construction of aqueducts, pavements, and other situations exposed much to water, and where hard dryness is of importance.

It may be noticed, that the expense of such a machine will vary according to circumstances, but it cannot be great, and in many places it may be added to thrashing and corn mills, and the expense be scarcely noticed in that way.

It is obvious, that the analysis of lime-stone may be effected in the same way as that of other calcareous materials, except that where the stone is of a hard and firm texture, it should be reduced to a state of powder, in order to expedite its solution. Where the lime-stone subjected to analysis does not yield more than two-thirds of its weight of pure chalk, it can seldom be burnt with profit; unless in a country where fuel is cheap and lime is dear. Good lime-stone yields upwards of ninety *per cent.* That of particular quarries is almost wholly calcareous, as has been already seen.

Lime-stone Gravel, a hard sort of calcareous marble, that assumes the appearance of small stones or gravel, which, when spread upon the ground and mixed with it, gradually falls into smaller pieces, and fertilizes the soil in proportion as it breaks down and mixes with it. It is a sort of manure little known in Britain, although it is common in many parts of Ireland.

But after what has been already observed, little need be said as to the qualities or mode of applying this manure. The farmer will easily be able to perceive, that if the pieces of which this gravel consists are large, and dissolve but slowly, the quantity applied at one dressing ought to be great, and the effects will be slow and lasting; but if the gravel be small, it will require a smaller quantity, which will operate more quickly, and last for a shorter time, like all other calcareous substances in the same circumstances, or which are applied in the same manner to lands.

Lime-stone, in Mineralogy. See LIME.

Lime-stone, Aqueous. See DELOMITE and RHOMBSAR.

Lime-stone, Quartz. See KONT.

Lime-stone, Rock. See SWIN-STONE.

Lime-stone, Precipitate. See ARAGONITE.

Lime-water liquor calis, aqua calis, aqua calis simplex, or the *American Solution*, is prepared by pouring twelve pounds of boiling distilled water on half a pound of lime, and stirring them together; let the vessel be immediately covered, and left to stand for three hours; then keep the solution upon the remaining lime in stoppered glass bottles, and pour off the clear liquor when it is wanted for use. Lime is soluble in about 45 times its weight of water, or little more than one gram in one fluid-ounce, forming a transparent solution; hence the proportion here directed, is in fact more than is required for the saturation of the water; but the larger quantity

allows, moreover, for any impurity contained in the lime, and as it is a cheap article, the quantity used is scarcely of any importance. The process here adopted is simple, efficacious, and convenient, and by keeping the solution standing upon the lime it will always be saturated; and the place of any small of evaporation of lime which forms upon the surface, if exposed, will be supplied from the lime, which remains in a state ready for solution. *London Pharm.* 1829.

The general opinion of lime acting as a caustic, and consuming the bodies it was made to act upon, by means of the great quantity of particles of fire it contained, long denied any preparation of it a place among internal medicines; at length, water poured upon it was found to take in a part of its virtues, and to be a valuable medicine, and very safely to be given internally in large quantities.

For this purpose, a gallon and a half, or two gallons of water, were poured by degrees upon a pound of fresh-burnt quick-lime; the vessel shaken when the ebullition ceased, and then set by, till the undissolved lime had settled; after which, the liquor was poured off, and passed through a filter. Only a small portion of the lime is dissolved by the water, and the remainder gives a strong impregnation to large quantities of fresh water, though not so strong, as the first; great part remaining at last undissolved; this sediment, calcined again, becomes quick-lime, as before; and by repetitions of this process, nearly the whole may be dissolved. The solution has a strong styptic taste; and its effects in chemical mixtures are similar to those produced by quick-lime. In vessels quite filled with lime-water, and exactly closed, it may be kept unchanged for many months; but in open vessels, the calcareous matter soon separates from the aqueous fluid, and forms a crust or cream upon the surface, insipid and indissoluble as the earth in its natural state, and again convertible into quick-lime by repeated calcination. It is observed, that the quantity of calcareous matter that is thus separated from lime-water, is even greater than it ought to be, if it was exactly proportioned to the evaporation of the water; the cause of which is, that the quick-lime gradually recovers from the air as much gas as is necessary to deprive it of its properties of quick-lime, and to restore it to its state of impure calcareous earth, mild, effervescent, and insoluble in water. Hence lime-water by long exposure to air, loses most of its strength, and at last becomes almost insipid. It is necessary also, when this liquor is employed as a menstruum, to add some quick-lime in substance, in order to continue the impregnation of the water with the lime.

All lime is not equally good for the making of this water; but the several kinds differ, according to the substances they are made from. In Holland they make lime of sea-shells, which they find in vast abundance on their sea-shores. This was also a practice in the time of Dr Boerhaave; but the lime thus made, it has been said, is not fit for making lime-water. The water made from it does not keep long, and is less styptic and fortifying to the taste, and is greatly inferior to the water made with lime burnt from stones. The newer the lime is, the less it has been exposed to the air, and the drier it has been kept, and finally, the more it has held together without crumbling, or mouldering to powder, the better it is for making lime-water. *Mém. Acad. Par.* 1700.

It appears now, from the ingenious Dr. Allen's experiments, that one part of quick-lime is sufficient for five or six hundred parts of water. Water will dissolve but a certain portion of quick-lime; and how much that is cannot be easily ascertained. So far seems certain from Dr. Allen's experiments, that one pound of quick-lime is sufficient for making

making six hundred pounds of good lime-water; and that those who with Charas have supposed, that the second and third lime-water is weaker than the first, have been led into an error by the small quantity of water they used. And it has been generally believed, that in order to obtain good lime-water, the quick-lime must not only be recent and fully calcined, but also for one part of quick-lime only eight, ten, or, at most, twelve parts of water taken; as if it could impregnate no more. But the doctor says he has found, by many experiments, that it is altogether indifferent whether the water be hot or cold, poured on gradually, or at once, the water poured on the lime, or the lime thrown into the water; whether the quick-lime be in shells or flaked; or even exposed to the air for several months, the such quantities of the water as are commonly used; and if the quick-lime be fresh, whether for one pound of it, eight, ten, twenty, fifty, or five hundred pounds of water be taken. Only it is necessary, even for the first water after the ebullition is over, to stir and mix the lime with the water, and allow it time to impregnate itself; which is best known by the crust formed on its surface. Filtration indeed is not necessary, if it be not to prevent any undissolved lime being mixed with it; or cruils diminishing its transparency.

The doctor, for his own use, poured about eight pounds of boiling water upon a pound of stone quick-lime in a glazed earthen vessel. He drank about a pint and a half of this lime-water daily for about sixteen months; filling up the vessel, when necessary, with fresh water, sometimes hot and sometimes cold, without observing any difference in the lime-water, which he constantly filtered through grey paper before he drank it. He observed, that the lime was not exhausted after two years and two months, nor was the water sensibly weaker, when it stood a sufficient time on the lime, which he knew by the cruils that were formed. But the lime becoming considerably lighter, after it is long thus used, it at length requires several days to subside, and form the cruils, and after the cruils are formed, it does not leave half the water clear as it did at first. On the whole, this single pound of lime afforded the doctor about six hundred pounds of lime-water. He adds, that having taken lime-water made indifferently of lime-stone, or of chalk, or of shells, and sometimes made of all the three together, he was never able to discover any difference in their effects. But so much lime-water is not to be obtained from quick-lime, unless it be fresh, completely calcined, and free from heterogeneous substances; for if defective in any of these, it will yield proportionally less lime-water. Lewis's Mat. Med. and Jacquer's Chem. Dict.

Mr. Buriel has given an ample account of its effects in the French Memoirs, chiefly from his own experience. But he observes, it succeeded much better in Holland, &c. than in France. It is a powerful alterant, and, like a pure alkaline water, fitted to blunt and destroy acid ferments, which are the principles of all obstructions, and the cause of most chronic diseases. Its principal use is in cachexies, green-sickness, dropsy, scurvy, obstructions on the liver, spleen, &c.

Experience has shewn lime-water to be an excellent medicine in many cases; in the gravel and stone particularly. And it has also been found very serviceable in the gout, in habitual relaxations of the bowels, and in other cases of relaxation. In some kinds of the scurvy likewise it is of use; and is often applied with success externally to ulcers, &c.

Fabricius ab Aquapendente assures us, he cured a scirrhus spleen, and the dropsy, by a continued use of sponges

dipped in common lime-water, and placed near the part affected. Boyle's Works, Abr. vol. i. p. 80.

Lime-water, which was long looked on as a caustic, was, in the last century, found to be a very safe and valuable remedy. It is uncertain who first ventured to give it inwardly, but Willis, Bates, and Moreton, seem to have used it much.

Lime-water kills worms, and many other, if not all, insects. Hence Dr. Alston concludes, it might prove a good anthelmintic for children; and experience has confirmed this notion.

It is probable, that lime-water may be of great use in long sea-voyages, preventing the corruption of water, or insects breeding in it, as well as curing the diseases to which sea-sailing people are most subject. The experiment is certainly safe, easy, and attended with no expense; one pound of fresh well-burnt quick-lime of any kind being enough for a hoghead of water, which may not only be used for common drink by the diseased, or for prevention by the healthy; but also by boiling and exposing it to the air for a short time, it may be reduced to sweet water, and used in dressing the victuals of the most delicate.

The virtues of lime-water do not depend on its absorbency; and it may as justly be called antalkaline, as antacid.

Lime-water prevents, or long protracts, the putrefaction of animal substances. Dr. Alston also thinks that quick-lime in a ship's well would effectually prevent the corruption of the water, and consequently the putrid steams, or foul air, thence arising, which sometimes prove fatal to the crew.

The virtues of lime-water outwardly applied in many diseases of the skin, in excoriations, ulcers, gangrenes, &c. are well known. Perhaps there is not a better gargarism for several sorts of sores in the mouth and throat than lime-water. It has also been known to be of great use in the tooth-ache. Inwardly taken, lime-water has all the virtues of pure element, which are not a few; and on which probably depend the good effects of mineral waters, more than on the minerals they contain. Dr. Alston never found it caused thirst; on the contrary, he found it quenched thirst as well as simple water, and custom rendered it agreeable. Lime-water is notably detergent and attenuating, even more so than soap itself, of mucous, viscid, and other animal fordes, which makes it preferable, in many cases, to the purgals, as well as to mineral waters. In a word, lime-water may be said, in general, to purify the blood, with as good reason, as any other medicine whatever, especially from any putrid, purulent, or scorbutic foulness.

Dr. Lewis observes, that lime-water, drank to the quantity of a quarter of a pint three or four times a day, has been found serviceable in ferofulous complaints, fluxes, seminal weaknesses, and other disorders proceeding from an impurity of the fluids, or laxity and debility of the solids. It generally promotes urine; orientates the cuticular discharge; and, where the stomach is oppressed with viscid phlegm, expectoration. It for the most part binds the belly, and sometimes occasions a troublesome constiveness, unless this effect be occasionally provided against by the interposition of proper laxative. It answers best in cold, sluggish, phlegmatic, and corpulent habits; and is to be used more cautiously in hot, bilious dispositions, and where the patient is much enaciated, or the appetite weak, and at the time of any critical or periodical evacuation. It has been customary to impregnate lime-water with different materials,

nat-rials, partly for rendering it more acceptable to the palate and stomach, and partly for improving its medicinal efficacy against cutaneous defecations. The college of Edinburgh directed, in this view, three ounces of the shavings of the wood and bark of salutaris, one ounce and a half of sliced liquorice, and four drams and a half of bruised nutmegs; the college of London, half an ounce of salutaris bark, and one ounce of liquorice, with the addition, in some cases, of four ounces of rasped guaiacum wood, and three drachms of coriander seeds; to be macerated for four days in three quarts of lime-water, and the liquid strained off for use. These infusions are taken in the same quantities as the simple lime-water, by themselves, or with the addition of milk. Lewis's Mat. Med.

But Dr. Macbride observes, that the activity of lime-water is impaired by infusing vegetable substances therein, which contain much fixed air, such as the guaiacum or salutaris; for these woods, abounding in resin, give out their cementing principle, which, uniting with the dissolved quick lime, restores it to its original state of an inactive calcareous earth: therefore, when it is intended that these woods, or any other substance of the like nature, should give out their virtue to lime-water, and that the water should, at the same time, contain its due proportion of dissolved lime, some quick-lime ought to be added, during the time of maceration. He also observes, that as milk contains a large proportion of fixed air, it ought not to be mixed with lime-water, since it must necessarily take off from its activity. To the same purpose, Dr. Alton has observed, that there is scarcely any thing that is usually mixed and given along with lime-water, that does not, more or less, destroy its efficacy; for which reason he recommended it always to be taken alone. Macbride's Essays, p. 250. 251.

It is observed by Dr. Lewis, that lime-water dissolves, by the assistance of heat, mineral sulphur, vegetable oils and resins, and animal tats. It extracts also, in the cold, the virtues of sundry resinous and oily vegetables, and dissolves thick phlegm, and mucous matters, and the curd of milk, with which last it forms a white liquid, nearly similar to milk in its natural state. But the solvent power of quick-lime has been evinced by Dr. Macbride, and shewn to extend to a variety of different substances, as camphor, myrrh, gum guaiacum, asa fetida, aloes, castor, balsam of Tolu, mallich, jalap, and the cortex Peruvianus, which were found to yield strong solutions and tinctures; and these, he says, are more elegant medicines, and perhaps may be found more efficacious than the spirituous tinctures, since they will never become turbid, or separate on being mixed in any watery vehicle. And since the solvent power of quick-lime is found to depend on its depriving certain substances of that fixed air or carbonic acid, which is their cementing principle, it was natural to imagine that it might be usefully applied to the solution of the human calculus or stone.

Of the various substances examined by Dr. Hales, with a view of determining their respective quantities of fixed air, the human calculus was found to contain the largest proportion; above one-half of this mass consisting of fixed air. Nevertheless, if the caustic alkali, or lime-water, could be safely conveyed to it, these would absorb the fixed air, and the earthy parts, deprived of what bound them together, must presently fall to pieces. That lime-water is lithontriptic has been shewn sufficiently by Dr. Hales, and more fully by Dr. Whytt. See his Essay on the virtues of Lime-water, in the Cure of the Stone, and Edinb. Ess. &c. vol. ii. art. 13. p. 383. vol. v. art. 69.

This gentleman prefers calcined oyster-shell lime-water to any other; which he says, proves a more active menstruum

for this concrete, than that made from the stone limes; the dissolving power of the oyster-shell lime-water seeming, from Dr. Whytt's experiments, to be more than double to that of the stone lime-waters. Dr. Alton seems to think this a matter of indifference; and was himself cured chiefly by the stone quick-lime water before mentioned. This lithontriptic quality of lime-water has been farther confirmed by Dr. Alton, who has shewn the efficacy of lime-water in this respect, not only when made by the first infusion, and assailed by artificial heat, but even after fifty or more infusions, and in the common air. The doctor thinks that the energy of lime-water in this case probably consists in its penetrating detergency, whereby, insinuating itself among the solid parts of the calculi, or into their pores, it separates them, or diminishes their cohesion, but does not dissolve them. See LITHONTRIPTIC.

But the efficacy of quick-lime and caustic alkali in this intention, is now known to depend principally, if not entirely, on its power of absorbing the air, which binds calculous substances together. However, the alkali, when combined with oil, and made into soap, is not only so greatly obtunded thereby, as to lose much of its power, but the soap itself is so nauseous, that few persons can be induced to take it in a quantity sufficient to prove of much effect: it would, therefore, be a happy discovery if any vehicle could be found out that would sheathe the acrimony of the caustic alkali, so as to allow it to be taken in large and continued doses. Possibly, says Dr. Macbride, veal broth, or a decoction of marshmallow roots, might be found to answer this purpose; and lime-water might be taken at the same time, which would not at all interfere with the operation of the alkali, but rather add to its activity. Dr. Chittick's nostrum, which is found, after a perseverance of some months, actually to dissolve the stone, is said to be nothing more than the caustic alkali, given in veal broth. But lime-water, when taken alone, must often fail in producing any considerable effect as a lithontriptic, because it will lose much of its power, as Dr. Macbride has shewn, from the fixed air of the alimentary substances in the first passages, who, therefore, recommends it to be drank when the stomach is empty; and also, as Dr. Whytt and Dr. Macbride have proved by experiments, from the fixed air of the urine itself, which will saturate great part of the quick-lime, even when it hath reached the bladder. Macbride's Essays, ess. 5. passim.

Since there is but a small proportion of lime in the water, it may be thought that taking a few grams of the quick-lime in substance would prove much more effectual in the stone, than large quantities of lime-water. But this is a mistake; and hence Mrs. Stephens's egg-shells and snail-shells, if burnt to quick-lime, can never be equally successful with lime-water for the stone.

As for the *aquez benedicta composita*, or compound lime-waters, they are not to be compared with simple lime-water in the gravel; nor, in Dr. Alton's opinion, in any disease requiring this water.

The doctor adds, in his Appendix, that though he cannot yet determine how far lime-water may be proper, even in acute dysenteries, yet he has found it safe in febrile colds; and by the cases he there mentions, it seems probable that lime-water, by its diluent and diuretic qualities, may prove more useful in fevers than is at present believed.

However this may prove on farther trials, it may be said, in general, that lime-water is diluent, detergent, antiseptic, antispasmodic, diuretic, and vulnerary; useful in all diseases proceeding from, or accompanied with, obstructions in the bowels

bowels or glands, viscid phlegm, calculeous concretions, or putrefaction; and commended for the scurvy, ferophulae, gravel, consumptions, empyema-asthma, arthritis vaga, cedematous swellings, diabetes, fluor albus, fluxes, &c. and outwardly for diseases of the skin, ulcers, gangrenes, &c. It may be taken to the quantity of a pound, once, twice, or thrice a day; or used for common drink. See Dr. Alston's Dissertation on Quick-lime, and Lime-water, Edinb. 1752. See LITHONTRIPTIC.

LIME-Water, in *Gardening*, an useful kind of water, which is prepared by slaking caustic lime in soft water, in the proportion of half a peck of the former to thirty-two gallons of the latter, letting them remain some time before they are made use of, stirring them well, two or three times a day, for two or three days. It is a liquid which, when the lime has subsided, is found highly useful in clearing fruit-trees from the ravages of the Aphis puceron, or vine-fretter. It should be applied once a day by means of an engine, so as to be thrown as much as possible on the under sides of the leaves, and with considerable force, pressing the fore finger upon the end of the pipe, to make it spread like small rain, and taking care that every part of the tree be well watered. It should be done as much as possible in cloudy weather, and when the sun is off the walls. Where the trees have an easterly aspect, they may be watered about half-past eleven o'clock in the forenoon, and in a northern one, the first thing in the morning; but in a southern aspect, about four o'clock in the afternoon. But when northerly or easterly winds and frosty nights prevail, it should be discontinued till the weather becomes mild. The trees should always get dry before night, and never be watered when the sun is upon them. Care must likewise be taken that the grounds of the lime be not made use of, as it would make the trees have a disagreeable appearance, and perhaps be injurious. See PUCERON and VINE-FRETTOR.

LIME-Work, such works or kilns as are constantly employed in the manufacturing of lime. A late writer has thought it necessary, that the managers of estates should understand the nature of this sort of manufacture, though it is seldom necessary or eligible for a large proprietor of land to carry on his own lime-works, "unless during a limited time, at the outset of new works, to ascertain their value," as there are always enterprising men who will give more rent for a work, than the profits arising from it to a proprietor, even when under the direction and management of the most faithful person. They and the lands attached to them should rather be considered by such proprietors as farms, the building of kilns and sheds as erecting farm offices, and the laying out and constructing of roads, railways, &c. as general improvements of their estate; the tenants agreeing to work the quarries agreeable to articles, and to keep the kilns, buildings, and roads in states of proper repair.

LIME, in *Geography*, a town of America, in Grafton county, New Hampshire, situated on the E. bank of Connecticut river; 12 mils S. of Dartmouth college, and containing 1318 inhabitants.

LIMER, LYEMMER, or Lime-hourl. See *Blood-Hound* and *Dog*.

LIMERICK, in *Geography*, a county of Ireland, in the province of Munster, called from the town of the same name, which was, from the earliest times in Irish history, a place of considerable importance. At the time when the Irish chieftains did homage to Henry II. Daniel O'Brien, king of Limerick, was of the number. This prince appears to have been also sovereign of Clare, which was then called Thomond. Limerick is bounded on the north by the

counties of Clare and Tipperary, being separated from the former by the river Shannon, on the west by Kerry, on the south by Cork, and on the east by Tipperary. Its length from east to west is 40 Irish (51 English) miles. Its breadth from north to south 25 Irish (32 English) miles. It contains 386,750 acres, or 604 square miles Irish, equal to 622,975 acres, or 970 square miles English. There are 125 parishes, which by unions form 60 benefices, of which 33 only had parish churches at the time Dr. Beaufort published. The parishes are mostly in the dioceses of Limerick and Emly. The population was stated by Dr. Beaufort at 170,000, but it must have considerably increased. The soil of Limerick is extremely good for tillage, and very productive of grafs; especially those grounds which are called the *coracks*, whose fertility is proverbial, and is caused by the rich manure which is annually deposited by the overflowings of the Shannon. The heaviest and fattest beasts that are slaughtered at Cork are fed in this county; much butter is exported from it; the orchards produce a very fine cyder, and it is by no means destitute of trees and plantations. The pasture system, which has been on the decline in most parts of Ireland since the introduction of corn bounties, proposed by that enlightened friend of his country, the Rt. Hon. John Foster, when chancellor of the exchequer, still continues in Limerick, but is on the decline. Even when Mr. Young wrote in 1778, he observed a great increase of tillage; "thrice the corn grown that there was formerly; much pasturage broken up on this account, some bullock land and some sheep land." The same intelligent writer also speaks of improvement in the state of the poor, but this still wants amelioration. Limerick, though diversified by small hills, is not at all mountainous, except on the south-east, where it is bounded by the Galtees, a ridge of formidable mountains, that extend into Tipperary, and on the borders of Kerry, where it grows uneven, and forms a grand amphitheatre of low but steep mountains, which extends in a wide curve from Loughil to Drumeckolohen. In the first of these rises the river Maig, which crosses the county, and falls into the Shannon; as do many fine streams by which it is plentifully watered. In the western hills are the sources of the Feale and the Gale, which run westward through Kerry, and of the *Black* water which flows in a contrary direction through the county of Cork. Limerick is the county town; for which see the next article. There are no other towns of consequence. A colony of palatines from Germany was settled in this county about a century ago, by a former lord Southwell. Of these Mr. Young mentions some particulars which are interesting. "They have in general leases for three lives, or 31 years, and are not cottars to any farmer, but if they work for them, are paid in money. The quantities of land are small, and some of them have their feeding land in common by agreement. They are different from the Irish in several particulars; they put their potatoes in with the plough in drills, horse-hoe them while growing, and plough them out. One-third of the dung does in this method, for they put it only in the furrows, but the crops are not so large as in the common method. They plough without a driver: a boy of twelve has been known to plough and drive four horses, and some of them have a hepper in the body of their ploughs, which sows the land at the same time it is ploughed. Their course of crops, 1. Potatoes, 2. Wheat, 3. Wheat, 4. Oats; or 1. Potatoes, 2. Barley, 3. Wheat, 4. Oats: in which management they keep their land many years, never laying it out as their neighbours do. They preserve some of their German customs; they sleep between two beds: they appoint a burgomaster, to whom they appeal in case of all disputes; and

and they yet (1778) preserve their language, but that is declining. They are very industrious, and in consequence are much happier, and better fed, clothed, and lodged, than the Irish peasants. We must not however conclude from thence, that all is owing to this; their being independent of other farmers, and having leases, are circumstances which will create industry. Their crops are much better than those of their neighbours. There are three villages of them, about 70 families in all. For some time after they settled, they fed upon four crout, but by degrees left it oil, and took to potatoes; but now subsist upon them and butter and milk, but with a great deal of oat bread, and some of wheat, some meat and fowls, of which they raise many. They have all offices to their houses, that is, stables and cow-houses, and a lodge for their ploughs, &c. They keep their cows in the house in winter, feeding them upon hay and oat straw. They are remarkable for the goodness and cleanliness of their houses. The women are very industrious, reap the corn, plough the ground sometimes, and do whatever work may be going on; they also spin, and make their children do the same." The late Silver Oliver, esq. of Castle Oliver, planted another colony, taken from this first, of about 66 families, amounting to 700 Protestants, on his estate, and of these Mr. Young gives a similar account. But with these exceptions, the husbandry of the county of Limerick is perhaps the worst in Munster, which is attributed to the natural richness of the soil, and to the greater prevalence of the grazing system. Mr. Young says, that the rich land reaches from Charleville, at the foot of the mountains, to Tipperary by Kilsenning, a line of 25 miles, and across from Ardpetuch to within four miles of Limerick 16 miles. Bruff, Kilmallock, and Hospital have very good land about them; the quantity in the whole conjectured to be 100,000 acres. This is chiefly under bullocks. The corseilles on the Shannon are from two to three miles broad. There is also a light lime-stone land, for sheep and cows. Mr. Young, speaking of the land near Castle Oliver, in the rich district, says, "it is a rich, mellow, crumbling, putrid, sandy loam, 18 inches to three feet deep, the colour a reddish-brown. It is dry sound land, and would do for turnips exceedingly well, for carrots, for cabbages, in a word for every thing. I think, upon the whole, it is the richest soil I ever saw, and such as is applicable to every purpose you can wish; it will fat the largest bullock, and at the same time do equally well for sheep, for tillage, for turnips, for wheat, for beans, and in a word for every crop and circumstance of profitable husbandry." After some other particulars he concludes thus: "The face of the country is that of desolation; the grounds are over-run with thistles, ragwort, &c. to excess; the fences are mounds of earth, full of gaps; there is no wood, and the general countenance is such that you must examine into the soil before you will believe that a country, which has so beggarly an appearance, can be so rich and fertile." These remarks were written above 30 years ago, and improvement has since taken place, but they are still too applicable. Limerick is represented in the imperial parliament by three members, two for the county, and one for the city. This county has not yet had a statistical account of it published. Beaufort, Young.

LIMERICK, a city of Ireland, capital of the county of the same name, strongly situated on the river Shannon, on an island in which it is partly built. It is a port-town, and is represented in parliament. The new port, which is connected with the old city by a bridge, is called Newtown Pery, from the Pery family, the head of which is now earl of Limerick, whose estate it is. The buildings are of brick, large, and uniform, so that whilst the old

town has a very ruinous appearance, this port will bear comparison with the best streets in almost any other city, except where public buildings contribute to ornament them. The public buildings are not many, or deserving of much notice. The custom-house is a plain building. The cathedral is an ancient and venerable pile. The bishop's palace is a comfortable modern house at the well end of the city. The corporation of Limerick is what may be called a close one, as no person can become a freeman, except by favour of the council; freeholders, however, can vote at the election of members of parliament. The magistrates are a mayor, two sheriffs, a recorder, a town- clerk, aldermen and burgesses; it hath also a military governor, constable and town major, and is the residence of the general commanding a district. The population probably exceeds 50,000. The trade of Limerick is very extensive, and is rapidly increasing. Its export of corn is perhaps the greatest in Ireland, and its corn-market is very convenient. It must more and more derive benefit from the canal connecting the Shannon with the Liffey. There are six churches, a Presbyterian meeting-house, a Methodist meeting-house, a Quakers' meeting-house, and several chapels for Roman Catholics, who form the greatest part of the population. There are also some charitable institutions well attended to, and a public library, lately instituted. The inhabitants are reckoned gay and fond of society, and public amusements are in general well supported. Limerick, being naturally a city of strength, and formerly well fortified by art, has always been deemed a place of considerable importance. In 1651 it was taken by Ireton, in the service of the parliament, after a vigorous siege. In 1690, it was unsuccessfully besieged by king William in person. In 1691, it surrendered to general Ginkle, afterwards earl of Athlone, on terms of capitulation very advantageous to the besieged, and all who professed the Roman Catholic religion, which are called the *articles of Limerick*. Limerick is 94 Irish miles S.W. from Dublin. Beaufort, Young, Carlisle.

LIMERICK, a bishopric of Ireland, in the ecclesiastical province of Cashel, united to the bishoprics of Ardferret and Aghadoo, in the year 1663. The two latter have been long incorporated so as to form but one diocese; the dignity of archdeacon, and the ruined walls of a church with a round tower, are all the memorials of the bishopric of Aghadoo that now remain. The whole union comprehends great part of the county of Limerick, the whole of Kerry, and a few parishes in the counties of Cork and Clare. There are in all 176 parishes, which are united so as to form 88 benefices, and of these only 47 have churches, and 14 glebe houses. It is to be remembered, however, that the population is not Protestant. Beaufort.

LIMERICK, a port-town of America, in York county and state of Maine, near the confluence of Oolippe river with Saco, and opposite to Gorham; incorporated in 1787, and containing 905 inhabitants.—Also, a township in Montgomery county, Pennsylvania, containing 999 inhabitants.

LIMPSOL, LIMASSOL, or LIMISSO, a town of the island of Cyprus, formerly *Nemofia*, is now in a miserable state, abounding with ruins and rubbish. Its harbour, however, is not a little frequented; here vessels are loaded with grain, cotton, and other productions of the soil. The best Cyprus wines are made in its environs, and it is the emporium of all those of the island who are concerned in trade. Not far from this town, if it deserves that appellation, stood the ancient "Limassol," which still, at a period of remoter antiquity, was called *Amathus*, celebrated for a temple consecrated to Venus and Adonis, in which was preserved,

preserved, according to Pausanias, a rich necklace of precious stones, ornamented with gold, the work of Vulcan, and given in the first instance to Hermione. But this ancient town is destroyed. (See AMATHUS.) Near Limassol, E. of it, is the most southern promontory of the island, formerly named the promontory of *Agathiri*, at present Cape di Gatti or *Gatto*, on account of the great number of cats kept by the monks, who, in the 4th century, obtained permission to establish themselves there, as well as on mount Olympus, on condition of keeping many of those animals for hunting and destroying snakes, which had multiplied in the island. (See CATTO and CYPRUS.) Limassol is the see of a bishop, suffragan of Nicotia. N. lat. 34° 45'. E. long. 32° 30'.

LIMESTONE, a post-town of America, in Kentucky, on the S. side of Ohio river, and on the W. side of a small creek of the same name. This is the usual landing place for people who come down in boats with an intention of settling in the upper parts of the state, and here the champagne country on the E. side of the river begins; four miles N.E. of Washington. N. lat. 38° 40'. W. long. 84° 17'.

LIMETREE, in *Gardening*, is a tree of the deciduous kind, occasionally used in plantations for its wood, &c. There are four species, each of which is capable of being raised from layers and cuttings.

It is suggested by Mr. Nicol, that this sort of tree succeeds in the most perfect manner, in "low, deep, sub-humid booms," but that "in dry gravelly soils, it loses the beautiful gloss of its foliage, for which it is so much admired in the early summer season."

It may be noticed that the timber of the limetree is used by carvers, it being a soft light wood; as also by architects for framing the models of their buildings, &c. The turners likewise use it for making light bowls, dishes, &c. but it is too soft for any strong purposes. See CUTTINGS, in *Botany*, *Gardening*, and *Painting*. See also TULIN.

LIMETREE BAY, in *Geography*, a bay on the S. coast of Santa Cruz. N. lat. 27° 45'. W. long. 63° 27'.

LIMETUM, in *Botany*, appears from Pliny to be a name of Gallic origin for a plant with which the ancient Gauls poisoned their arrows. This appellation, however, could not have been originally applied to the present genus, all the species of which are natives of the Cape of Good Hope. Linn. Gen. 182. Schreb. 246. Willd. Sp. Pl. v. 2. 201. Mart. Mill. Dict. v. 3. Art. Hort. Kew. ed. 2. 337. Juss. 314. Lamarck Illustr. t. 275. Gertn. t. 79. —Class a 1 order, *Hyptanthia Digyna*. Nat. Ord. *Urticaceae*, Linn. *Urticaceae*, Juss.

Gen. Ch. Cal. P. distinct inferior, permanent, of five, ovate, acuminate, carinate leaves, membranaceous at the margin, two of them exterior. Cor. Petals five, equal, ovate, with a slight claw, obtuse, shorter than the calyx; recurv forming a margin round the germen, bearing the anthers. Stam. Filaments seven, awl-shaped, shorter than the corolla; anthers ovate. Pist. Germen inferior, globose. Style clavate, cylindrical, shorter than the stamens; stigma rather obtuse. Peric. Capsule globose, of two cells. Seeds foliary, hemispherical, hollow.

Or. We are induced to follow the opinion of Linnæus respecting the capsule of this genus, as it undoubtedly belongs to the *Portulacæ* of Jussieu. See CROCEAE and Schreb.

Ess. Ch. Calyx of five leaves. Pet. five, equal. Capsule globose, of two cells. Seeds foliary, clavate.

1. *L. africanum*. Linn. Sp. Pl. 288. Thunb. Prod. 68. —Leaves oblong, on footstalks. —A native of the Cape,

whence it was brought by Mr. Francis Masson into the Royal Garden at Kew in the year 1774. It flowers in June and July. Linnæus justly remarks, that this tree has the appearance of *Corrigiola* or *Telyllium*. "The root is perennial. Stems prostrate, feeble, a span long, a cubit thick, perennial at the base. Leaves alternate, remote, linear-lanceolate, or oblong, about an inch in length. Corymbs of green and white flowers terminal, foliary, compound, naked, on long stalks. Martyn says that the leaves of this are subject to vary; for that in the Bankian herbarium may be seen linear, oblong, ovate, roundish and spatulate leaves, if the specimens be all of one species."

2. *L. capense*. Willd. v. 2. Thunb. Prod. 68. (Linnæum; Mart. Mill. Dict. v. 3. *L. aphyllum*; Linn. Suppl. 214.) —Leaves ovate, sessile. —It is curious that the younger Linnæus should have given this the specific name of *aphyllum*, remarking that it appears to be without leaves, when at the same time he describes them as ovate and sessile. Martyn, judging from Masson's figure in the Bankian herbarium, says that *L. capense* is a small plant, extremely woody at the bottom. Leaves ovate, about sessile, and as woolly as those of mullein; radical ones numerous; stem-leaves fewer.

3. *L. athiopium*. Willd. and Thunb. —Leaves linear-lanceolate. This species is only known from a description by Thunberg and adopted by Willd. now a delusion. The last author justly observes, that we have a delusion in instance, in these three species of *Limnan* of two forms which are not given for the sake of true distinction; all the plants being natives of the Cape, though severally called *africanum*, *capense*, and *athiopium*.

We further learn from professor Martyn, that there is a fourth species in the Bankian herbarium, which is truly a shrub, and may be called *L. fruticosum*.

LIMINGO, in *Geography*, a town of Sweden, in the government of Uleå; 11 miles S. of Uleå.

LIMINGTON, a town of America, in York county, and state of Maine, bounded N. and E. by Saco river; 50 miles N. of York.

LIMIT, in *Mathematics*. See LIMITS.

LIMIT of distant vision, in *Optics*. See DISTANCE VISION.

LIMITATION, **LIMITATION**, in *Logic*, is a certain time assigned by nature, within which an action must be brought; and limitation of time is twofold; *viz.* to make title to an inheritance by the common law; and in writs by several statutes. There is a limitation in real and personal actions; and in the former, he that will sue for any lands or hereditaments, ought to prove, that he or his ancestors were seized of the lands sued for by writ of assize, or he cannot maintain his action; and this is called limitation of assize. Stat. West. 1. See WRIT OF RIGHT and STATUTE of LIMITATION *infra*. Also INFORMATION.

There is no limitation with regard to the time within which any actions touching personal estate may be brought; so that I have never seen the times of Richard I. and Henry III.; for by that time the Statute of limitation, 22 Hen. VIII. c. 5. had taken place, and extended to any writ of right of any tenement, *freehold*, or estate of *duration*, *hereditament*, or *leasehold*. And thus, perhaps Elfrida, upon very good reason, because it may very easily happen, that the title to an advowson may not come into question, nor the right have an opportunity of being tried, within 60 years, which is the longest period of limitation assigned by the statute of Henry VIII. See ADVOWSON and INCURSION.

Limitation of time. See ENTRY.

Limitation of time, in a legal sense, imports how long

the estate shall continue, or is rather a qualification of a precedent estate. As where one doth give lands to a man to hold to him and his heirs male, and to him and the heirs female, &c. here the daughters shall not have any thing in it, so long as there is a male; for the estate to the heirs male is first limited. Co. Litt. 313.

A limitation is denominated by Littleton (§ 380. 1 Inst. 234.) a "condition in law." For where an estate is so expressly confined and limited by the words of its creation, that it cannot endure for any longer time than till the contingency happens, upon which the estate is to fail, this is denominated a "limitation;" as when land is granted to a man, *so long* as he is parson of Dale, or while he continues unmarried, or *until* out of the rent and profits he shall have made 50*l.* and the like. (10 Rep. 41.) In such case the estate determines as soon as the contingency happens, and the next subsequent estate, which depends upon such determination, becomes immediately vested without any act to be done by him who is next in expectancy. But when an estate is, strictly speaking, upon "condition in deed," (as if granted expressly *upon condition* to be void upon the payment of 40*l.* by the grantor, or *so that* the grantee continues unmarried, or *provided* he goes to York, &c. Rep. 41.) the law permits it to endure beyond the time when such contingency happens, unless the grantor, or his heirs or assigns, take advantage of the breach of the condition, and make either an entry or a claim, in order to avoid the estate. (Litt. § 347. Stat. 32 Hen. VIII. c. 24.) Yet though strict words of condition be used in the creation of the estate, if on breach of the condition the estate be limited over to a third person, and does not immediately revert to the grantor or his representatives, (as if an estate be granted by A to B, on condition that within two years B intermarry with C, and on failure thereof then to D and his heirs,) this the law construes to be a limitation and not a condition (1 Vent. 202.); because, if it were a condition, then upon the breach thereof, only A or his representatives could avoid the estate by entry, and so D's remainder might be defeated by their neglecting to enter; but, when it is a limitation, the estate of B determines, and that of D commences, and he may enter on the lands the instant that the failure happens. So also, if a man by his will devises land to his heir at law, on condition that he pays a sum of money, and for non-payment devises it over, this shall be considered as a limitation; otherwise, no advantage could be taken of the non-payment, for none but the heir himself could have entered for a breach of condition. Cro. Eliz. 201. 1 Roll. Abr. 411. Blackst. Com. b. ii.

LIMITATION of the Crown. The statutes 1 W. & M. cap. 8. 12 W. III. cap. 2. and 1 & 2 Ann. cap. 17. 4 Ann. cap. 8. &c. are acts for the limitation of the crown, and settling it on Protestant heirs in the house of Hanover. See CROWN.

LIMITATION, Statutes of, a species of plea in bar, in which a person may plead the time limited by certain acts of parliament, beyond which no plaintiff can lay his cause of action. This, by the statute of 32 Hen. VIII. c. 2. in a writ of right is *sixty* years; in assises, writs of entry, or other possessory actions real, of the seisin of one's ancestors, in lands; and either of their seisin, or one's own, in rents, suits, and services, *fifty* years; and in actions real for lands grounded upon one's own seisin or possession, such possession must have been within *thirty* years. By stat. 1 Mar. II. c. 5. this limitation does not extend to any suit for advowsons. (See above.) But by the statute 21 Jac. I. c. 2. a time of limitation was extended to the case of the

king, *viz.* *sixty* years precedent to 19th February, 1623. (3 Inst. 183.) but this becoming ineffectual by efflux of time, the same date of limitation was fixed by statute 9 Geo. III. c. 16 to commence, and be reckoned backwards, from the time of beginning any suit, or other process, to recover the thing in question; so that a possession for *sixty* years is now a bar even against the prerogative, in derogation of the ancient maxim "*nullum tempus occurrit regi.*" By another statute, 21 Jac. I. c. 16, *twenty* years are the time of limitation in any writ of formedon; and by consequence, *twenty* years are also the limitation in every action of ejectment; for no ejectment can be brought, unless where the lessor of the plaintiff is entitled to enter on the lands; and by the statute 21 Jac. I. c. 16. no entry can be made by any man, unless within *twenty* years after his right shall accrue. Also, all actions of trespass (*quare clausum fregit*, or otherwise) detinue, trover, replevin, account, and sale, (except upon accounts between merchants), debt on simple contract, or for arrears of rent, are limited by the statute last-mentioned to *six* years, after the cause of action commenced; and actions of assault, menace, battery, mayhem, and imprisonment, must be brought within *four* years, and actions for words within *two* years after the injury committed. And by the statute 31 Eliz. c. 5. all suits, indictments, and informations, upon any penal statutes, where any forfeiture is to the crown alone, shall be sued within *two* years, and where the forfeiture is to a subject, or to the crown and a subject, within *one* year after the offence committed; unless where any other time is specially limited by the statute. Lastly, by statute 10 W. III. c. 14, no writ of error, *scire facias*, or other suit, shall be brought to reverse any judgment, fine, or recovery for error, unless it be prosecuted within *twenty* years. The use of these statutes of limitation is to preserve the peace of the kingdom, and to prevent those innumerable perjuries which might ensue, if a man were allowed to bring an action for any injury committed at any distance of time. Upon both these accounts the law therefore holds, that "*interest reipublice ut sit finis litium,*" and upon the same principle the Athenian laws in general prohibited all actions, where the injury was committed *five* years before the complaint was made. If, therefore, in any suit, the injury or cause of action happened earlier than the period expressly limited by law, the defendant may plead the statutes of limitations in bar; as upon an *assumpsit*, or promise to pay money to the plaintiff, the defendant may plead *non assumpsit infra sex annos*; he made no such promise within *six* years; which is an effectual bar to the complaint. Blackst. Com. b. iii.

LIMITED FEES, denote such estates of inheritance as are clogged or confined with conditions, or qualifications of any sort. These are of two sorts, *viz.* *qualified* or *base-fees*, and *fee-conditional*, or *fee-tail*. See *BASE-FEES*, and *FEES-TAIL*.

LIMITED Problem, is that which admits but of one solution, or which can only be solved one way: as to make a circle pass through three points given, not lying in a right line, to describe an equilateral triangle on a line given, &c. See **PROBLEM**, and **DETERMINATE**.

LIMITROPHOUS COLUMN. See **COLUMN**.

LIMITS, in *Mathematics*, a term sometimes used, in general, for quantities, one of which is greater, and the other less than another quantity. Thus, in the quantities, *a, x, b*, if *a* be less than *x*, and *b* be greater than *x*, *a* and *b* are said to be limits of *x*. The word occurs in this sense, when we speak of the limits of the roots of equations.

Sometimes a quantity is said to be a limit between two others, when it is greater than the one and less than the other. So a ratio is said to be a limit between two other ratios,

ratios, when it is greater than the one, and less than the other.

But limit is often used in a more restricted sense; thus, when a variable quantity approaches continually to some determinate quantity, and may come nearer to it than to have any given difference, but can never go beyond it; then is the determinate quantity said to be the limit of the variable quantity.

Hence, the circle may be said to be the limit of its circumscribed and inscribed polygons; because these, by increasing the number of their sides, can be made to differ from the circle less than by any space that can be proposed, how small soever.

The limit of a variable ratio, is some determinate ratio, to which the variable ratio may continually approach, and come nearer to it than to have any given difference, but can never go beyond it. Hence, the ratio of the ordinate to the sub-tangent of a curve, is said to be the limit of the variable ratio of the differences of the ordinates, to the differences of the abscissæ.

The word limit, in this sense, signifies the same as what sir Isaac Newton calls a first or prime, and a last or ultimate ratio.

There are two cases of a variable quantity, or variable ratio, tending to such a limit, as we have been describing. In the first case, the variable quantity, or ratio, will not only approach to its limit within less than any given difference, but will actually arrive at its limit.

In the second case, the variable quantity, or ratio, will only approach its limit within less than any given difference, but will never actually arrive at it.

Sir Isaac Newton, to avoid the harshness of the hypothesis of indivisibles, and the tediousness of demonstrations, according to the method of the ancients, by deductions *ad absurdum*, has premised several lemmata, in the first section of the first book of his Principles, relating to the first and last sums, and ratios of nascent and evanescent quantities; that is, to the limits of sums and ratios. This doctrine chiefly depends on the first of those lemmata; the words of which are, "Quantitates ut & quantitatuum rationes, quæ ad æqualitatem tempore quovis finito constanter tendunt, & ante finem temporis illius propius ad invicem accedunt quam pro data quavis differentia, sunt ultimo æquales."

The learned gentlemen, who have written in defence of sir Isaac, against the author of the Analyst, are not agreed among themselves as to the precise meaning of this lemma. One of these gentlemen says, that the genuine meaning of this proposition is, that those quantities are to be esteemed ultimately equal, and those ratios ultimately the same, which are perpetually to each other, in such a manner, that any difference, how minute soever, being given, a finite time may be assigned, before the end of which, the difference of those quantities, or ratios, shall become less than that given difference. See Pref. State of the Rep. of Letters for Oct. 1735, and for Oct. 1736.

What sir Isaac Newton intends we should understand by the ultimate equality of magnitudes, and the ultimate identity of the ratios proposed in this lemma, will be best known from the demonstration annexed to it. By that it appears, sir Isaac Newton did not mean that any point of time was assignable, wherein these varying magnitudes would become actually equal, or the ratios really the same; but only that no difference whatever could be named, which they should not pass. The ordinate of any diameter of an hyperbola, is always less than the same continued to the asymptote; yet the demonstration of this lemma can be applied, without changing a single word, to prove their ultimate equality.

The same is evident from the lemma immediately following, where parallelograms are inscribed, and others circumscribed to a curvilinear space. Here the first lemma is applied to prove, that by multiplying the number, and diminishing the breadth of these parallelograms *in infinitum*, that is, perpetually and without end, the inscribed and circumscribed figures become ultimately equal to the curvilinear space, and to each other; whereas, it is evident, that no point of time can be assigned, wherein they are actually equal; to suppose this were to assert, that the variation ascribed to the figures, though endless, could be brought to a period, and be perfectly accomplished; and thus we should return to the unintelligible language of indivisibles. The excellence of this method consists in making the same advantage of this endless approximation towards equality, as by the use of indivisibles, without being involved in the absurdities of that doctrine. In short, the difference between these two may be thus explained.

There are but three ways in nature of comparing spaces: one is by shewing them to consist of such, as by imposition on each other will appear to occupy the same place: another is, by shewing their proportion to some third; and this method can only be directly applied to the like spaces as the former; for this proportion must be finally determined by shewing when the multiples of such spaces are equal, and when they differ: the third method to be used, where these other two fail, is by describing upon the spaces in question such figures as may be compared by the former methods; and thence deducing the relation between those spaces, by that indirect manner of proof, commonly called *ductio ad absurdum*; and this is as conclusive a demonstration as any other, it being indubitable, that those things are equal which have no difference. Thus Euclid and Archimedes demonstrate all they have written concerning the comparison and mensuration of curvilinear spaces. The method advanced by sir Isaac Newton for the same purpose differs from their's, only by applying this indirect form of proof to some general propositions, and from thence deducing the rest by a direct form of reasoning. Whoever compares the fourth of sir Isaac Newton's lemmas with the first, will see, that the proof of the curvilinear spaces, there considered, having the proportion named, depends wholly upon this, that if otherwise the figure inscribed within one of them, could not approach, by some certain distance, to the magnitude of that space: and this is precisely the form of reasoning, whereby Euclid proves the proportion between the different circles. As this method of reasoning is very diffusively set out in the writings of the ancients; and sir Isaac Newton has here expressed himself with that brevity, that the turn of his argument may possibly escape the unwary, the reading of the ancients must be the best introduction to the knowledge of his method. The impossible attempt of comparing curvilinear spaces, without having any recourse to the forementioned indirect method of arguing, produced the absurdity of indivisibles.

As the magnitudes, called in this lemma ultimately equal, may never absolutely exist under that equality; so the varying magnitudes holding to each other the variable ratios, here considered, may never exist under that, which is here called the ultimate ratio. Of this sir Isaac Newton gives an instance, from lines increasing together by equal additions, and having from the first a given difference. For the ultimate ratio of these lines, in the sense of this lemma, as sir Isaac Newton himself observes, will be the ratio of equality, though these lines can never have this ratio; since no point of time can be assigned, when one does not exceed the other.

In like manner, the quantities called by sir Isaac Newton vanishing, may never subsist under that proportion here esteemed their ultimate.

In the case of drawing tangents to curves, where the ordinate bears the same proportion to the subtangent, as that wherewith the difference of the ordinates, to the difference of the abscissæ, vanish; these lines must not be conceived, by the name of an evanescent, or any other appellation, ever to subsist under that proportion: for should we conceive these lines, in any manner, to subsist under this proportion, though at the instant of their vanishing, we shall fall into the unintelligible notion of indivisibles, by endeavouring to represent, to the imagination, some inconceivable kind of existence of these lines between their having a real magnitude, and becoming absolutely nothing. Sir Isaac Newton was himself apprehensive, that this mistake might be made; for as he thought fit (in compliance with the bad taste which then prevailed) to continue the use of some loose and indistinct expressions resembling those of indivisibles, for which he has himself apologized, he expressly cautions us against misinterpreting him in this manner, when he says: "Si quando dixerō quantitates quā minimas vel evanescentes, vel ultimas, cave intelligas quantitates magnitudinis determinatas, sed cogita semper diminuendas sine limite." Thus expressly has he declared to us, that vanishing quantities, or whatever other less accurate appellation he names them by, are to be considered as indeterminate quantities bearing to each other, under their different magnitudes, different proportions; which the quantities themselves can never obtain, and the limit of these proportions is that, for the sake of which these quantities are considered: inasmuch, that since these quantities have different proportions, while they obtain the name of vanishing quantities, the term ultimate is necessarily added to denote that proportion, which is the limit of an endless number of varying ones. The like remark is necessary, when these quantities are considered in the other light, as arising before the imagination: for then the proportion intended must be specified, by calling it the first, or prime proportion of these quantities. And as this additional epithet is necessary to express the proportion intended, so it is absurd to apply it to the quantities themselves; as sir Isaac Newton says, there are "rationes primæ quantitatum nascentium," but not "quantitates primæ nascentes." *Philosoph Transactions*, N 342, p. 205.

So that, according to the author we have been quoting, all the examples given by sir Isaac in the before mentioned section, are to be understood of such limits or ultimate ratios, as are never attained to by the quantities and ratios limited, but to which these may approach indefinitely, that is, so as to differ less than by a given quantity.

On the other hand, a learned gentleman, who assumed the name of Philalethes Cantabrigiænsis, thinks that sir Isaac means, by the words of the lemma, and proves, in his demonstration, not that the quantities or ratios are barely to be considered as ultimately becoming equal, or are to be esteemed as ultimately equal; though, in reality, they can never have that proportion to each other; but that they do at last become actually, perfectly, and absolutely equal. *Pres. State of the Republic of Letters for November 1735*, p. 371.

He also distinguishes, as above, between quantities and ratios which arrive at their limits, and those which do not. And it is insisted on, that every one of the examples given in the lemmata of this first section of the first book of sir Isaac's Principles, are of such quantities and ratios as actually arrive at their respective limits; nor is there an in-

stance there given of a quantity, or ratio, which never arrives at its limit, except one at the latter end of the scholium of this section (and that by way of illustration of a particular objection only) of two quantities, having a given difference, and being equally increased, *ad infinitum*, and whose ratio, it is admitted, never arrives at its limit. But decreasing quantities may really and in fact be diminished *ad infinitum*: for they may vanish and come to nothing. The ratio, therefore, of these, says he, may arrive at its limit; though that of the others cannot.

Neither are these learned gentlemen agreed as to the sense of the word *vanishing* or *evanescent*, in the scholium of this first section of sir Isaac's Principles.

The question is, whether the quantities that vanish are understood to spend some finite time in vanishing, or to vanish in an instant, or point of time; and consequently, whether they bear one to another an infinite number of different successive ratios during the vanishing, or one ratio only, at the point or instance of their evanescence.

This last is the sense in which Philalethes takes the word *evanescent*, or *vanishing*; and the dispute, on this head, as he observes, is of no other consequence than to determine, whether the sense in which he uses the word be agreeable to sir Isaac Newton's. For, if the quantities vanish in an instant, I take the only ratio with which they vanish; or they spend a finite time in vanishing, and I take the last of the ratios, which they successively bear to one another during that time; still the ratio, taken in either of these cases, will be one and the same. *Present State of the Republic of Letters for November 1735*, p. 383, 384.

We cannot pretend to give the whole detail of this controversy, but must refer the curious to the *Present State of the Republic of Letters for 1735*. We shall only observe, that this disquisition is partly critical and partly scientific. The critical inquiry is into the sense of sir Isaac, so far as it may be determined from his own words; and here we cannot help thinking that this is somewhat doubtful. The other inquiry is about the true or scientific notion, upon which this doctrine ought to be founded. With respect to which we shall only ask two questions, which every reader may resolve for himself, to wit, whether the conception or notion he has of the ratio or proportion of evanescent quantities, at the point or instance of their evanescence, be more clear and distinct than the notion of infinitesimals? And whether the notion of inscribed or circumscribed polygons to any curve, attaining their last form, and thereby coinciding with their curvilinear limit, be more clear and distinct than the notion of polygons of an infinite number of sides in the method of infinitesimals?

Before we leave this subject, it may be proper to give the sentiments of an eminent mathematician about the doctrine of limits, or of prime and ultimate ratios, and to shew the connection of this doctrine with that of fluxions. Mr. Maclaurin, in his *Treat. of Flux.*, art. 502.

Sir Isaac Newton considers the simultaneous increments of flowing quantities as finite, and then investigates the ratio which is the limit of the various proportions which those increments bear to each other, while he supposes them to decrease together till they vanish; which ratio is the same with the ratio of the fluxions. In order to discover this limit, he first determines the ratio of the increments in general, and reduces it to the most simple terms, so as that (generally speaking) a part at least of each term may be independent of the value of the increments themselves; then, by supposing the increments to decrease, till they vanish, the limit readily appears.

For example, let a be an invariable quantity, x a flowing quantity,

quantity, and any increment of x : then the simultaneous increments of xx and ax will be $2xo + oo$ and ao , which are in the same ratio to each other as $2x + o$ is to a . This ratio of $2x + o$ to a continually decreases while o decreases, and is always greater than the ratio of $2x$ to a , while o is any real increment; but it is manifest, that it continually approaches to the ratio of $2x$ to a as its limit; whence it follows, that the fluxion of xx is to the fluxion of ax , as $2x$ is to a . If x be supposed to flow uniformly, ax will likewise flow uniformly, but xx with a motion continually accelerated; the motion with which ax flows, may be measured by ao ; but the motion with which $2x$ flows is not to be measured by its increment $2xo + oo$, but by the part $2xo$ only, which is generated in consequence of that motion; and the part oo is to be rejected, because it is generated in consequence only of the acceleration of the motion with which the variable square flows, while o , the increment of its side, is generated; and the ratio of $2xo$ to ao is that of $2x$ to a , which was found to be the limit of the ratio of the increment $2xo + oo$ and ao . See FLUXION.

It is objected against sir Isaac Newton's method of investigating this limit, that he first supposes that there are increments; that when it is said *let the increment vanish*, the former supposition is destroyed, and yet a consequence of this supposition, *i. e.* an expression got by virtue thereof, is retained. But the suppositions that are made in this method of investigating the limit are not so contradictory as this objection seems to import. He first supposes that there are increments generated, and represents their ratios by that of two quantities, one of which is given so as not to vary with the increments. If he had afterwards supposed that no increments had been generated, this indeed had been a supposition directly contradictory to the former. But when he supposes those increments to be diminished till they vanish, this supposition surely cannot be said to be so contradictory to the former as to hinder us from knowing what was the ratio of those increments, at any term of the time, while they had a real existence; how this ratio varied, and to what limit it approached while the increments were continually diminished: on the contrary, this is a very concise and just method of discovering the limit which is required.

It is to be observed, that the limiting, prime, or ultimate ratio of increments, strictly speaking, is not the ratio of any real increments whatsoever. But as the tangent of an arch is the right line that limits the position of all the secants that can pass through the point of contact, though, strictly speaking, it be no secant; so a ratio may limit the variable ratios of the increments, though it cannot be said to be the ratio of any real increments. The ratio of the generating motion may be likewise said to be the last or ultimate ratio of the increments, while they are supposed to be diminished till they vanish, for a like reason. It may just be added, that there being two cases of variable quantities and ratios tending to a limit, it might have conducted to perspicuity, and preventing disputes, to have distinguished these different limits by some addition. As in the first case to have called it a limit or ultimate ratio *inclusive*; because the limit is the last of the quantities or ratios limited: and in the second to have called it a limit or ultimate ratio *exclusive*; because the quantities limited never attain to the limit, though they approach to it indefinitely.

This distinction may perhaps receive some farther illustration from the following example. It is known that the osculatory circle is a circle that touches a curve so closely that no other circle can be drawn through the point of contact between them, all other circles passing within or with-

out them both; and hence the osculatory circle is supposed to have an equal curvature with the curve at that point. See Mr. Maclaurin's Flux. art. 394.

Now if we conceive the osculatory circle at the end of the great axis of an ellipsis, it will fall entirely within the ellipsis; and the curvature of the ellipsis and osculatory circle may both be said to be limits of the curvatures of all the circles falling wholly within, and touching the ellipsis at the end of its great axis. But the term limit will not in both cases have precisely the same meaning; for the osculatory circle is a limit *inclusive*, being the last of the circles limited; and the ellipsis is a limit *exclusive*, none of the circles limited ever coinciding with it. As to the circles which fall wholly without the ellipsis, and touch it at the end of its great axis, they have no limit *inclusive*, no circle touching the ellipsis so closely, that no other can pass between; the only limit here is *exclusive*, the ellipsis itself.

The contrary of this happens at the end of the lesser axis. At any other point of the ellipsis, one half of every osculatory circle is a limit *inclusive* of the femicircles that fall within, and the other half is a limit *exclusive* of those that fall without.

May we not ask, if a curve is the limit of its inscribed or circumscribed polygons in any other sense, than the curvature of the ellipsis is the limit of the curvatures of the circles before described, which approach nearer and nearer to the curve, but never coincide with it? It is true we hear it often said, that the osculatory circle is equicrural, and so coincides with the ellipsis; but this seems a consequence of the language of infinitesimals. It would be more accurate to say, that the curvature of the ellipsis is the limit *exclusive* of all the before mentioned circles, and that the osculatory circle is their limit *inclusive*. That excellent geometer, Mr. Simfon, in his Conic Sections, lib. v. prop. 36. cor. says only, after demonstrating the chief property of the osculatory circle, that *eandem habere cum sectione conica curvaturam dicitur*, giving this only as an appellation, but not as a proposition. See on the subject of this article, Robins's Disc. on Fluxions, in his Tracts, vol. ii.

LIMITS of the Roots of an Equation.—We have already observed, that by finding the limits of the roots of an equation, is to be understood the finding of two such numbers, that one shall be greater and one less than the root required; by which means an approximation is evidently made towards the true root, and the nearer these limits approach towards each other, so much the more accurate will be the approximation. La Grange, in his "Traité de la Résolution numérique des Equations," has carried the method of limits to its utmost possible perfection, by shewing, in all equations, how the limits of each of its roots may be ascertained, and has shewn, that the method of approximation employed by Newton, and in fact every method, except that of his own, is defective in this respect, *viz.* that between the limits ascertained in their operation, there may be one, two, or more roots, and consequently, that they are not necessarily the limits of one root, but merely the limits between which one at least of the real roots of the equation must lie. The nature of this article will not admit of our entering into an explanation of the process of this celebrated analyst; we can, therefore, only refer the reader to the work itself, and must content ourselves in this place with giving a few of the most remarkable cases relating to the limits of the roots of an equation.

1. If we can find two quantities, which, being substituted for the unknown quantity in any equation, give two results with contrary signs, then will these two quantities

be the limits of the value of x , that is, a value of x will always be found between these two quantities.

Let $x^m = Ax^{m-1} + Bx^{m-2} - Cx^{m-3} + \&c. + N = 0$; and suppose that, by substituting any quantity p , instead of x , we have

$$p^m - Ap^{m-1} + Bp^{m-2} - Cp^{m-3} + \&c. + N = R;$$

and by substituting another quantity, q , for it, we obtain

$$q^m - Aq^{m-1} + Bq^{m-2} - Cq^{m-3} + \&c. + N = -S;$$

then, I say, that there is at least one real value of x between the limits p and q ; that is, x is less than the former, and greater than the latter. The truth of the proposition, however, is better demonstrated from a partial than from a general example.

Let us, therefore, assume the equation

$$x^3 - 13x^2 + 7x - 1 = 0;$$

here, if we substitute $x = 2$, and $x = 20$, we have a result in the first case $= -31$; and in the second $= +2939$; and it remains to be shewn that there is, at least, one real value of x comprised between these limits. For this purpose, the equation may be written

$$x^3 + 7x - (13x^2 + 1)$$

which quantity is found to be negative when $x = 2$; but positive when $x = 20$. That is, in the first case, we have

$$(x^3 + 7x) < (13x^2 + 1),$$

and in the latter

$$(x^3 + 7x) > (13x^2 + 1).$$

Now, it is obvious, that each branch of these expressions will increase as x is augmented, and that they will likewise be each diminished as x is diminished. Let us, therefore, conceive x , in the first case, to be successively increased by any small quantity, till it arrives at the value of x in the second case. Then, since $x^3 + 7x$, which was at first less than $13x^2 + 1$, is now become greater than $13x^2 + 1$, it must necessarily have passed through that state, in which it was neither greater nor less; that is, the two branches must have passed through that state in which they were equal; but when

$$x^3 + 7x = (13x^2 + 1),$$

we have also

$$x^3 - 13x^2 + 7x - 1 = 0;$$

and, consequently, this value of x is a real root of the equation proposed.

This reasoning, though employed only in a particular case, is equally applicable to our general equation: for, by putting the positive part of the equation $= P$, and the negative $= Q$; also, supposing p to be that value of x which renders the result negative, or, which is the same, which gives $P < Q$; and q that value which makes $P > Q$, then we may conclude the same as above, that P , from being less than Q , having passed to that state in which it is greater than Q , there must necessarily be a real value of x , between p and q , which renders $P = Q$; or the proposed equation $= 0$. We may also ascertain the limits of x between 0, and some real quantity, positive or negative. For example, in the general equation

$$x^m - Ax^{m-1} \pm Bx^{m-2} - Cx^{m-3} \pm \&c. \pm N = 0,$$

it is obvious, that by taking $x = 0$, the result will be negative or positive, according as N is affected with the sign $-$ or $+$. Therefore, if, in the first place, we find p such that

the result is positive, and $x = 0$, making it negative, a real value of x must lie between the limits p and 0. Again, the above equation may be converted into another, having the same roots, only with contrary signs, by writing $-y$ for x . And let us suppose, in the first place, that m is even, then the transformed equation will be

$$y^m + Ay^{m-1} \pm By^{m-2} + Cy^{m-3} \&c. \pm N = 0;$$

and, consequently, N will still have, with regard to y^m , the same sign, which, as above, we suppose to be negative; then, if q be such as will give a positive result, and $x = 0$ giving a negative, it follows, that a real value of y will be found between the limits q and 0; and, consequently, in the equation proposed, a real root is comprised between the limits $-q$ and 0.

But if the power m be odd, then the transformed equation will be

$$-y^m - Ay^{m-1} \mp By^{m-2} - Cy^{m-3} \mp \&c. \pm N = 0,$$

$$\text{or, } y^m + Ay^{m-1} \pm By^{m-2} + Cy^{m-3} \pm \&c. \mp N = 0;$$

and, consequently, y^m and $\mp N$, have not the same sign with regard to each other. If, therefore, now, any value q can be found, such that the result may be negative, a root of this equation will be found between the limits q and 0, and, therefore, in the original one between $-q$ and 0.

2. The greatest positive root of an equation is always contained between the limits $S + 1$ and 0; S being the greatest negative co-efficient that enters into the equation.

In order to prove this, we must demonstrate that in any expression

$$x^m \pm Ax^{m-1} \pm Bx^{m-2} \pm Cx^{m-3} \&c. + N.$$

The first term may be made to exceed the sum of all the other terms. Now, it is obvious, in the first place, that the case which presents the greatest difficulty, is that in which all the co-efficients are made negative, and each equal to the greatest; let, then, S be the greatest negative co-efficient, it is to be demonstrated, that such a value of x may be found as will render

$$x^m > S(x^{m-1} + x^{m-2} + x^{m-3} + \&c. + 1).$$

Or, since the part within the parenthesis is equal to $\frac{x^m - 1}{x - 1}$, we have to shew, that we may find x such, that

$$x^m > \frac{S(x^m - 1)}{x - 1}, \text{ or } x^m > \frac{Sx^m}{x - 1} - \frac{S}{x - 1}.$$

Now, this will be manifestly the case, if we make

$$x^m = \frac{Sx^m}{x - 1}, \text{ or } 1 = \frac{S}{x - 1}, \text{ or } x = S + 1.$$

It is therefore obvious, that this value, substituted for x in the proposed equation, will give a positive result; whereas, $x = 0$ gives a negative result: therefore, from what is shewn above, a real value of x is found between the limits $S + 1$ and 0. If the foregoing equation be converted into another, with the signs of the roots changed, and if R in that equation be the greatest negative co-efficient, then $-(R + 1)$, and 0, will be the limits also of the greatest negative root.

It follows, immediately from what is shewn above, that every equation of even dimensions, having its last term negative, has at least two real roots, the one positive and the other negative.

It may also be readily demonstrated, upon similar principles, that every equation of odd dimensions has at least one real

real root ; a truth which it is difficult to prove in any other manner. See La Croix's *Elemens de Algebra*, and La Grange's work above quoted.

LIMITS, in a *Military Sense*, denote the distance which a centry is allowed on his post, viz. fifty paces to the right, and as many to the left ; and though the weather be ever so bad, he must not get under cover.

LIMITS of a *Planet*, its greatest excursions or distances from the ecliptic. See PLANET.

LIMITANEI, among the Romans, an appellation given to the soldiers who were stationed on the frontiers of the empire.

LIMITROTOPHI, among the Romans, the same with limitanei.

LIMMA, or LEIMMA, an interval of the *Greek Music*, which is a comma less than the semitone major, and, re-trenched from a tone major, leaves behind the *Apotome* ; which see.

The ratio of the limma is 243 to 256, and is generated by beginning at C, and moving by 5ths to B ; for then the quantity by which the neighbouring C exceeds B, is precisely in the ratio which we have established.

Philolaus, and all the Pythagoreans, made the limma a diatonic interval, which answered to our semitone major : for, after two conjunctive tones major, there remains only that interval to complete the true 4th, or tetrachord. So that, according to them, the interval from E to F was less than that from F to F#. Our chromatic scale gives quite the contrary. Rousseau.

The abbé Roussier has given the musical etymology of the word leimma, according to Aristoxenus. Mem. sur la Mus. des Anc. p. 142.

LIMMAT, in *Geography*, a river of Switzerland, which rises in the Alps, about 11 miles S. of Glarus, assuming the name of Lint or Linth, and having passed Glarus and joined the Mat, near the lake of Wallenstadt, takes the name of Limmat, and having traversed the lake of Zurich, joins the Aar, three miles N. of Baden. The stream of this river is very rapid ; its water beautifully transparent ; and its borders, at first flat, afterwards gently rising into hills clothed with pasture and wood, or divided into vineyards, and at last becoming quite perpendicular, and fringed to the water's edge with hanging trees. About a mile from Baden, where the Limmat flows with the greatest rapidity, is a beautiful wooden bridge, 240 feet long, and suspended about 20 feet from the surface of the water. It was the last work of Grubenman, the self-taught architect, and is far superior in elegance to that of Schaffhausen.

LIMMEN, a town of Holland ; 5 miles S. of Alcmær.

LIMNÆUS, JOHN, in *Biography*, an eminent German jurist, was born at Jena in 1592, where his father was professor of mathematics. Having received a good education in the elements of learning, he went to Weimar to pursue his maturer studies, and from thence to the university of his native place, where he remained till the death of his father in 1614, when he removed to Altdorf. In 1618, he engaged himself as travelling tutor to two young men of Nuremberg, whom he accompanied to France, England, and Holland. Having finished his engagement with these, he took upon himself the office of private tutor to several young persons of rank, among whom was Albert, margrave of Brandenburg. In process of time, this prince gave him the post of chamberlain and member of his privy council. He died in the enjoyment of these offices in the year 1663. His works are numerous, and valued for their erudition. The chief are, "Tractatus de Academiis," 4to. ; "Notitie

Regni Gallie," 2 vols. 4to. ; "De jure imperii Romano-Germanici," 5 vols. 4to. Moreri.

LIMNER, corrupted from the French word *enlumineur*, a decorator of books with initial or other pictures. Johnson.

LIMNIA, in *Botany*. See CLAYTONIA.

LIMNING, (from *enluminer*, Fr. *to adorn books with paintings*). As these paintings, or illuminations, as they are called, were always done in water-colours, limning is never properly employed, except it be to designate that species of art, which is now commonly known by the name of miniature-painting, wrought in those colours, and on paper ; indeed, it is become almost obsolete, though, in the minds of the vulgar, it is sometimes used to signify the art of painting generally, and more particularly *Portrait-painting* ; which see. See also the articles MINIATURE and WATER-COLOURS.

LIMNITIS, a word used by the ancients to express the concretion of round reeds, or water-plants, by some called *adarse* : or somewhat analogous to that.

LIMNOPEUCE, in *Botany*, from *λίμνη*, a pool or lake, and *πέυκη*, a pine-tree, a name given by Vaillant to the *Pinifolia* of Dillenius, *Hippuris* of Linnæus, in allusion to its spiry shape and watery habitation. See HIPPURIS.

LIMNOPHILA, from *λίμνη*, a pool or lake, and *φιλή*, to love, because it inhabits such places. Brown Prod. Nov. Holl v. 1. 442. Class and order, *Didymia Angiosperma*. Nat. Ord. *Perfonata*, Linn. *Scrophularia*, Juss.

Eff. Ch. Calyx tubular, five-cleft, equal. Corolla funnel-shaped ; limb in five nearly equal segments. Stamens within the tube ; anthers cohering in pairs. Stigma dilated, oblique. Capsule of two cells, and two deeply divided valves, the partition inserted into that edge of the valves which bursts latest.

Herbs that inhabit marshes, with opposite deep-cut leaves, mostly divided into three parts to the base, which gives them the appearance of being whorled. Flower-stalks axillary, with two bractæas at the top.

The only species named by the author is

L. gratioloides. (Hottonia indica ; Linn. Sp. Pl. 208. H. flore solitario ex foliorum alis proveniente ; Burm. Zeyl. 121. t. 55 f. 1. Tsjudan-tsjera ; Rheede Hort. Malab. v. 12. 71 t. 36.)—Gathered in the Tropical part of New Holland by Mr. Brown, who suspects that several species are confounded by botanists under the above denomination, to be ascertained by examination of them in a recent state only. It is remarkable that the plant of the *Hortus Malabaricus* is said to grow in a dry sandy soil. See HORTONIA.

LIMO. See CITRUS.

LIMOCINCTI, among the Romans, a kind of priests, who officiated at public sacrifices, and were dressed with a garment called *limus*.

LIMODORUM, in *Botany*, *λίμωδωρον*, a sort of parasitical plant, or rather, as it should seem, some kind of tare, it being said to choke or suffocate the *sanum græcum*. By this latter name we are not perhaps to understand literally the fennugreek or *Trigonella*, but may extend it to any other plant cultivated for hay in Greece, as more than one of the leguminous tribe are, or have been. Dodonæus applied this ancient name to the *Orobanche*, or Broom Rape ; Clusius to the *Orchis abortiva* of Linnæus ; which at least is what he described and intended. in his *Stirp. Pannon.* 241, though in his *Hystoria* acut. of *Ophrys Nidus-Avis*, by mistake, annexed to that description. Linnæus, having referred the plant of Clusius to the genus *Orchis*, adopted the name in question for a new genus of the same natural order ; but Swartz. in his excellent treatise on this order, having referred the Lin-

near *Limodorum* to his *Cymbidium*, very properly restores the name to the original plant of Clusius, which proves distinct in genus from *Orchis*, as Tournefort had done before him. Clus. Hist. v. 1. 270. Tourn. t. 250. Swartz. Orchid. in Schrad. N. Journ. v. 1. 84. t. 1. f. 4. Ind. Occ. 1519. Willd. Sp. Pl. v. 4. 122.—Class and order, *Gynandria Monandria*. Nat. Ord. *Orchideæ*, Linn. Juss. Brown. Prodr. Nov. Holl. v. 1. 309.

Gen. Ch. reformed. *Cal.* Perianth of three, generally spreading, equal leaves, rarely reversed. *Cor.* Petals two, generally smaller than the calyx-leaves. Nectary a spreading lip, undivided or lobed, concave at the base, projecting behind in a spur, various in figure and length. *Stam.* Another an hemispherical, sometimes pointed, terminal, deciduous lid, of two or four cells; masses of pollen stalked, in pairs. *Fyl.* Germen inferior, oblong, or obovate, nearly upright, furrowed; style semi-cylindrical, often gibbous, concave in front; stigma concave or convex, in the front of the style near the top. *Peric.* Capsule oblong, with three or six ribs, with one cell and three valves, opening by clefts between the ribs. *Seds.* numerous, minute, each clothed with a chaffy tunic, inserted into the downy internal ridges of the valves.

Eff. Ch. reformed. Calyx-leaves somewhat spreading. Lip spreading, elongated at the base behind into a spur. Anther a terminal lid, deciduous.

Dr. Swartz enumerates twenty-one species, besides a doubtful one, which is *Rodriguezia* of the Prodr. Fl. Peruv. et Chil. t. 25. Professor Willdenow has twenty-seven species, for though he omits the six last of Swartz's, having, perhaps, not seen Schrader's New Journal, in which, and in its reprint the *Genera et Species Orchidearum*, only, they are described; he has added twelve others, which Swartz had only in part indicated as doubtful. All these are adopted by Willdenow from books; the six whose descriptions he had not seen, were all gathered by Dr. Afzelius at Sierra Leone.

This genus differs from *Cymbidium* in having a spur to the nectary, in whose cavity the honey is lodged. We have however already mentioned, (see *CYMBIDIUM*.) that this character, though apparently decisive, is overset by some nondescript *Orchideæ*, found by Dr. Buchanan in the East Indies. These, by every mark, except the absence or presence of a spur in which they totally differ among themselves, must form one genus, differing in habit from every thing already known; and we have little doubt that a critical examination of them recent, would be the means of detecting some over-ruling character, which would stamp this genus, independent of all that concerns the spur. In that case, the latter might still remain a sufficient distinction between *Limodorum* and *Cymbidium*.

Some remarkable species of *Limodorum* are

L. Tankervilleæ. Banks in Ait. Hort. Kew. ed. 1. v. 3. 302. t. 12. Andr. Repos. t. 426. Willd. n. 1. (*Phaius grandifolius*; Loureir. Cochinch. 529.)—Leaves radical, elliptic-lanceolate, pointed, ribbed, plaited. Stalk simple, many-flowered. Lip convoluted, with a very short spur.—Native of China. It is treated in Europe as a stove plant, flowering in the spring. We first saw it at Lady Tankerville's in 1786, and it blossomed that year at Haarlem. The great size of the whole plant, which much exceeds that of any other of this natural order, whether wild or cultivated in Britain, and the splendidly contrasted colours of the flowers, render it much admired. The inside of the calyx and petals is cinnamon-coloured, the outside of the most brilliant polished white; the nectary crimson, often compared, though certainly inferior in beauty, to the foxglove.

L. abortivum. Willd. n. 26. (*L. austriacum*; Tourn. Inst. 437. *Orchis abortiva*; Linn. Sp. Pl. 1336. Jacq. Austr. t. 193. *Epipactis*, n. 1288. t. 36. Hall. Helvet. v. 2. 148.)—Leaves none. Stalk with several tubular sheaths. Flowers but little spreading. Lip wavy. Spur awl-shaped, the length of the germen.—Native of shady woods in Germany, Italy, the south of France, and some parts of Switzerland, but rare even in that country of *Orchideæ*. That it has no right to a place in the Flora of Britain, though admitted by Ray and Hudson, is now generally allowed. The mistake arose from its being confounded in old books with *Orchanebe cerulea*, Engl. Bot. t. 423, as is minutely explained at length in Tr. of Linn. Soc. v. 4. 164—169, and it appears that Lobel's *Orchanebe major*, e *Gramontio lucco Monspeliensium*, Lob. Ic. v. 2. 269. f. 1, which is *Orchanebe monspeliaca floribus oblongis*, Ger. em. 1312, is certainly this *Limodorum*. The root consists of two biennial clusters of thick, cylindrical, divaricated fibres. The stalk is simple and solitary, eighteen to twenty-four inches high, clothed with a few close purplish sheaths, and terminating in a close spike of rather large flowers, variegated with paler and deeper purple.

L. Epipogium. Willd. n. 27. (*Epipogium*; Gmel. Sib. v. 1. 11. t. 2. f. 2. *Satyrium Epipogium*; Linn. Sp. Pl. 1338. Jacq. Austr. t. 84. *Epipactis*, n. 1289. Hall. Helvet. v. 2. 149.)—Leaves none. Stalk sheathed. Flowers few, pendulous, reversed. Lip three-lobed, concave. Spur ovate, ascending.—This singular and rare plant grows in some shady barren forests in Siberia, Germany, and Switzerland. Its pale hue and fleshy habit, so like *Epipactis* *Aridus-Avis*, indicate its being a parasitical attendant on the roots of trees. See *EPIPACTIS*, n. 9; and *EPIPOGIUM*.

Dr. Swartz refers also to this same genus the *Cypripedium bulbosum*, Linn. Sp. Pl. 1347. Sm. Spicil. t. 11, a most curious plant, found in Lapland and Nova Scotia, of which very little is known; but the propriety of this measure is in our opinion very doubtful.

LIMODORUM, in *Gardening*, contains plants of the bulbous-rooted herbaceous perennial kind, of which the species commonly cultivated are the tuberous-rooted *limodorum* (*L. tuberosum*); the tall *limodorum* (*L. altum*); and the Chinese *limodorum* (*L. Tankervilleæ*.)

Method of Culture.—These plants are increased by planting the offsets from the roots in pots of bog-earth, and plunging them, in the first sort, in a mild tan-pit, and in the others, in the tan hot-bed of the stove. The proper time of taking them off is when the plants are the most destitute of leaves.

But the two last sorts should have a loamy mould, and but little water in the winter season. And the first requires the protection of a good green-house in winter, but the two last should be kept in the bark-bed of the stove.

All these plants afford variety in green-house and stove collections.

LIMOGES, in *Geography*, a city of France, and capital of the department of the Upper Vienne; and before the revolution, the see of a bishop. It is a place of considerable trade, and contains about 20,550 inhabitants, and 25,466 in the two cantons, on a territory of 292½ kilometres, in 11 communes. N. lat. 45° 50'. E. long. 1° 20'.

LIMON, in *Botany*, Tourn. 397, the Lemon. See *CRATUS medica* β

LIMON, in *Geography*, a small island in the W. side of the gulf of Bothnia. N. lat. 60° 44'. E. long. 17° 9'.

LIMONA de la Trou, a town near the N. coast of the island of Hispaniola; 15 miles S.E. of Cape Francois.

LIMONE, a town of France, in the department of the Maritime

Maritime Alps; S. of Cani.—Also, a town of the island of Negropont; 20 miles S. of Negropont.

LIMONES, GRANDE, a town of the island of Cuba; 50 miles S. of Havana.

LIMONEST, a town of France, in the department of the Rhône, and chief place of a canton, in the district of Lyons. The place contains 750, and the canton 11,089 inhabitants, on a territory of 77½ kilometres, in 12 communes.

LIMONHE, a town of France, in the department of the Lot, and chief place of a canton, in the district of Cahors; 13 miles E. of Cahors. The place contains 1175, and the canton 9279 inhabitants, on a territory of 255 kilometres, in 13 communes.

LIMONIA, in *Botany*, in its present application, evidently alludes to *Limon*, the lemon; the genus which is so denominated being next akin to *Citrus*, in characters, habit, and sensible qualities. The word therefore can have no reference to the λεμονια of the Greeks, *Limonia* of the Romans, which is a species of *Anemone*, and derives its name from λεμον, a meadow.—Linn Gen. 213. Schreb. 285. Willd. Sp. Pl. v. 2. 571. Mart. Mull. Dict. v. 3. Ant. Hort. Kew. ed. 2. v. 3. 43. Juss. 261. Lamarck Illustr. t. 353. Gært. t. 58.—Class and order, *Dicandria Monogynia*. Nat. Ord. *Aurantiæ*, Juss.

Gen. Ch. Cal. Perianth inferior, of one leaf, very small, in from three to five, more or less deep, segments, permanent. Cor. Petals from three to five, oblong, obtuse, erect, spreading at the summit. Stam. Filaments from six to ten, awl-shaped, erect, shorter than the corolla; anthers linear, erect. Pist. Germen oblong, superior; style cylindrical, the length of the stamens; stigma capitate, flat. Peric. Berry ovate, or nearly globose, of three cells, with membranous partitions. Seeds solitary, ovate.

Eff. Ch. Calyx in from three to five deep segments, inferior. Petals three to five. Berry of three cells. Seeds solitary.

Three species of this genus, all tropical spinous shrubs, and much resembling orange trees in miniature, were known to Linnæus. Five without spines, adopted from Forster, Lamarck and Retzius, are added by Willdenow. Two more from the East Indies, described by Dr. Roxburgh, one with and one without spines, are mentioned in Mr. Aiton's new edition.

Examples of the spinous species are

L. monophylla. Simple-leaved Thorny Limonia. Linn. Mant. 237. Roxb. Corom. v. 1. 59. t. 83. (*Limones pumili zeylanici sylvestres*; Burm. Zeyl. 143. t. 65. f. 1.)—Leaves simple. Spines solitary.—Native of the East Indies, in the extensive forests of the coast of Coromandel, where it is called by the natives the Wild Lime. This is a shrub or small tree, with alternate, stalked, ovate, entire, obtuse, evergreen, shining leaves, full of pellucid dots, as are those of all the rest, and each accompanied by a sharp axillary thorn. The flowers are white, in axillary clusters. Petals four. Stamens ten, united into a firm hemispherical cup. Berry the size of a very small gooseberry, brownish, of four cells, thickly coated.—Notwithstanding the monadelphous stamens and simple leaves, this species has too entirely the habit of the rest to be separated from them.

L. trifoliata. Three-leaved Limonia. Linn. Mant. 237. Jacq. Ic. Rar. t. 463. Andr. Repof. t. 143.—Leaves ternate. Spines in pairs.—Native of the East Indies. It makes a pretty appearance in the stove, when decorated either with its white blossoms, which are three-cleft and hexandrous, or its scarlet berries, which are sweet and pleasantly acid. The leaflets are emarginate, the central

one largest. Branches zigzag and slender.—When this shrub flowered some years since at Vienna, it answered so ill to the character of *Limonia*, in number of parts, that the celebrated Jacquin was near making a new genus of it, which he destined to honour an English botanist. There can be no doubt however that it belongs to *Limonia*. "Le petit citron doux" of Sonnerat, Voy. to New Guinea, 102. t. 63, is made a variety of this by Willdenow, who, judging by the figure, not the description, improperly says it has no spines. The sessile leaves, and solitary flowers, give it a different appearance.

Of the unarmed species are

L. pentaphylla. Five-leaved Limonia. Retz. Obf. fasc. 5. 24. Roxb. Corom. v. 1. 60. t. 84.—Spines none. Leaves pinnate; leaflets elliptical, entire, two pair with an odd one.—Native of the East Indies. The flowers are small and white, exquisitely fragrant, in axillary branched clusters. Fruit red, the size of a currant. Stamens ten, distinct, spindle-shaped.

L. arborea. Tree Limonia. Roxb. Corom. v. 1. 60. t. 85.—Spines none. Leaves pinnate; leaflets ferrated, oblong, two pair with an odd one.—From the same country. The flowers are very numerous, in branched clusters, fragrant. Fruit small, brown. Stamens thread-shaped.

LIMONIA, in *Geography*, an island in the Mediterranean, about three miles long, and one broad; six miles W. of Rhodes. N. lat. 36° 27'. E. long. 27° 22'. On its eastern coast is a small haven, defended by a shoal, on the margin of which stands the only village in the island. At some distance from Limonia is Narki, or Karki, anciently Chalcia, or Chalcis, which seems by several shoals that rise above the waters to have formerly joined with Limonia.

LIMONIUM, in *Botany*, derived, as it appears, from λεμον, a meadow, (because the plant occupies, to a great extent, low tracts of land on the sea-shore,) is the old name for several species of Sea Lavender. (See STATICE.) The same name has been also applied to the Red Valerian, to the Buck-bean, and even to the *Pyrola rotundifolia*. The latter indeed does grow on low sandy commons in Holland, and near Yarmouth, but likewise in the most elevated heathy alpine places; nor, as far as we know, in scarcely any intermediate station; for what is so named in books is often *P. minor*. The coincidence of alpine and maritime plants, found in no other situations, is a curious problem for the vegetable physiologist.

LIMONIUM-Gall, in *Natural History*, the name of a species of gall or vegetable protuberance, serving for the lodging of an insect, affording a very beautiful appearance on the plant, and very common in the eastern parts of the world.

This of the limonium is singular, in that it is produced from a butterfly egg, and is inhabited by a true caterpillar. The butterfly deposits her eggs on several parts of the leaves and stalks of this plant, and the young caterpillar, as soon as hatched, eats its way through the surface; and continuing to eat when within, his depredations occasion an abundant derivation of juices to the part, by means of which a gall, or protuberance, is formed, which is sustained by a pedicle, and in all respects resembles a fruit. This is of a roundish figure, and by degrees grows to the size of a nutmeg. It is composed of several coats, or crusts; the exterior ones are soft and spongy, but the interior are harder, and more woody than the galls of the oak. As the generality of other caterpillars feed on the substance of the leaves of trees and plants, this eats only the inside of its lodgment; and nature so readily supplies this defect by new matter, that the

the cavity, in which it is lodged, is never found to be very great.

This seems the only known instance of a gall formed by a genuine caterpillar, the inhabitants of the willow galls, though usually esteemed smooth caterpillars, being not so, but the worms of a four-winged fly. Reaumur's Hist. of Insects, vol. vi. p. 227.

LIMOSA, in Ornithology, the scolopax glottis of Linnaeus, the name of a long-legged water-bird, common in Italy, and called by some *glottis*, and *pluvialis major*. See also *Scolopax limosa*, *fusca* and *Fedoa*, *Tetanus*, &c. &c. and *RECURVIROSTRA Americana*.

LIMOSA, in Ichthyology, a name given by Salvian to the common mackerel, and in his figures to the *thynnus*, or tunny-fish, called the *Spanish mackerel*. See *Thynnus* *SCOMBER*.

LIMOSANO, in Geography, a town of Naples, in the county of Molise; 17 miles N.E. of Molise.

LIMOSELLA, in Botany, derived from *limus*, mud, from the circumstance of its growing and thriving in muddy pools and ditches. For the same cause it has obtained the English appellation Mudwort.—Linn. Gen. 320. Schreb. 419. Willd. Sp. Pl. v. 3. 341. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 668. Ait. Hort. Kew. 2. 359. Brown Prod. Nov. Holl. 443. Juss. 96. Lamarck Illustr. t. 535. Gærtn. t. 50.—Class and order, *Didymia Angiospermia*. Nat. Ord. *Precie*, Linn. *Lyfsmachia*, Juss.

Gen. Ch. Cal. Perianth of one leaf, five-cleft, erect, acute, permanent. Cor. of one petal, bell-shaped, erect, equal, five-cleft, acute; divisions spreading. Stam. Filaments four, erect, two of them adhering to the same side, shorter than the corolla; anthers simple. Pist. Germen superior, oblong, obtuse; style simple, as long as the stamens, reclining; stigma globose. Peric. Capsule ovate, half covered by the calyx, of one cell and two valves. Seeds numerous, oval. Recept. ovate, very large.

Ess. Ch. Calyx five-cleft. Corolla five-cleft, equal. Stamens approaching each other in pairs. Capsule with one cell, two valves, and many seeds.

1. *L. aquatica*. Common Mudwort. Linn. Sp. Pl. 881. Engl. Bot. t. 357. Fl. Dan. t. 69. (*Spergula perpusilla lanceatis foliis*; Loes. Prof. 261. t. 81.)—Leaves lanceolate.—Found in muddy pools where water has been standing. Dr. Abbot sent it to Mr. Sowerby from Bedfordshire, and Dr. Smith has gathered it on the Denes at Lowestoft in Suffolk. It flowers in July and August.—Root annual, creeping. Stems prostrate, cylindrical. Leaves radical, on long footstalks, smooth, entire, not involute. Flowers small, flesh-coloured. Calyx somewhat irregular, acute, smooth. Capsule with a groove along its upper side.

2. *L. diandra*. Diandrous Mudwort. Linn. Mant. 252. Koenig.—Leaves somewhat linear.—A native of the East Indies and the Cape of Good Hope.—The habit of this species is exactly similar to that of the last, but the plant is only about a fourth as large in all its parts, so that it may be considered as one of the smallest of all plants. Stems creeping, short. Leaves radical, linear, scarcely widening in the middle, obtuse. Linnaeus complains that on account of the minuteness of the flowers he could not describe them from a dried specimen, but that the acute discoverer of this species, Koenig, found them to be diandrous.

3. *L. australis*. New Holland Mudwort. Brown. Prod. Nov. Holl. 443.—Leaves spatulate linear.—We know nothing of this species, but we insert it, on the authority of Mr. Brown, as a native of New Holland, who justly observes that all the species stand in need of further investigation.

LIMOURS, in Geography, a town of France, in the

department of the Seine and Oise, and chief place of a canton, in the district of Versailles; nine miles S. of Versailles. The place contains 858, and the canton 7304 inhabitants, on a territory of 147½ kilometres, in 14 communes.

LIMOUX, a town of France, and principal place of a district, in the department of the Aude. N. lat. 43° 3'. E. long. 2° 18'. The place contains 5142, and the canton 12,556 inhabitants, on a territory of 240 kilometres, in 23 communes.

LIMPET, in Conchyliology. See PATELLA and CONCHIOLOGY.

LIMUS, among the Romans, a garment reaching to the ground, and worn by the priests, who on that account were called *limocincti*.

LINACAGAN, in Geography, one of the islands in the East Indian sea, called Calamianes. N. lat. 11° 40'. E. long. 120° 10'.

LINACRE, THOMAS, in Biography, an eminent physician, and one of the most elegant scholars of his age, was born at Canterbury about the year 1460. Having completed his school-education, under a very eminent master, in his native city, he entered at Oxford, and was chosen fellow of All-Souls' college in 1484. His desire of farther advancement in learning induced him to accompany his former schoolmaster, De Selling, into Italy, whither the latter was sent on an embassy to the court of Rome by Henry VII. De Selling left him at Bologna, with strong recommendations to Angelo Poliziano, who was at that time accounted one of the most elegant Latinists in Europe; but whom our young student, by his assiduous application, at length excelled in the purity of his style in that language. At Florence, Linacre had the good fortune to acquire the favour of that munificent patron of literature, Lorenzo de Medicis, who granted him the privilege of attending the same preceptors with his own sons. He knew how to profit by such an opportunity; and under Demetrius Chalcondylas, who had fled from Constantinople when it was taken by the Turks, he acquired a perfect knowledge of the Greek language. Thus accomplished in classical learning, he went to Rome, and studied medicine and natural philosophy under Hermolaus Barbarus. He applied particularly to the works of Aristotle and Galen, and is said to have been the first Englishman who was well acquainted with those writers in the original Greek. On his return to England, he took the degree of doctor of physic at Oxford, and gave lectures on physic and taught the Greek language in that university. His reputation soon became so high, that king Henry VII. called him to court, and entrusted him with the care both of the health and education of his son, prince Arthur. He is said also to have instructed princeess Catherine in the Italian language. He was made successively physician to the kings Henry VII., Henry VIII., and Edward VI., and to the princeess Mary.

In the reign of Henry VIII., indeed, he appears to have stood above all rivalry at the head of his profession; and he evinced his attachment to its interests, as well as to the public good, by various acts; but especially by founding two lectures on physic in the university of Oxford, and one in that of Cambridge, and by obtaining the institution of the Royal College of Physicians in London. He saw with concern, that the practice of medicine was chiefly engrossed by illiterate monks and empirics, licences being easily obtained by improper persons, when the bishops were authorized to examine and license practitioners in an art of which they could not be competent judges. Through the interest of cardinal Wolsey, therefore, Linacre obtained letters patent in 1518 from Henry VIII., constituting a corporate body

body of regularly bred physicians in London, in whom was vested the sole right of examining and admitting persons to practise within the city, and seven miles round it; and also of licensing practitioners throughout the whole kingdom, except such as were graduates of Oxford or Cambridge, who by virtue of their degrees were independent of the college, except within London and its precincts. The college had likewise authority given to it to examine prescriptions and drugs in apothecaries' shops. Linacre was the first president of the new college, and continued in the office during the remaining seven years of his life; and, at his death, he bequeathed to the college his house in Knight-riding-street, in which its meetings were held. There is no doubt that this institution greatly contributed to the credit and dignity of the medical profession in the metropolis, and many justly celebrated names are enrolled among its members. In process of time, however, its foundation became narrowed, and it fell into the usual monopolizing spirit of a corporation, whilst its powers to controul the audacity of empirical impostors (the principal object of its establishment) have sunk into total disuse.

Towards the latter part of his life, in the year 1519, Linacre entered into holy orders; a step to which, it would seem, he was principally induced, from a desire to obtain a studious and easy retirement, at a time when he became exceedingly afflicted with that painful disease, the stone, which greatly incapacitated him for business, and at length put an end to his life. Sir John Cheke relates that, not long before his death, when worn out by sickness and fatigue, he first began to read the New Testament; and that when he had perused the fifth, sixth, and seventh chapters of St. Matthew, he threw the book from him with violence, exclaiming, "either this is not the gospel, or we are not Christians!" a declaration, if rightly understood, equally honourable to the morals he found there inculcated, and satirical to those of the age. He died in great agonies from the stone, on the 20th of October, 1524, at the age of sixty-four, and was buried in St. Paul's cathedral, where a monument was afterwards erected to his memory by his admirer and successor in fame, Dr. Caius.

In his literary character, Linacre stands eminently distinguished; inasmuch as he was one of the first, in conjunction with Collet, Lilly, Grocin, and Latimer, who revived, or rather introduced, the learning of the ancients in this island. Translations from the Greek authors into Latin were the chief occupations of the literati of those times; and Linacre conferred a benefit on his profession, by translating several of the most valuable pieces of Galen. These were the treatises, "De Sanitate tuenda," in six books, which was printed at Cambridge in 1517, and dedicated to king Henry VIII.; "De Morbis curandis," in fourteen books, printed at Paris in 1526; three books, "De Temperamentis," and one "De inæquali Temperie," first printed at Cambridge in 1521, and inscribed to pope Leo X.; "De naturalibus Facultatibus," three books, together with one book "De pulsum Usu," the first time of printing, which is unknown, but they were reprinted by Colihæus in 1528, as well as his posthumous translation of the four books "De Morborum Symptomatibus." In these versions Linacre exhibited a Latin style so pure and elegant, as ranked him among the finest writers of his age: it was laboured, indeed, with that solicitude of correctness, which bespoke a Latinist formed in the Italian school of that time. His friend Erasmus describes him as "Vir non exacti tantum, sed severi judicii;" and Huet, in his learned treatise "De claris Interpretatoribus," gives him the praise of extraordinary elo-

gance and chasteness of style, but intimates that he occasionally sacrifices fidelity to these qualities.

It was, indeed, on his reputation as a philologist, that he seems chiefly to have valued himself. His first essay was a translation of "Proclus on the Sphere," dedicated to his pupil, prince Arthur; and he also wrote a small book of the rudiments of the Latin Grammar, in English, for the use of the princess Mary, which was afterwards translated into Latin by the celebrated Buchanan. But the work, which appears to have engaged a very large portion of his time, and was universally acknowledged to be a work of the most profound erudition, was a larger grammatical treatise, entitled "De emendata structura Latini Sermonis, libri sex." This work, which was not printed till after his death, in December 1524, when it appeared with a commendatory letter from the learned Melancthon, was received with much applause by men of erudition, and passed through several editions: it was too complex however, and too profound in metaphysical divisions, and in the philosophy of language, for popular use. His friend Erasmus, indeed, in his "Moriae Encomium," bestowed some good-natured raillery upon the author, for having tortured himself for twenty years by the subtleties of grammar, and, after forsaking other more important objects, thought himself happy in living long enough to establish certain rules for distinguishing the eight parts of speech.

In his professional character, Linacre acquired universal reputation, among his countrymen and contemporaries, for skill and practical ability, as well as for his learning; and he was equally the subject of applause and estimation as an upright and humane physician, a steady and affectionate friend, and a munificent patron of letters. It were sufficient of itself to justify this eulogium, to mention that he was the intimate friend of Erasmus. That great and worthy man frequently takes occasion to express his affection and esteem for his character and abilities; and writing to an acquaintance, when seized with an illness at Paris, he pathetically laments his absence from Linacre, from whose skill and kindness he might receive equal relief. The following epitaph, written by Caius, will be acceptable to the learned reader from the elegance of its composition.

"Thomas Lynacrus, Regis Henrici VIII. medicus; vir et Græcè et Latine, atque in re medica longe eruditissimus. Multos ætate sua linguantes, et qui jam animam despondent, vitæ restituit. Multa Galeni opera in Latinam linguam, mira et singulari facundia, vertit. Egregium opus de emendata structura Latini sermonis, amicorum rogatu, paulo aute morte edidit. Medicinæ studiosis Græcæ publicas lectiones duas, Cantabrigiæ unam, in perpetuum stabilivit. In hac urbe Collegium Medicorum fieri sua industria curavit, cujus et Præsidens proximus electus est. Fraudes dolosque mirè perosus; fidus amicis; omnibus juxta charus: aliquot annos antequam obierat Presbyter factus; plenus annis, ex hac vita migravit, multum desideratus, anno 1524, die 21 Octobris. Vivit post funera virtus. Thomæ Linacro clarissimo Medico, Johannes Caius posuit, anno 1557. See Aikin's Biog. Memoirs of Med. Friend's Hist. of Physic. Gen. Biog.

LINAGROSTIS, in *Botany*, from *λινον*, *thread*, and *αγροστis*, *grass*, the old name of the Cotton-grass. See *ERUOPHORUM*.

LINARES, in *Geography*, a town of Spain, in the kingdom of Jaen, six leagues from the Sierra Morena; only remarkable for a fountain with many jets, and the remains of a Roman aqueduct, by which water was conveyed to the ancient Castelo, now Cazlona. In the neighbourhood are

very rich lead mines, and one of a semi-metal, with which the emerald tint is given to porcelain. Two leagues from this town there is a silver mine, famous in the time of the Carthaginians, which belonged to the beautiful Himilcon, wife of Asdrubal. The Romans also worked this mine. It has a shaft 2000 feet deep, into which numerous galleries open. It was long neglected; but re-opened in the 17th century, when a vein of silver was found five feet broad: however, it has since been disregarded. It belongs to the town of Bæza.

LINARIA, in *Botany*, so called from having the habit and foliage of *Linum*, or Flax, is the Toad-flax. (See *ASTIRRHINUM*.) The French botanists are partial to the name, though certainly none of the bell; and as they divide the genus, retain *Astirrhinum* for such species only as have no spur.

LINARIA, in *Ornithology*. See FRINGILLA and LINNET.

LINARYD, in *Geography*, a town of Sweden, in the province of Smaland; 11 miles S.E. of Wexio.

LINATO, a town of Italy, in the department of the Olona, on the Lambro; 5 miles S.E. of Milan.

LINBO, a small island in the Adriatic. N. lat. 44° 37'. E. long. 14° 57'.

LINCH-CLOUT, in *Artillery*, the flat iron under the ends of the arms of an axle-tree, to strengthen them, and diminish the friction of the wheels. See CLOUTS.

LINCH-PIN, in *Rural Economy*, the small pin, in carts or other carriages, that is put upon the end of the axle-trees, to confine the wheels on them in a steady manner. See LINSPIRS.

LINCHANCHIA, in *Geography*, a town of Mexico, in the province of Yucatan; 25 miles N. of Merida.

LINCKIA, in *Botany*, so called by Micheli, in honour of John Henry Linck, an apothecary at Leipzig, fellow of the Royal Society of London, who died in 1734, at the age of 60. He wrote an account of the coffee-tree, from one which flowered in a garden near his residence, in 1724, and his treatise may be seen in the *Ephemerides* of the Acad. Naturæ Curioforum, v. 1. 204. He is also the author of a splendid work in folio, on the species of Star-fish, *Asterias*. The plant to which Micheli has given his name, see Mich. Gen. 126. t. 67, is *Tremella Nefsee* of Linnaeus. See TREMELLA.

LINCOLN, an ancient city in the county of that name, England, and a place of considerable importance in the ecclesiastical and military annals of the kingdom, is singularly situated on the top and side of an eminence, which slopes with a steep descent to the south, where the river Witham runs at its base. A large portion of the city, or rather suburbs, extends, in a long street, from the foot of the hill to the south. On the northern side of it, without the walls, is another suburb, called Newport, supposed to have been an outwork of the Roman station. Camden, and some other antiquaries, state, that this place was occupied as a station, or strong hold, by the Britons, anterior to the Roman colonization of the island; and that then it bore the name of "Lindcoit, from the woods (for which some copies have, corruptly, Lintcoit)." By Ptolemy and Antoninus the name of the place is written Lindum; and, from having the privilege of a colony, it was called Lindum colonia. As a military station, occupied by a colony of Romans, it must have been a place of some extent and consequence. This is evident from the vestiges that remain, and from the various discoveries that have been made at different periods. The form of the fortified station was that of a parallelogram, divided into four equal parts by two streets, which crossed it

at right angles. At the extremities of these were four fortified gates, nearly facing the four cardinal points. The whole was encompassed by an embattled wall, which, on three sides, was flanked by a deep ditch, but on the fourth side the steepness of the hill rendered a foss unnecessary. The area, thus inclosed, was about 1300 feet in length by 1200 in breadth, and is estimated to have contained thirty-eight acres. The walls have been levelled with the ground; and three of the gates have been long since demolished. The remaining gate, to the north, which is called Newport gate, is described by Dr. Stukeley as "the noblest remnant of this fort in Britain, as far as I know;" and he expresses much surprise, that it had not "been taken notice of" before his time. The great or central gateway has a semi-circular arch, sixteen feet in diameter, formed with twenty-six large stones, apparently without mortar. The height is twenty-two feet and a half, of which eleven are buried beneath the ground. On each side of the arch are seven courses of horizontal stones, called springers, some of which are from six to seven feet in length. On each side of the arch are two small lateral doorways or poiterns. A mass of the old Roman wall is still to be seen eastward of this gate; and to the west is another large mass, called the mint-wall, which was about sixteen feet high and forty feet long, and had scaffold-holes and marks of arches. Mr. Gough supposed this to be part of a Roman granary. Southward of the station above described were other Roman works, which extended from the brow to the bottom of the hill. It appears that a fortified wall, with towers at the corners, continued from the top to the bottom of the hill, where it turned at right angles by the side of the river. These fortifications underwent several alterations and additions, during the various wars to which the place was subjected. Hence it is very difficult, if not wholly impossible, to define what is really of Roman origin, or of Saxon or Norman workmanship. It is equally perplexing to ascertain the time of establishing the first colony here forming the station, building the walls, or extending the city. Various coins and other remains of antiquity have been discovered here. In 1739, three stone coffins were found at the south west corner of the clove, near the Chequer gate. Beneath these was a tessellated pavement, and under that a Roman hypocaust. A similar discovery was made in 1782. In the tenth volume of the *Archæologia* is a description of an ancient place of sepulture, discovered in an open field, half a mile from the east gate of the ancient Lindum. In 1790 was found, about three or four feet below the surface, a very curious sepulchral monument, evidently Roman, and of some person of high rank. Many fragments of antiquity were preserved by the Rev. Dr. Gordon, the precentor of the cathedral, who gives an account of several earthen and glass urns, which were discovered in the same field, some of which were of singular shape. He also describes a room, twenty feet by sixteen, which was discovered in a quarry. The same field having been broken up for the purposes of quarrying, several stone coffins of various shapes have at different times been discovered in the loose ground, which covers a substratum of rock. From these, and from other circumstances, it is highly probable that this was a Roman burial-ground.

Soon after the Romans quitted the island, Lincoln, in common with other places of consequence, shared in the general calamities which ensued by the incursions of the Picts, Saxons, and Danes. At what period the Saxons first possessed themselves of this city does not appear in history: but early in the sixth century we find Arthur, king of Britain, obtaining great advantages over the combined forces of

the two Saxon chiefs, Colgern and Cerdic, and compelling them to relinquish the siege of Lincoln. In those struggles the old town was nearly destroyed, and, as Leland supposes, "new Lincoln was made out of a piece of old Lincoln." The Saxons, for their better security, fortified the southern part of the hill with ditches and ramparts, walled the town, and erected gates. At the time of the Norman conquest, Lincoln appears to have been one of the richest and most populous cities in England: and of great importance as an emporium of trade and commerce. The Domesday Survey mentions 1070 manfions, 900 burgesses, and 12 lagemen, having sac and soke. On the accession of the Conqueror to the throne, he ordered four strong castles to be built; of which one was to be at Lincoln. In consequence of this, a large and strong castle was erected on the ridge of the hill, on which this city was situated. The building was 644 yards in circumference, and occupied the space on which it is asserted that 166 houses had stood; 74 more were at the same time demolished without the limits, that the whole might be insulated. In the reign of Henry I. a navigable canal was made, or enlarged, from the river Witham at Lincoln to the Trent near Torksey; and was probably the first canal of the sort ever made in England. This was about seven miles in length, and is at present called the Foss dyke. By this a communication was formed with the Trent, and down that by the Humber to the sea. Being thus accessible for foreign vessels, and having also the advantage of an inland navigation, the city became populous and wealthy; and, according to Alexander Nechain, a poet of that age, "Lincoln was now stored with good things, and became the support of the neighbouring country." At this period, it appears to have possessed a large share of the import and export trade of the kingdom. When, in the year 1140, the empress Maud came to England to assert her title to the crown, she took up her residence at Lincoln, as a place of safety, and conveniently situated for communication with her friends. Stephen hearing of it marched quickly thither, closely besieged the city, and took it: but the empress had escaped. The king, having possessed himself of the city, appeased the tumults of the neighbourhood, and finding the country quiet, left a garrison, and proceeded to his army, acting in other parts of the kingdom. During the contest between the empress and Stephen, Lincoln acquired great notoriety; and thence obtained a degree of consequence in the estimation of future monarchs. After Henry II. had been crowned in London, he was afterwards, according to Speed, crowned at Lincoln in the year 1155. We find this city and its castle materially concerned in the contentions between king John and the associated barons. The castle and bail of Lincoln appear to have continued in the occupation of the crown till the time of Edward I., when Henry de Lacy died seized of them, and they passed, with other parts of his inheritance, to the earl of Lincoln, and so became annexed to the duchy of Lancaster. John of Gaunt, duke of that palatinate, greatly improved the castle, and made it his summer residence; having, according to a local tradition, built himself a winter palace below the hill, in the southern suburbs. Several parliaments were held at Lincoln in the reigns of Edward I. II. and III. In the year 1348, the contracted spirit of monopoly so far prevailed here, against the acts of parliament passed in the years 1335 and 1337, and the king's resolutions to foster the woollen manufactures, that the weavers of Lincoln obtained a grant from Edward III., of what they considered and called their *liberties*. By this charter they were invested with the power of depriving any weaver not of their guild, of the privilege of working at his trade within twelve leagues of the city. This

and other similar monopolies were abolished in 1351, by an act called the *Statute of Cloths*. In the following year, the staple of wool was removed from Flanders to England; and Lincoln was one of the staple towns appointed on that occasion. It was also made a staple for leather, lead, and various other articles. This proved highly beneficial to the place, for it thereby recovered from the losses it had sustained by military ravages, and was soon restored to a flourishing condition. At the commencement of hostilities between Charles I. and his parliament, the king came to Lincoln, and convened the nobility and freeholders of the county.

The diocese of Lincoln, after the see was removed from Sidnacester, soon acquired a vast accumulation of territorial jurisdiction and wealth. It included so many counties, that it was described as ready to sink under the incumbent weight of its own greatness; and though Henry II. took out of it the diocese of Ely, and Henry VIII. those of Peterborough and Oxford, it is still considered the largest in England. As the jurisdiction was great, so, prior to the reformation, the revenues were proportionably abundant. Except the two archbishoprics, and those termed the principality bishoprics, Winchester, Durham, and Ely, no see was so well endowed, which was the reason that there is no record, prior to the time of Elizabeth, of any bishop of this see having been translated to another, except Winchester; though since that time, Willis observes, "no less than ten out of seventeen have left this for more valuable ones." Nor was it less remarkable for the number of episcopal palaces within the diocese. Previous to the year 1547, it had eight. In this county, Lincoln, Sleaford, and Nettleham; in Rutlandshire, Ledington; in Huntingdonshire, Buckden, the usual residence of the bishops; in Buckinghamshire, Woburn and Finghurst; in Oxfordshire, Banbury Castle: there were also two others at Newark in Nottinghamshire; and Lincoln Place, Chancery Lane, London. All these, except that at Lincoln, with about thirty manors, were given up, in the first year of Edward VI., by Holbech, the first married bishop; who, in order to gratify the wishes of some courtiers, and to raise his own family, exchanged almost every species of landed property annexed to the see for impropriations; so that now only four manors remain of the ancient demesnes. The present revenues, therefore, principally arise from rectorial property or tythes.

The cathedral is not only the most prominent object of this city, but is the most interesting as a subject of history, antiquity, and art. This magnificent structure, from its situation on the summit of a hill, and from the flat state of the country to the south-east and south-west, may be seen at the distance of twenty miles. Raised at a vast expence, by the munificence of several prelates, it discovers, in many parts, singular skill and beauty, particularly in its western front, which must attract the attention of every traveller. The see being translated from Dorchester to Lincoln in 1088, St. Remigius de Fescamp, the first bishop, founded a cathedral church, which was so far advanced in the course of four years as to be ready for consecration. All the bishops of England were summoned to attend on that occasion. Remigius died two days before the intended solemnity. His successor, Robert Bloet, finished the cathedral, dedicated it to the Virgin Mary, and greatly enriched it. In his time, the bishopric of Ely was taken out, and made independent of that of Lincoln. The cathedral, having been destroyed by fire in 1124, was rebuilt by Alexander de Blois, then bishop, who arched the new fabric with stone, to prevent a recurrence of a similar accident; and greatly increased the size and augmented the ornaments of it, so as to render it the most magnificent sacred edifice in his time.

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Bishop Hugh Burgundus enlarged it by the erection of what is now called the New Work. He also built the chapter house. This prelate died in 1200. Two kings (John of England and William of Scotland) affixed to carry his body to the cathedral, where it was enshrined in silver, according to Stukeley; but Sanderfon says the shrine was of beaten gold. Bishop Gynewell added to the cathedral the chapel of St. Mary Magdalen. Bishop Fleming built a chapel on the north side, in which he was buried: on his monument is his figure in free-stone, pontifically habited. Bishop Alnwick was a considerable benefactor to the cathedral, and built the stately porch at the great south door. Bishops Russell and Longland built two chapels: to both these prelates are altar-tombs, though the latter was interred at Eton.

The cathedral church consists of a nave, with its aisles; a transept at the west end; and two other transepts, one near the centre, and the other towards the eastern end; also, a choir and chancel, with their aisles, of corresponding height and width with the nave and aisles. The great transept has a nave towards the east: attached to the western side of this transept is a gallilee, or grand porch; and on the southern side of the eastern aisle are two oratories, or private chapels; while the northern side has one of nearly similar shape and character. Branching from the northern side are the cloisters, which communicate with the chapter-house. The church is ornamented with three towers: one at the centre, and two at the western end: these are lofty, and are decorated with varied tracery, pillars, pilasters, windows, &c. The dimensions of the whole structure, according to the accurate measurements of Mr. T. Espin of Louth, are as follow: the height of the two western towers 180 feet. Previous to the year 1808, each of these was surmounted by a central spire 101 feet high. The great tower in the centre of the church, from the top of the corner pinnacle to the ground, is 300 feet; its width 53 feet. Exterior length of the church, with its buttresses, 524 feet; exterior length, 482 feet; width of western front, 174 feet; exterior length of great transept, 250 feet; interior, 222; width, 66; the lesser or eastern transept 170 feet in length, 44 in width, including the side chapels; width of the cathedral, 80 feet; height of the vaulting of the nave, 80 feet. The chapter-house is a decagon, and measures, interior diameter, 60 feet 6 inches. The cloisters measure 118 feet on the north and south sides, and 91 on the eastern and western sides. The grand western front, wherein the greatest variety of styles prevails, is certainly the workmanship of three, if not more, distinct and distant eras. This portion of the fabric consists of a large square-shaped façade; the whole of which is decorated with door-ways, windows, arcades, niches, &c. It has a pediment in the centre, and two octangular stair-case turrets at the extreme angles, surmounted by plain spire-shaped pinnacles. The upper transept and the choir appear the next in point of date. These are in the sharp-pointed style; and their architecture is very irregular, having pillars with detached shafts of Purbeck marble, in different forms, but all very light: those on the sides of the choir have been strengthened. The vaulting is generally simple; the ribs of a few groins only have a filleted moulding. A double row of arches or arcades, one placed before the other, is continued round the inside of the aisles, beneath the lower tier of windows. The windows, which are lofty and narrow, are placed two or three together; the greater buttresses in front are ornamented in a singular manner with detached shafts, terminating in rich foliage. This part of the fabric was probably built by bishop St. Hugh. The great transept, the gallilee porch,

and the vestry, are nearly of the same, but in a later style. The vestry is vaulted, the groining having strong ribs; and beneath it is a crypt with groins, converging into pointed arches. The nave and central tower were next rebuilt, probably begun by bishop Hugh de Welles, as the style of their architecture is that of the latter part of the reign of John, or the beginning of Henry III. Part of the great tower was erected by bishop Grosthead, who finished the additions which had been made to the old west front. The part extending from the smaller transept to the east end appears to have been built by bishops Gravesend, Sutton, and D'Alderby, about the conclusion of the thirteenth, or commencement of the fourteenth century. The latter prelate built the upper story of the rood tower, and added a lofty spire, which was constructed of timber, and covered with lead. This was blown down in a violent storm in the year 1547; and the damages then sustained were not wholly repaired till 1775. That nothing might be wanting to render this church as splendid in its furniture as it was elegant in its workmanship, it received the most lavish donations. So sumptuously was it supplied with rich shrines, jewels, &c. that, Dugdale informs us, Henry VIII. took away 2621 ounces of gold, and 4285 ounces of silver, besides precious stones of great value. This cathedral had formerly a great number of costly sepulchres and monumental records: of many, not a vestige remains; nor are the places known where they stood. At the Reformation, what the ravages of time had left, the zealots pulled down or defaced: so that, at the close of the year 1548, there was scarcely a perfect tomb remaining. Among the illustrious persons who were buried here, and had monuments erected to their memory, were Catherine Swinford, wife of John of Gaunt, duke of Lancaster; Joan, countess of Westmoreland, their daughter; and Bartholomew, lord Burghersh, brother to the bishop of that name. Many of the bishops were interred here.

On the north side of, and connected with, the cathedral are the cloisters, of which only three sides remain in the original state. Attached to the eastern side is the chapter-house, a lofty elegant structure. It forms a decagon, the groined roof of which is supported by an umbilical pillar, consisting of a circular shaft, with ten small fluted columns attached to it; having a band in the centre, with foliated capitals. One of the ten sides forms the entrance: in the other sides are nine windows, having pointed arches with two lights each. Over the north side of the cloisters is the library, which contains a large collection of books, and some curious specimens of Roman antiquities. It was built by dean Honeywood.

Besides monasteries, nunneries, and other edifices for pious uses, Lincoln had formerly more than fifty churches. Eleven only, exclusive of the cathedral, now remain; and scarcely any of them merit a particular description. Those most worthy of notice are, St. Bennet's, St. Mary de Wigford's, and St. Peter's at Gowts: these have lofty square towers in the Norman style. St. Peter's is a very ancient structure, and appears to have been the chapel of some religious house, of which the remains are extant. The places of worship for the different denominations of Dissenters, are, one for Roman Catholics, one for Independent Baptists, one for Presbyterians, and one for Methodists.

The number of parishes within the city is twelve, which, with the four townships within its jurisdiction, make sixteen. These, according to the government survey in the year 1800, contained 1574 houses, which were inhabited by 7398 persons. Many of the houses are old, but there are some very good buildings, both upon and below the hill. The city

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has of late been considerably improved, by making a new road, paving the footways, and erecting a new market place.

Lincoln has an extensive trade in corn and wool, of which great quantities are exported into Yorkshire, by vessels which obtain a back freightage of coals and other necessary articles for the use of the interior. This city is a county of itself, having subject to it four townships in the vicinity, Bracebridge, Canwick, Branton, and Waddington, called the "Liberty of Lincoln." This privilege was conferred in the third year of George I.; and in official acts it is denominated, "The City and County of the City of Lincoln." Its viscountial jurisdiction extends twenty miles round; a privilege unequalled by that of any city in the kingdom. In the 26th year of Edward I. A. D. 1298, Wilhelmus Disney and Johannes Marmion were summoned to parliament as its first representatives. In the history of the boroughs of Great Britain, it is said, "This city had summons, with London and York, to send members to parliament, the forty-ninth of Henry III." The right of election is considered to be in the freemen, and the number of voters is about eleven hundred. The political influence, though by no means absolute, is possessed by Lord Delaval, who has a seat at Doddington, in the neighbourhood. The civil government of Lincoln is vested in a corporation, consisting of a mayor, twelve aldermen, two sheriffs, twenty-eight common-councilmen, and four chamberlains; with a recorder, deputy recorder, steward of the courts of borough-mote, a town-clerk, four coroners, four sergeants of the key, or bailiffs, and other inferior officers. The city was incorporated so early as the seventh year of Edward II.; Henry Beil being then the first mayor. Leland, in his description of Lincoln, enumerates five "Gates in the waulles of the citie," and observes, "It is easy to be perceived, that the towne of Lincoln hath been notably builded at three tymes."

Of the castle, built by the Conqueror, little now remains; and the area is occupied by buildings appropriated to uses of the municipal power. The few remaining vestiges convey the same idea of original Norman architecture as that of York, erected nearly at the same period. The keep was not included, but stood half without and half within the castle wall, which ascended up the slopes of the hill, and joined the great tower. This being situated on a high artificial mount, it was equally inaccessible from within or without the castle area. It was nearly round, and covered the summit of the mount. The walls are above seven feet in thickness. In a corner of the area is a curious small building, appearing on the outside like a tower, called Cob's hall; which Mr. King thinks was originally used as a chapel.

Few places in the kingdom exhibit so many ancient remains as Lincoln. Saxon, Norman, and pointed arches; and door-ways with turrets, walls, mullions of windows, and other fragments of old dilapidated buildings, appear in every direction. Its numerous churches and religious houses, the vestiges of which occasionally meet the eye of the enquiring traveller, are highly interesting to the antiquary, as tending to illustrate the progress of the arts, and the history of past ages. The Mint-wall, mentioned by Mr. Gough, is still remaining, and forms part of the inclosure of a garden.

Chequer gate, at the west end of the cathedral, had two gate-houses; the western one has been recently taken down; the remaining one, to the east, has three gateways, and two turrets between them. In Eastgate-street are two very ancient gateways, one of which is nearly entire. At the bottom of

the town, near Brayford water, are remains of a fort, called Lucy-tower. In the minster yard is a large gateway, with grooves for a portcullis. A large oblong building, in Broadgate-street, was appropriated to the Grey friars, and still displays much of its ancient architecture: part of this edifice is now used as a free-school, and the other part as a library. The deanery-house was founded by dean, afterwards bishop, Gravefend, in 1254. The vicar's college, called the Old Vicars, formed a quadrangle, of which there remain only four good houses, inhabited by the vicars. The bishop's palace, on the south side of the hill, which, from being situated near the summit, Leland described as "hanging in declivity," was built by bishop Chesney, to whom the site was granted by king Henry II. It was enlarged by succeeding prelates, and was scarcely exceeded in grandeur by any of our ancient castles. Adjoining to St. Andrew's church-yard formerly stood the palace of the celebrated John of Gaunt. Opposite to this house is a large building, called John of Gaunt's stables. It was a large structure, in the Norman style, and formerly consisted of a quadrangle, enclosing a spacious area; of which only the north and west fronts remain. The Jew's house, on the side of the hill, is an object of great curiosity: it is singularly ornamented in front, and some of its mouldings are similar to those found the west doors of the cathedral; in the centre of the front is a semicircular arched door-way, with a projecting pilaster. This house was possessed by Belafet de Wallingford, a Jewess, who was hanged for clipping in the 18th of Edward I. The Stone-bow, a large tower-gateway, crossing the High-street, is said to have been erected in the reign of Richard II.; but the style indicates a later date. The High-bridge, over the main stream of the Witham, consisting of one arch, is considered to be at least five hundred years old. Formerly here were two grammar schools, one in the clole, the other in the city: they were united in 1583. The principal modern buildings are, the market house, erected 1736; the blue-coat-school, on the plan of Christ's-hospital, London; the county hospital; the county gaol, constructed on the plan of Mr. Howard for solitary confinement; two assembly rooms, and a small theatre.

Among the distinguished natives of Lincoln was the late Dr. Willis, celebrated for his treatment of infancy, who died at an advanced age December 1807. *Beauties of England*, vol. ix. *The History of Lincoln*, 12mo. 1810.

LINCOLN, a maritime county of America, in the state of Maine, bounded N. by Kennebeck county, S. by the ocean, E. by Hancock county, and W. by that of Cumberland. The sea-coast extends from that part of Penobscot bay, opposite to Deer island eastward, to Cape Small-point westward. The sea-coast of the counties of Cumberland and Lincoln is 100 miles in extent, measured in a straight line, but said to be above 200 by the course of the waters. It abounds with safe and commodious harbours; and the whole shore is covered by a line of islands, among which vessels may generally anchor in safety. Across the country there is a water communication by lakes, ponds, and rivers, from the western to the eastern bounds; so that the productions of the country may be conveyed to the different seaports. The chief towns are Wicasset, Waldoborough, and Warren.—Also, a county of Upper Canada, divided into four ridings and 20 townships, containing about 6000 inhabitants, and furnishing five battalions of militia. It is said that 19 covered waggon brought families to settle in the vicinity of the county of Lincoln, in June 1799.—Also, a county of Morgan district, North Carolina, containing 12,568 inhabitants, of whom 1479 are slaves. In this county are mineral springs and mines of iron. The manu-

facture

facture of iron is carried on in this county. The chief town is Lincolntown. —Alfo, a county of Georgia, formed in 1796, containing feven townships, and 4766 inhabitants, including 1433 flaves. —Alfo, a county of Kentucky, containing 8555 inhabitants, of whom 1750 were flaves. The road from Danville on Kentucky river paffes through fourth-wefterly, and over Cumberland mountain to Virginia. —Alfo, a town in Mercer county, Kentucky, on the road from Danville to Virginia; 12 miles S. E. of Danville. —Alfo, a township in Grafton county, New Hampshire, incorporated in 1764, and containing 41 inhabitants. —Alfo, a township in the N. E. part of Addison county, Vermont, containing 97 inhabitants. —Alfo, a township in Middlefex county, Maffachufetts, incorporated in 1754, and containing 756 inhabitants; 16 miles N. W. of Bolton.

LINCOLNSHIRE, a maritime county of England, is bounded on the N. by the river Humber, which feparates it from Yorkfhire; on the E. by the German ocean; on the S. by Cambridgefhire and Northamptonfhire; and on the W. by the counties of Rutland, Leicefter, Nottingham, and York. It is in length 77 miles, and about 48 in breadth; and contained, according to the return made to parliament in 1800, 42,489 houfes, inhabited by 208,557 perfons, viz. 102,445 males, and 106,112 females: 24,263 were flated to be employed in trade and manufacture; and 60,584 in agriculture. By a return to the houfe of lords in 1805, the area of this county is flated to be 2787 fquare ftatute miles, equal to 1,783,680 ftatute acres; the number of inhabitants on each fquare mile 75; and the total number of perfons 209,025. The total amount of the money raifed by the poor's rate in 1803 was 145,848*l.* at the rate of 3*s.* 7*d.* in the pound; and the grofs amount of the affeffment under the property tax of 1806 was 2,704,736*l.* The average of the deaths for ten years appears to be as 1 to 49½ of the population. Mr. Stone, in his view of the agriculture of this county, ellimates the number of acres at 1,893,100; of which he fuppofes there may be 473,000 acres of inclofed, marfh, and fen lands, 200,000 of commons, wafles, and unembanked fait marfhies, 268 000 of common fields, 25,000 of woodlands, and 927,120 of inclofed upland. Mr. Arthur Young flates the area of this county at 2888 fquare miles, or 1,848,320 acres; of which he fays, the wolds contain, 234,880; the heath 118,400; lowland 776,960; and mifcellaneous foils 718,080.

That part of Britain which is now called Lincolnfhire, was, anterior to the Roman conqueft, poffeffed by a clafs of Britons known by the name of Coritani. During the Roman dominion, this diftrict was included within the province of Britannia prima; and was interfefted by different roads, occupied by military ftations, and fome of its natural inconveniences removed by Roman fcience and induftry. The principal roads were the Britifh Ermin-ftreet, afterwards adopted by the Romans, and the Fofs-way. A great work of this county, generally attributed to the Romans, is the Car-dyke, a large canal or drain, which extends from the river Welland, on the fouthern fide of the county, to the river Witham, near Lincoln. Its channel, for nearly the whole of this courfe, an extent of upwards of forty miles, is fixty feet in width, and has a broad flat bank on each fide. This great canal receives from the hills all the draining and flowing waters, which take an eafterly courfe, and which, but for this Catchwater drain, as it is now appropriately called, would ferve to inundate the Fens. Several Roman coins have been found on the banks of this dyke. The whole of the prefent county is fuppofed to have been named by the Romans Lindum, and the principal ftation or town Lindem colonia.

During the Anglo-Saxon dominion in England, Lincolnfhire was incorporated within the kingdom of Mercia, which, according to an old chronicle quoted by Leland, was then divided into two provinces, north and fourth; and as the Trent was the line of feparation, the county of Lincoln conflituted a confiderable part of South Mercia. Crida was the frft Mercian fovereign, and began his reign in 586. At this time Mr. Turner, (History of the Anglo-Saxons,) fuppofed that the whole ifland was governed by eight Anglo-Saxon monarchs; whence it fhould rather be denominated an octarchy than an heptarchy. During the eftablifhment of thefe petty kingdoms, the Saxons were in conflant warfare with the Romanized Britons; and after thefe were fubdued, the former were repeatedly embroiled in conflicts with each other. In the midft of thefe civil commotions Chriftianity was introduced, and gradually made its progrefs through the ifland; giving a new turn to human purfuits, and diverting and engroffing the attention of the barbarous heathens. Peada, the fon of Penda, was the reigning monarch here, when this religion was accepted by the South Mercians: he founded a monaffery at Medenhamfted, now Peterborough. He was foon afterwards murdered, as fuppofed, by his wife. Edwin the Great, the frft Chriftian king of Northumberland, conquered the counties of Durham, Chefter, Lancaller, the Ifle of Man, and Anglefea, carried his arms fourthward over the Trent, and obtained all the province of Lindfey. Paulinus, who converted him to Chriftianity, preached the gofpel wherever that king's power extended. He built the cathedra of Southwell, a little weft of Newark, baptized many thoufands in the river Trent, near to Tiofulingacefter, and converted Blecca, the governor of Lincoln. This was about the year 630. The learned and pious Alkfrid kept his court at Stamford in 658. After the death of Ofwy, king of Northumberland, Egfrid, his fon, invaded Wulfere, and wrestled from him the whole province of Lindfey in Lincolnfhire. In 677 he erected the epifcopal fee of Sidnacefter, in favour of Eadhed, who had been chaplain to his brother Alkfrid, king of Deira. In 683, Eadhed removed to Ripon, where he remained till his death. The fourth Mercian kingdom and bifhop's fee being thus eftablifhed, but few public events are recorded, till the incurfion of the Danes, who, in the year 870, laid wafte great part of Lincolnfhire, and burned the monafferies of Bardney, Croyland, and Medenhamfted, putting all the monks to the fword. After the defeat of the Danes by Alfred, the fovereignty of Mercia fell into his power. He did not, however, afcendly incorporate it with Weflex, but difcontinued its regal honours; and during the reign of Edward the Elder, it was found neceffary to conftitute and fortify feveral places on the borders of Mercia joining Northumbria, particularly on the banks of the Humber. Mercia was foon afterwards annexed to Weflex, but fome places were ftill held by the Danes; among thefe were the towns of Stamford and Lincoln, even fo late as 941, when Edmund the Elder expelled them hence.

The maritime counties of England being more directly expofed to attack from invading armies and piratical plunderers; and in the early part of our civil eftablifhments, being more populous than the midland country, were therefore frequently expofed to the conflicts of warfare; and hence it is found that thefe diftricts abounded with military works and caftles or caftellated manfions. Befides the permanent ftations of the Romans in Lincolnfhire, they threw up caftrematations in different places; to guard the vallies, protect the great roads, and defend the mouths of the rivers. In the continued wars between the Anglo-Saxon kingdoms, thefe were again occupied by the contending parties; and after

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after the Norman conquest, some of the most commanding were adopted by the conqueror's captains and barons, and then became heads of extensive lordships. To describe or discriminate them, is, and ever will be, impossible; for documents are wanting, and the innovations of the latter occupiers generally obliterated or annihilated all traces of their predecessors. Exclusive of the Roman stations, there are notices or remains of the following fortifications in this county. Encampments at or near Brocklesby, Hibberton, Broughton, Roxby, Winterton cliffs, Aulkborough, Yarborough, South Ormsby, Burwell, Stamford, Castle-hill near Gainsborough, Winterton, Humington, Ingoldby, Castle Carleton, Burgh, Brough, north of Causton, Barrow. Castles, or remains at Horncastle, Tattershall, a noble remain, Bourne, only earth-works remaining, Caistor, Somerton, Moor Tower, Stamford, Scrivelsby, Torksey, a fine remain, Sleaford, only earth-works, Bollingbrook, Lincoln, with walls and gates, Folkingham, with large fosse, Kyme tower, and Hufley tower, near Boston, Pinchbeck, a moated mansion, Bitlam.

According to the best authorities, the episcopal see was established at Lincoln towards the close of the eleventh century, previous to which era, the diocese had consisted of the two Anglo-Saxon sees of Dorchester, now a village in Oxfordshire, and Sidnacester a place bordering on the river Trent. The diocese of Lincoln is the largest in the whole kingdom, notwithstanding those of Oxford, Peterborough, and Ely, have been taken from it. It comprehends the counties of Lincoln, Leicester, Huntingdon, Bedford, and Buckingham, excepting the parishes of Monks, Risborough, and Halton, which are peculiars of Canterbury; and Abbot's, Aston, and Winslow, (which, with fifteen other parishes that are in Hertfordshire, and were taken thence, being made of exempt jurisdiction, and appropriated to the abbey of St. Albans, became, on the dissolution of that monastery in 1541, part of the diocese of London.) The see also retains the greater part of Hertfordshire, and several parishes in the counties of Oxford, Rutland, and Northampton. The whole diocese is divided into six archdeaconries; these are subdivided into fifty-two deaneries; the number of parishes is stated by Browne Willis to be, including donatives and chapels, 1517, of which 577 are impropriated; and the clergy's yearly tenths in this very extensive jurisdiction 1751*l.* 14*s.* 6*d.* Camden says there are 630 parishes in this county. The monasteries, hospitals, &c. connected with the cathedral and its ecclesiastical establishment, were very numerous, and some of very extensive influence.

The ecclesiastical architecture of Lincolnshire has long been justly celebrated for its magnificence; and its numerous churches have been the subjects of admiration. It is remarkable that the most splendid edifices which adorn this district, were erected chiefly in its lowest and most fenny situations, where all communication must formerly have been, and even to this day is extremely difficult. The ecclesiastical edifices in the division of Lindsey, excepting the cathedral of Lincoln, are in general inferior to those in Kesteven and Holland; but in the north-eastern part of this division, which is bounded by the German ocean to the east, and the highlands, called the Wolds, to the west, there are several churches, displaying much elegance in their architecture, and built of excellent materials. The division of Kesteven abounds with churches splendid both in their plans and decorations. In the central part, the greater proportion of them is adorned with lofty spires; while many of those in the northern and southern extremities present handsome towers, frequently divided into three or four distinct stories,

and formed of excellent materials and masonry. The date of the churches in this division, with the exception of those of Sempringham and St. Leonard Stamford, is, in few instances, earlier than the thirteenth century. It is principally in the division of Holland that Lincolnshire boasts of superior excellence in ecclesiastical architecture; and it is really surprising that so many fine monastic buildings, and sacred edifices, should have been erected in a country so inconvenient for travelling, so unpleasant to the eye, and so uncongenial with the common comforts of life; yet in this fenny and swampy district, are the churches of Boston, Gosberton, Pinchbeck, Spalding, Holbeach, Gedney, Long-Sutton, Croyland, and many others, which have a just claim to universal admiration. The character and plan of the churches in this division vary in different parts. Some are cruciform; many have spires in common with those of Kesteven; while embattled towers at the west end form the principal feature of the remainder. Of the splendid church at Croyland, only a small portion of the original structure now remains; but sufficient to shew that in its entire state, it was not inferior to any of our cathedrals, either in size or architectural ornament. The stone employed in the erection of the edifices of this district is universally found to be of an excellent and durable species, still retaining at the distance, in many instances, of six or seven centuries, its original face and firmness.

This county is more noted for its religious than for its civil architecture. Though of great extent, it contains but few mansions of consequence, grandeur, or elegance, and those are chiefly of modern erection. The following are the principal; Grimsthorpe castle; the seat of the duke of Ancaster-Nocton; earl of Buckinghamshire—Glentworth; earl of Scarborough—Broklesby; lord Yarborough—Belton; lord Brownlow—Redbourn; lord William Beauchamp—Burton; lord Monson—Doddington; lord Delaval—Bloxholm; Hon. colonel Manners—Manby; Hon. Charles Anderson Pelham—Revesby abbey; sir Joseph Banks, bart.

Lincolnshire, and the counties of Essex, Cambridge, and Norfolk, have been generally described as particularly unfavourable to health; and from their contiguity to the sea, with the numerous fens, meres, brooks, &c. with which they abound, are commonly stigmatized as producing pellilential climates, only calculated to excite agues, cramps, and rheumatisms. These general maxims, though frequently originating in facts, are too often perverted, or extended beyond due bounds. Lincolnshire may be said to be in this predicament; for its name is commonly associated with fens, flatness and bogs. Those who reside in, or have travelled over it, are enabled to appreciate and define its character. Arthur Young has pointed out and described many features and places in this county, that may be referred to as partaking of the beautiful and picturesque:—"About Belton," he says, "are fine views from the tower on Belmont; Lyra and the Norfolk cliffs are visible, Nottingham castle also, the vale of Belvoir, &c. And in going by the Cliff towns to Lincoln, there are many fine views. From Fulibeck to Leadenham, especially at the latter place, there is a most rich prospect over the vale of the Trent to the distant lands that bound it. These views, over an extensive vale, are striking, and of the same features as those from the cliff-road to the north of Lincoln, to Kirton, where is a great view both east and west to the Wolds, and also to Nottinghamshire. Near Gainsborough there are very agreeable scenes; from the plantation of H. Dalton, of Knaith, and from the chateau battery of Mr. Hutton, of Burton, the view of the windings of the Trent, and the rich level plain of meadow, all alive with great herds of cattle, bounded

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bounded by distant hills of cultivation, are features of an agreeable country. But still more beautiful is that about Trentfall; from Sir John Sheffield's hanging wood, and the Rev. Mr. Sheffield's ornamented walk, following the cliff to Alkborough, where Mr. Goulton's beautiful grounds command a great view of the three rivers; as the soil is dry, the woods lofty, and the country various, this must be esteemed a noble scenery, and a perfect contrast to what Lincolnshire is often represented by those who have only seen the parts of it that are very different. The whole line of the Humber hence to Grimsby, when viewed from the higher wolds, presents an object that must be interesting to all. Thus, with the very great plantation of Lord Yarborough, are seen to much advantage, from that most beautiful building, the mausoleum at Brocklesby." Many other parts of the county might be pointed out as presenting in themselves, or commanding, interesting scenery. The country around Grantham, also in the vicinity of Louth, and that more particularly between Bourn and the former place, including the noble and spacious woods of Grimsthorpe, abound with that inequality of surface, that diversified interchange of hill and dale, wood and lawn, which constitute the picturesque and beautiful in natural scenery.

Lincolnshire may be said to present three great natural features, each of which has a specific and nearly uniform character. These are the wolds, heaths, and fens. The latter occupy the south-eastern side of the county, and though formerly a mere waste and perfectly sterile, have been, by means of drainage, &c. rendered subservient to agriculture; many parts indeed may be pronounced uncommonly fertile. On the sea coast, towards the north part of the county, this tract is narrow; near the Humber it contracts to a mere strip of land. The heaths, north and south of Lincoln, and the wolds, are calcareous hills, which, from their brows, command many fine views over the lower regions. The rest of the county is not equally discriminated, either by fertility or elevation. "The heath, now nearly inclosed," says Arthur Young, "is a tract of high country, a sort of back bone to the whole, in which the soil is a good sandy loam, but with clay enough in it to be slippery with wet, and tenacious under bad management; but excellent turnip and barley land, on a bed of lime-stones, at various depths, from six inches to several feet, commonly nine inches to eighteen. This hill slopes sharply to the west; the declivity of the same nature, but generally good; and this extends some distance in the flat vale, for the first line of villages, (built also as the soil lies in a longitudinal direction north and south.) The soil is rich loam, containing much pasture." Between Gainborough and Newark, for twenty five miles, is a large tract of flat sandy soil, the greater part of which has been inclosed, and partly drained. The soil of the Isle of Axholme may be said to be among the finest in England. It consists of black sandy loams, warp land, brown sand, and rich loams of a soapy and tenacious quality. The under stratum at Stacey, Belton, &c. is, in many places, an imperfect plaster stone. Respecting the general products of the county, the higher grounds are now mostly inclosed, and appropriated to tillage, and produce all sorts of grain. Some of the wolds, however, are not yet divided, but are devoted to sheep and rabbits. The lower lands that have been drained and inclosed, produce abundant crops of oats, hemp, flax, &c.

Lincolnshire has long been famous for a breed of fine horses; but the adjoining county of York has now the credit for rearing many that are actually bred in this county. In some districts great numbers of mares are kept for the sole purpose of breeding. In Holland Division almost every

farmer keeps some; and the number of colts reared is very great. The neat cattle of this county are described by Mr. Stone as being, for the greatest part, of a large sort, having great heads and short horns; stout in the bone, and deep in the belly; with short necks and fleshy quarters, narrow hips and chins, high in their rumps, and bare on the shoulders. The cows, he remarks, when fat, weigh from eight to nine hundred, and the oxen from ten to twelve hundred. The most profitable flock of the county appears to be sheep. Numbers are bred and fattened in this part of the kingdom. Large quantities of wool are thence obtained, to supply the demands of the neighbouring districts. It is a curious fact, that while so much has been said in commendation of the Leicestershire breed, the Lincolnshire, which is the same, should have been passed over in silence. Mr. Stone says, these sheep are not even varieties. The Lincolnshire, a large horned animal, adapted for the rich grazing and marsh land of the county; generally weighs well when fat, and bears a heavy fleece of coarse but long stapled wool; the weight, per fleece, is eight pounds and upwards. Mr. Young mentions a sheep sold at Smithfield, which clipped, the first year, 23lb. of wool, and in the second year, 22lb. Few manufactures are established in this county; but here are two objects of considerable merchandize, rabbits' fur, and goose feathers. These were formerly of great consequence, and furnished articles of extensive trade. From the system of inclosing, now so extensively adopted, both rabbits and geese are much diminished.

The rabbit warrens of this county were formerly much more extensive than at present, and were preferred on a principle of improvement; some being broken up for tillage, and others, which had been under till, being again laid down for this purpose. The soil of old warrens, by the rabbits continually stirring and ventilating the earth in burrowing, has been found incomparably better than lands of a like nature left in their original state. The fecundity of rabbits was a circumstance of no small consequence, when the skins of large well-chosen rabbits would produce 2s. 6d. or 3s. each: at that time they were used in making muffis, tippets, lining robes, &c.: the down was also employed in hats. As the skins constitute the principal profit of the proprietor, it becomes a primary object with him to attend to the breeding, killing, &c.: skins that are free from black spots on the inside are said to be in season. The trade is now on the decline, not only from the diminution in the value of the skins, but also from the means of conducting it becoming daily more circumscribed, it being now thought good husbandry to destroy the warrens, and apply the land to other uses. The number of warrens in this county has been greatly reduced, yet many thousand acres are still devoted to this kind of stock.

Many of what are called the fens, are in a state of waste, and serve for little other purpose than breeding and rearing geese, which are considered the fenman's treasure. They are a highly valuable flock, and live where, in the present state of those lands, nothing else will: they are very prolific, and the young quickly become saleable, or speedily contribute to increase the flock. The feathers are very valuable; and however trifling it may appear, the sale of quills alone amount, on a large flock, to a considerable sum. "During the breeding season," Mr. Gough says, "these birds are lodged in the same houses with the inhabitants, and even their very bed-chambers; in every apartment are three rows of coarse wicker pens, placed one above another; each bird has its separate lodge, divided from the other, which it keeps possession of during the time of sitting. A gozzard, or gooseherd, attends the flock, and twice a

day drives the whole to water, then brings them back to their habitation, helping those that live in the upper stories to their nests, without ever misplacing a single bird." The geese are usually plucked five times in the year: at Lady-day for quills and feathers, and again at Midsummer, Lammas, Michaelmas, and Martinmas. Goslings are not spared, as early plucking tends to increase the succeeding feathers. Mr. Young states, that "the feathers of a dead goose are worth sixpence, three giving a pound; but plucking alive does not yield more than three-pence a head *per annum*. Some wing them only once every quarter, taking ten feathers from each goose, which sell at five shillings a thousand. Plucked geese pay, in feathers, one shilling a head in Wildmore Fen." The common mode of plucking live geese is considered a barbarous custom; but it has, perhaps, prevailed ever since feather beds came into general use. The mere plucking is said to hurt the bird but little, as the owners are careful not to pull before the feathers are ripe, that is, just ready to fall: if forced from the skin sooner they are of inferior value.

The general improvements that have been effected in this county within the last twenty years, and that are now gradually making, have co-operated to alter the general appearance, the agriculture, climate, &c. so materially, that the surface has assumed a new aspect, the value of land is greatly increased, the means of social and commercial communication have been facilitated, and the comforts of domestic life greatly promoted. Yet there is still scope for material improvements: for the roads, in many parts of the county, are in a very bad state; and the traveller has not advantages adequate to the tolls levied on him. In the vicinity of Boston, Spalding, and Louth, the commissioners have commenced a plan for forming firm and substantial roads. This is mostly done by laying shingles, brought from the Norfolk coast, in the centre of the road, and mixing them with the silt of the place.

The wolds extend from Spilsby, in a north-westerly direction, for about 40 miles to Barton, near the Humber. They are, on an average, nearly eight miles in breadth, of sand and sandy loam, upon flinty loam, with a substratum of chalk. Beneath this line lies an extensive tract of land at the foot of the wolds, called the marsh, which is secured from the encroachments of the sea by embankments, and is agriculturally divided into north and south marshes by a difference in the soil.

The fens of this county form one of its most prominent features. They consist of lands which, at some distant period, have been inundated by the sea, and by human art have been recovered from it. In the summer they exhibit immense tracts, chiefly of grazing land, intersected by deep ditches, called droves, which serve both for fences and drains. These are accompanied generally by parallel banks, upon which the roads pass, and are intended to keep the waters, in flood time, from overflowing the adjacent lands. They not only communicate with each other, but also with larger canals, called dykes and drains, which, in some instances, are navigable for boats and barges. At the lower end of these are sluices, guarded by gates, termed gowts. During the summer, numerous flocks and herds are seen grazing over this monotonous scene, and many of the pastures afford a luxuriant herbage: but in the winter, or in the autumn, if it should prove wet, the aspect is changed; the cattle quickly disappear, and the eye must pass over thousands of acres of water or ice, before it can find an object on which to rest. Several causes combine to produce this drowning of the lands. Many of the fens lie below the level of the sea; some are lower than the beds of the rivers; and all are beneath the high-water mark of their respective

drains. The substratum of the fens is silt, or sea-sand, which is a well-known conductor of water. Through this, when the drains are full, the sea-water filters; and, unable to pass by the drains, rises on the surface, and is known by the name of *foak*. Dugdale was of opinion, that there was a time when these parts were not inundated. In his history of embanking, he observes, that the isle of Axholme, though for many ages it hath been a fenny tract, was not anciently so, but was originally a *woody* country, not annoyed with these inundations, as is evident from the great numbers of trees which had been found in the moor. The same author, speaking of the great level, gives his opinion that it was formerly firm and dry land, neither annoyed with stagnation of fresh waters, nor inundations from the sea; and this he supposes was the case of the fens in Lincolnshire, and the adjoining counties: for it is an established fact, that large timber trees will not thrive in watery lands, and such have been found lying in the earth abundantly in this country.

The principal rivers which either rise in the county, pass through it, or are connected with it, are the Trent, the Ancholme, the Witham, the Welland, and the Glen. The Trent, though not properly a river of this county, forms the boundary of it on the north-western side, from the village of North Cliford to that of Stockworth; whence it constitutes the eastern boundary of the isle of Axholme: it thence flows to Aldborough, and having received the Dun and the Ouse, mingles its waters with the Humber. From Gainsborough, where it is crossed by a handsome bridge, it is navigable for coals, corn, and various articles of commerce. The Ancholme is a small river, rising in the wolds, near Market-Raish, whence it is navigable to the Humber, into which it falls some miles below the junction of the Trent. The Welland has its source near Sibbertoft, in Northamptonshire; and being increased by numerous streams, passes Market-Deeping; where, entering the fens, it leaves a portion of its waters and sludge, which it had accumulated in its previous passage through the rich lands of Northamptonshire, Leicestershire, and Rutlandshire. It afterwards meets the contributory Glen, and empties itself into Foss-dyke-Wash, east of Boston. The Witham, which is completely a river of this county, derives its origin near South-Witham; and thence flows almost due north, through the park of Ealton, and to Great Ponton. It preceeds through a wide valley to Lincoln: continuing its course to Boston, it unites its waters with the sea at a place called Boston-Deeps. Much of the present bed of the river, from Boston upwards, is a new cut, made for the purpose of widening the channel, rendering it more commodious for navigation, and better adapted to receive and carry off the water of the contiguous fens. These rivers, with those of the Grant, Ouse, and Nene, in the adjacent counties, from the obstructions they meet in delivering their waters to the ocean, form one great cause of inundating so large a portion of valuable land. In viewing the various inlets of the sea, it is surprising to observe the immense quantity of sand and sludge which is continually depositing on the shore. This is owing to the nature of the tides, which, from the form of the channel, flow with more violence than they ebb. Hence the mouths of the rivers are choked up, and the descending waters are thrown back on the low-lands. The great bay, or estuary, into which the different rivers, passing through the fens, are emptied, is very shallow, and full of shifting sands and silt.

That this district was thus flooded at a very remote period, is evident from the plans of embanking and draining which the Romans adopted, in order to counteract the mischievous

effects of such inundations. Since their departure, much has been done at various times for the improvement of the fen country; and an immense expence has been occasionally, and is still annually, incurred, to prevent the encroachment of the water, and to ameliorate the soil. A very brief notice of these endeavours will tend to give some idea of the country, and to illustrate those periods of history. Deeping Fen, on the banks of the Welland, appears to have received the earliest attention: for, at the beginning of Edward the Confessor's reign, (as Ingulphus relates,) a road was made across it by Evesham, formerly a monk of Peterborough, but at that time bishop of Dunelm. In the time of the Conqueror, Richard de Fines, the king's chamberlain, inclosed this part of the fen-country from the chapel of St. Guthlake to Cardyke, and to Chivelake near Crummore; excluding the river Welland by a large and extensive bank of earth. The Fes-Dyke is an artificial trench, extending about seven miles in length, from the great marsh near the city of Lincoln to the river Trent in the vicinity of Torksey. This was made or materially altered by king Henry I. in the year 1121, for the purpose of magnifying, and for making a general drain for the adjacent level. From its passing through such a flat country, the water could have but a slow current, whereby it became unnavigable, and the accumulation of mud, so that it was soon found necessary to cleanse it. Of the marshes on the river Ancholme, the first account on record is the 16th of Edward I. In succeeding reigns, various statutes were enacted for rendering effectual the drainage of this part of the country. The island of Axholme, though now containing some of the richest land in the kingdom, was formerly one continued fen, occasioned by the silt thrown up the Trent with the tides of the Humber. This obstructing the free passage of the Dun and the Idle, forced back their waters over the circumjacent lands, so that the higher central parts formed an island, which appellation they still retain. In the first of Edward III., and in several succeeding reigns, commissions were granted for repairing the banks and ditches, as they fell to decay. Early in Charles I.'s reign, that great work was commenced, which embraced not only the marshes of Axholme, but of all the adjacent fens, called Dikefmarsh and Hatfield chase, in the county of York. These comprehended an extent of lands which were not only drowned in winter, but even in summer were so deeply covered with water, that boats could navigate over 60,000 acres. It is traditionally affirmed that large vessels could sail up the river Witham from Boston to Lincoln; and from the ribs, timbers, &c. of ships, that have been frequently found near it, the tradition seems to be justified. At present, it is only adapted for barges, and the flow of the current is so small, that it does not cleanse the bed of the river. The first notice of the inconveniences arising from the obstruction of its waters, appears in the sixth year of Edward III., when commissioners were appointed for surveying the same. In consequence of their report, and of various surveys and presentations in different reigns, successive resolutions were made for restraining the waters within due bounds, and for clearing the land-floods specially to the sea. But in the last reign of Henry VIII., more effectual measures were thought necessary to be adopted for restoring the country; and an able engineer, Mayhew Hake, of Goxburgh in Flanders, was invited over to put it into execution. It was accordingly covenanted between him and the king's commissioners, that the said Mayhew Hake should bring with him from Flanders fourteen masons, and four labourers, to make him a proper sluice and dam near the town of Boston, sufficient for its future safeguard. For which they were to be remunerated as follows: Mayhew

Hake, for himself and man, per diem 4s.; masons and stone-layers, per week, 5s.; labourers, per week, 4s. The said Mayhew Hake to receive 50*l.* more on the completion of the work.—Should any more workmen be necessary they should be provided at the expence of the inhabitants of Boston, and the lord of Holland and Kesteven. To the north and north-east of the Witham, are the large fenney tracts called Wildmore Fen, West Fen, and East Fen, in the latter of which, it appears by a writ, 41 Elizabeth, 50,000 acres were drowned. A plan is now executing under the direction of that very scientific and able engineer Mr. John Rennie, by which these three fens will be effectually drained, and the lowlands of this part of the county be rendered productive and profitable.

Lincolnshire consists of three great divisions; Holland, Kesteven, and Lindsey; which are subdivided into 32 hundreds, wapentakes, and tokes; containing in the whole one city, 31 market-towns, 657 villages. Twelve members are returned to parliament: two for the shire, two for the city, and two from each of the boroughs of Boston, Grantham, Great Grimsby, and Stamford. Spalding and Wainfleet were represented in the eleventh year of Edward III. This county, from its extent and opulence, is not under the influence of any individual; and in contested elections the freedom of the people is not so liable to corruption as in smaller counties and properly boroughs. *Beauties of England and Wales*, vol. ix. *Stone's Agricultural Survey of Lincolnshire*. *Young's Ditto*.

LINCOLNTOWN, a post-town of America, in North Carolina, and capital of Lincoln county, containing about 35 or 40 houses, a court-house, gaol, and church; 46 miles from Morgantown.

LINCOLNVILLE, a town of Hancock county, in the State of Maine, on the W. side of Penobscot bay; 12 miles from Belfast.

LINCOLNIA, in *Botany*, a name given by Linnaeus, but of whose origin or derivation we are unable to trace any thing.—*Linna. Mant.* 147. *Schreb.* 1770. *Walp. Syl. Pl.* v. 1. 126. *Juss.* 412. *Char. and order*, *Pentandria Digynia*. *Nat. Ord.* *Incerte sedis*, *Juss.*

Gen. Ch. Cal. Perianth inferior, of four ovate permanent leaves, the inferior opposite pair shorter. *Carp.* Petals five, imbricate, reflex, erect. Nectary a cavity in-puffed at the base of the petals, surrounded below by a margin. *Stam.* Filaments five, awl-shaped, slender, erect, of middling length; anthers obuse, arrow-shaped, bending towards the base of each lobe. *Pist.* Germen half inferior with respect to the corolla, but superior with respect to the calyx; styles two, thread-shaped, striated; stigma simple. *Pist.* Capsule of two cells. *Seeds* two?

Linnaeus observes that if the perianth may be taken for bractæes, the flower is altogether superior, but this does not seem correct.

Ess. Ch. Petals five, having each a honey-bearing cavity at their base. Capsule of two cells, half inferior.

1. *L. alcyonoides* *Michx.* *M. t.* 216. *Syst. Vegr. ed.* 14. 261.—A native of mountainous watery places at the Cape of Good Hope. This is a *herb* furnished with wand-like determinate *branches*, furnished with the bases of the fallen leaves, as in the first tribe. *Leaves* feathered, or somewhat whorled, about five or six in a whorl, a most sessile, linear, triangular, channelled, rigid, shining, appearing curiously granulated under a microscope, 20 inch long, rough at the angles, the upper ones fimbriate. *Flowers* about the tops of the branches, lateral, sessile, the length of the leaves, permanent, flesh-coloured, or white.

LINCTUS, a form of medicine, the same as *lambitus*, *lobach*, and *celegma*.

LINDA, in *Geography*, a small island in the Indian sea, near the coast of Africa, at the mouth of the Zambesi.

LINDAHL, a town of Norway; 140 miles N. of Christiania.

LINDANUS, **WILLIAM**, in *Biography*, a celebrated Dutch divine, was born at Dort, in Holland, in the year 1525. He pursued his academic studies at Louvain, and afterwards went to France to perfect himself in the Greek and Hebrew languages. Having returned to Louvain, he was ordained a priest, and admitted a licentiate in divinity. This was in the year 1552, and in the following year he undertook the office of lecturer on the sacred scriptures at Dilligen, which post he filled for three years with high reputation. He took his degree of D.D. in 1559, after which he was appointed dean of the Hague; counsellor to the king; vicar to the bishop of Utrecht, and inquisitor of the faith within the same ecclesiastical jurisdiction. On account of his great zeal in the latter office, the duties of which he performed with much severity, he was nominated, by the bigotted Philip II. of Spain, to the bishopric of Ruremond. In 1568 he went to Rome, and was received by pope Gregory XIII. and the cardinals with singular marks of respect and esteem. On his return he exercised the functions of a Christian bishop in a very honourable manner, applying the revenues of his see to the relief of the indigent, and visiting every part of his diocese for the purpose of personally comforting, instructing, and assisting those who stood in need of temporal or spiritual aid. After a second journey to Rome, he was appointed, in 1588, to the bishopric of Ghent, an office which he held but three months, when he died in the sixty-third year of his age. He was reckoned a very learned man and an able divine. His writings are numerous, consisting of Polemical treatises; Paraphrases on many of the Psalms, and the Psalter, illustrated with Greek and Hebrew texts: but his most valued publication is entitled "*Panoplia Evangelica*." Moreri.

LINDAR, in *Geography*, a town of Itria; 5 miles N.E. of Mittenburg.

LINDAU, an imperial city of Germany, seated on an island in the lake of Constance, and communicating with the continent by means of a bridge. The island is so divided by an arm of the lake, as to form another smaller island, which is separated from the city, and consists of vineyards and garden enclosed within a wall. Lindau, from its peculiar situation, has been called the Venice of Swabia. Most of the burghers are Lutherans. This city contains, besides a parish church dedicated to St. Stephen, a well-endowed hospital, and a grammar-school. The castle, and Heyden Maur, or Heathen wall, as it is called, are reckoned Roman works; the latter being ascribed to Tiberius Nero, and the former to Constantinus Chlorus, during their encampments here, in their expeditions against the Vindelici and Alemanni. It is supposed that near this castle formerly stood a church, and that the little church of St. Peter here was built on the first introduction of Christianity into this country. The territory of Lindau comprehends 14 villages; 19 miles E. of Constance. N. lat. 47° 28'. E. long. 10° 35'.—Also, a town and castle of Hungary; 17 miles N.N.W. of Chakathurn.—Also, a town of Westphalia, in the territory of Bielefeld, situated on the Rhine; 12 miles N.W. of Duderstadt.—Also, a town of Germany, in the principality of Anhalt Zerbst; 5 miles N. of Zerbst.—Also, a town of Germany, in the principality of Bayreuth; 8 miles N.W. of Bayreuth.

LINDE, or **LINDENBERG**, a town of Sweden, in Westmanland, situated between two lakes; built by queen Chris-

tina in 1644; near it is a medicinal spring; 85 miles W.N.W. of Stockholm. N. lat. 59° 35'. E. long. 14° 56'.

LINDEAL, a town of Hindooostan, in the circle of Cuddana; 25 miles N. of Gandicotta.

LINDECK, a town of the duchy of Silesia; 8 miles N. of Gilly.

LINDEN, a town of Germany, in the principality of Culmbach; 6 miles N. of Neustadt.

LINDENAU, a town of Prussia, in the palatinate of Thorn; 20 miles N.E. of Culm.—Also, a town of Silesia, in the principality of Neisse; 6 miles N.W. of Patzschkau.

LINDENBERG, a town of Germany, in the principality of Bayreuth; 9 miles E.S.E. of Bayreuth.

LINDENBRUCH, **FREDERIC**, in *Biography*, a learned philologist of the seventeenth century, was a native of Flanders, and died in 1638. He wrote notes on Terence, on the fragments of certain Latin poets, and on Ammianus Marcellinus. He also published "*Codex Legum-Antiquarum, seu Leges Wisigothorum, Burgundionum, Longobardorum, &c.*" which is esteemed a very curious work. Moreri.

LINDENFELS, in *Geography*, a town of Germany, in the palatinate of the Rhine; 14 miles N.N.E. of Mannheim.

LINDENHARDT, a town of Germany, in the principality of Bayreuth; 9 miles S. of Bayreuth.

LINDER, a town of Itria; 12 miles N.N.E. of Pedena.

LINDERA, in *Botany*, a name dedicated by Thunberg to the memory of John Linder, a physician at Stockholm, afterwards ennobled by the name of Linderholpe, who was born in the year 1678, and died in 1724. He was a celebrated Swedish botanist, and author of the *Flora Wilbergensis*, published at Stockholm in 1728. His inaugural thesis "*de Hesperidum pomis*" was published at Abo in 1702. About six years afterwards appeared his treatise "*de Venenis*" printed at Leyden; a posthumous edition of which was published at Leipzig in 1739, under the direction of M. Stenzelius. This is said to be a masterly dissertation on vegetable poisons.—He was also the author of an essay upon the colouring properties of several Swedish plants, particularly of some Lichens.—Thunb. Jap. 9. Nov. Gen. 64. Schreb. 232. Willd. Sp. Pl. v. 2. 230. Juss. 429. Lamarck Illustr. t. 263.—Class and order, *Hexandria Monogynia* Nat. Ord. *Uncaria sedis*, Juss.

Gen. Ch. Cal. Perianth none. Cor. Petals six, ovate, obtuse. Stam. Filaments six, many times shorter than the corolla; anthers very small. Pist. Germen superior, ovate, smooth; style erect, a little shorter than the corolla; stigmas two, reflexed. Peric. Capsule of two cells. Seeds . . .

Ess. Ch. Corolla of six petals. Capsule of two cells.

1. *L. umbellata*. Thunb. Japon. 145. t. 21. Linn. Syst. Veg. ed. 14. 339. (Kuro Noji; Kämpf. Amoen. 608.) Found on the mountains of Japan, flowering in April and May.—Stem shrubby, branched, spreading and weak. Branches alternate, zigzag, smooth. Leaves clustered at the extremity of the branches, on footstalks, oblong, acute, undivided, about an inch long; smooth and green above; hairy and puber beneath. Flowers terminal, in simple, many-flowered umbels.

Thunberg informs us that the Japanese make small brushes of the wood of this plant for cleaning the teeth.

LINDERA is also the name of a genus in Adanson's *Familles des Plantes*, v. 2. 499. by which he seems to have intended to honour Dr. Lindern. (See **LINDERIA**.) His plant appears to be a *Charophyllum*.

LINDERKREUZ, in *Geograph.*, a town of Saxony, in the circle of Neuladt; 8 miles N.W. of Weyda.

LINDERNIA, in *Botany*, so called by Allioni, in honour of Francis Balthazar von Lindern, a physician at Strasburg, who lived in the early part of the last century, and appears to have graduated at Jena, where his inaugural dissertation, "*de Vermibus*," was published in 1707.—As a botanist he is known from the following works, *Tournefortius Alfaticus*, published in 8vo. at Strasburg, in 1728, — and *Hortus Alfaticus*, in 1747. The latter contains an account of the plants growing in the province of Alfatia, and especially about Strasburg. Both the works are accompanied by a few plates.—Allion. Ped. v. 1. 57. Linn. Mant. 154. Schreb. 416. Willd. Sp. Pl. v. 3. 325. Mart. Mill. Dict. v. 3. Juss. 122. Brown. Prodr. Nov. Holl. 440. Lamarek Illustr. t. 522.—Class and order, *Didymia Angiospermia*. Nat. Ord. *Personate*, Linn. *Scrophulariæ*, Juss.

Gen. Ch. Cal. Perianth of five, deep linear, acute, equal, permanent divisions. Cor. of one petal, gaping, two-lipped; upper lip very short, concave, emarginate; lower erect, trifid, the middle segment rather larger. Stam. Filaments four, in pairs, the two upper ones simple, the two lower ascending, with a terminal, straight tooth; anthers twin, the lower ones as it were lateral. Pist. Germen superior, ovate; style thread-shaped; stigma emarginate. Peric. Capsule oval, of one cell and two valves. Seeds numerous. Recept. cylindrical.

Ess. Ch. Calyx deeply five-cleft. Corolla ringent, the upper lip very short. The two inferior stamens having a terminating tooth and a subterminal anther. Capsule of one cell.

1. *L. Pyxidaria*. Linn. Mant. 252. Allion. Misc. Taur. v. 3. 178. t. 5. Icon. Taur. v. 16 t. 84. (Capraria gratioides; Linn. Sp. Pl. 876. *Pyxidaria repens* annua; Lindern. Tournef. Alfatic. 156. t. 5. Hort. Alfatic. 269. *Gratiola floribus pedunculatis*; Gron. Virg. 3.)—Leaves oval, entire, sessile. Peduncles solitary.—Originally a native of Virginia, in spongy, inundated marshes, whence it was brought into Europe, and may at present be found in similar situations, in Alface and Piedmont, flowering in July and August.—Root annual. Stem smooth, square, brittle, occasionally branched and creeping. Leaves opposite, small, slightly notched, like those of *Anagallis*. Flowers axillary, solitary, of a pale blue colour.

2. *L. diandra*. Swartz. Prod. 92. Ind. Occ. 1058. (*Erinus procumbens*; Mill. Dict. n. 6.)—Leaves on footstalks, ovate or roundish, slightly serrated. Stem creeping.—A native of moist sand or clay in Hispaniola.—Root thread-shaped, with short fibres. Stem herbaceous, loosely spreading. Branches ascending, square, smooth. Leaves opposite, ribbed, scarcely veined. Flowers small.

3. *L. japonica*. Linn. Syst. Veg. ed. 14. 567. Thunb. Japon. 253.—Leaves obovate, toothed, the lower ones on footstalks. A native of Japan, where it flowers through the spring. Root annual. Stem herbaceous, branched, weak. Branches alternate, from an inch to a span in length. Radical leaves numerous; stem-leaves few, sessile, all obovate, obtuse, toothed, very slightly hairy. Flowers in clusters at the extremities of the branches.

These two species last described are said by the ingenious Mr. Brown, in his Prodrum to the Flora of New Holland, to be certainly different in genus from *L. Pyxidaria*. The same author describes the three following new species of *Lindernia*, all natives of the tropical part of New Holland, though he remarks that they do not altogether accord with the original character of this genus.

L. alfinoides. Leaves ovate, entire or slightly toothed; stem-leaves distant: floral-ones small. Tube of the corolla a little longer than the calyx. Stem erect.

L. scapigera. Leaves broad-ovate, nearly entire: lower ones crowded together: those of the stem few and small: floral leaves minute. Tube of the corolla twice as long as the calyx.

L. jubulata. Leaves linear-awl-shaped, entire. Found by the Rt. Hon. Sir Joseph Banks only.

LINDERUPOE, in *Geography*, a small island of Denmark, in the Little Belt, near the coast of Sleswick; 8 miles W.S.W. of Assens in the island of Funen.

LINDESNESS, or *the Naze*, a cape on the S. coast of Norway, in the North Sea, connected with the land by a very narrow isthmus. The cape projects into the sea about a Norway mile towards the S.W., and is about half a mile broad. The promontory is high, rocky, and barren, and has upon it twelve houses of peasants. N. lat. 58 1'. E. long. 7 12'.

LINDEWEISE, a town of Silesia, in the principality of Neisse; 11 miles S.E. of Neisse.

LINDISFARNE, or *Holy Island*, an island situated in the North Sea, opposite to the coast of that portion of Durham which lies between the river Tweed and the county of Northumberland, England. It was named by the Britons Inis-Mendicante. The appellation Holy Island was given to it by the English from being the residence of several of the primitive fathers of the Saxon church. The distance of this island from the Mainland is about two miles. It is easily accessible at low water to all kinds of conveyance, but the sands are dangerous to such persons as are unacquainted with them. The circumference of this island is about nine miles, and the number of acres contained in it 1020, nearly one-half of which are mere sand-banks. The other grounds are rather of a rich soil; but previous to the year 1792, when the common was inclosed, only 40 acres were in tillage. The rental increased between the years 1790 and 1797, from 320*l.* to 396*l.* The town is situated on the west corner, and in 1798 was inhabited by 379 persons, who were chiefly employed in fishing. From the names and ruins of several streets it is conjectured to have been at one period much more considerable than it now is. In the year 635 this place was made a bishop's see by king Oswald. Its first prelate was a Scotchman of the name of Aiden. The church, or monastery, originally consisted of timber and thatch. St. Cuthbert, the saint to whom it was dedicated, was buried here; but after the Danes began their depredations, the monks removed to Chester-le-Street, and carried the saint's body along with them. After their flight the invaders destroyed the building, which however seems to have been subsequently rebuilt, at least in part. Various detached portions of this edifice are still standing. Portions of the church constitute the principal ruins. The north and south walls of it are still almost entire, though much out of the perpendicular. So likewise is a part of the west wall, but that on the east is nearly level with the ground. All the arches of this church are circular, except two in the chancel and one in the north aisle, but these, as well as a pointed arch over the north aisle, seem to be of later date than the rest of the building. The columns of the nave are of four kinds, very massy, and variously ornamented. The bases and capitals are plain. Over each arch are large windows in pairs, and over them again are smaller arches. One of the ribs of the arch, which supported the tower, is still standing. It is richly ornamented with Saxon zigzag, as is also the western door and some other arches. The stones of which this church is constructed are of a deep red colour.

colour. On the sides most exposed to the weather they are eaten into the semblance of honeycomb. The remains of the priory and offices lie on the south side. The inside of their walls is built of whin-stone, obtained from a rock which forms a lofty natural pier on the south shore of the island. The pedestal of St. Cuthbert's cross, anciently held in great veneration, and now called the *polling stone*, is situated a short way to the east. When a bride cannot step the length of it, the superstitious reckon it ominous of future unhappiness in the marriage state. The parish church is a plain but spacious structure, having semicircular arches on the one side and pointed ones on the other. The windows are long and narrow. The chancel stands upon a lofty whin-stone rock on the south-east portion of the island. At the commencement of the civil wars it was garrisoned by the king's forces, but shortly after, fell into the hands of the parliament. The Pretender attempted to obtain possession of it in the year 1715. A detachment of invalids is now usually stationed here. *Hodgson's Beauties of Northumberland*, Svo. 1811.

LINDO, a town, or rather the remains of a town, in the island of Rhodes, anciently called *Lindus*, the native place of Cleobulus, one of the seven wise men of Greece, and of Chares, who made or at least began the famous colossus, consecrated to the sun, and the site of a magnificent temple dedicated to Minerva. This temple is said to have been built by Danaus, king of Egypt, on landing here in his flight from his own kingdom. A festival was celebrated here, not with blessings and prayers, but, as Lactantius says, with curses and imprecations; inasmuch that if a good word escaped from any person present, it was deemed a bad omen, and the ceremony was begun anew. The vestiges of this city, called *Lindo*, are seated in a hamlet nearly in the middle of the E. side of the island, and altogether peopled by Greeks; its harbour, though far from being spacious, is much frequented by the small craft of the country; which there take in the commodities of the island and bring thither merchandise from other parts. Accordingly almost all the inhabitants of Lindo are addicted to commerce, or to the carrying trade of the neighbouring coasts and islands; they navigate with small fast-sailing vessels constructed by themselves, and to which they give greater solidity than the ships which come off the stocks of Rhodes, on account of government. A few Lindians also employ themselves in rural labours, but as the part of the island which they inhabit is less capable of tillage than any other parts, on account of its stony soil, their culture principally consists of plantations of vines, fig-trees, and such others; 14 miles S.S.W. of Rhodes. N. lat. 36° 17'. E. long. 27° 38'. Sonnini.

LINDON, a small island on the W. side of the gulf of Bothnia. N. lat. 60° 55'. E. long. 16° 57'.

LINDOW, a town of Brandenburg, in the Middle Mark; 33 miles N.N.W. of Berlin. N. lat. 52° 57'. E. long. 13°.—Also, a town of Brandenburg, in the Middle Mark; 8 miles S.S.W. of Frankfort on the Oder.

LINDSÆA, in *Botany*, a genus of ferns, so named by the late Mr. Dryander, after Mr. John Lindsay, "an assiduous and skilful botanist of Jamaica," author of a paper, printed in the *Transactions of the Linnæan Soc.* v. 2. p. 93, on the germination and raising of ferns from the seed; as well as of another paper, in the same vol. p. 313, concerning the raising of several other cryptogamic plants in the same manner. Dryandr. *Tr. of Linn. Soc.* v. 3. p. 39. *Sm. Mem. de l'Acad. de Turin*, v. 5. p. 413. t. 9. f. 4. *Tracts on Nat. Hist.* 242. t. 1. f. 4. Swartz. *Fil.* 118. *Brown Prodr. Nov. Holl.* v. 1. 156. = Class and order,

Cryptogamia Filices. Nat. Ord. *Filices darsifera*, Linn. *Jussl.*

Gen. Ch. *Capsules* annulated, in continued, nearly marginal, lateral or terminal, lines. *Involucrum* arising from the surface of the leaf, membranous, continued, entire or slightly crenate, at length reflexed, permanent.

Est. Ch. *Fructification* in continued, nearly marginal, lines. *Involucrum* from the surface of the leaf, continued, separating at the side towards the margin.

Nine species are described in Mr. Dryander's original essay, to which five are added by Dr. Swartz, one by M. Labillardiere and one by Mr. Brown.

1. *L. sagittata*. Dryandr. n. 1. (*Adiantum sagittatum*, Aubl. *Guian.* 964. t. 366).—Frond simple, arrow or heart-shaped, with a taper point.—Native of woods and fissures of rocks in Guiana. The root is creeping, bearing five or six fronds in a cluster, near a span high; the stalks black and shining; leaf smooth, with dichotomous veins all springing from its base where the stalk is inserted; line of fructification about a straw's breadth from the edge.

2. *L. reniformis*. Dryandr. n. 2. *Tr. of Linn. Soc.* v. 3. t. 7. f. 1.—Frond simple, kidney-shaped, obtuse.—Native of Guiana and Surinam.—Much like the last, of which we are inclined to suspect it a variety.

3. *L. ensifolia*. Swartz n. 3.—Frond pinnate; leaflets alternate, sword-shaped.—From the island of Mauritius. We have what answers to this character, from Madagascar; but if right, it is very nearly allied to the following.

4. *L. lanceolata*. Brown. n. 2. *Labill. Nov. Holl.* v. 2. 98. t. 248. f. 1.—Frond pinnate; leaflets alternate, linear-lanceolate, sometimes pinnatifid; stalk square.—Found by Labillardiere at Van Diemen's land; by Mr. Brown in the tropical part of New Holland. Each leaflet is about one and a half inch or two inches long, nearly sessile. If the dichotomous form, and great distance of the lateral veins from each other, which are very remarkable characters in Labillardiere's plate, be correct, this species is essentially distinct from the last, whose veins compose an uniform sort of network, interbranching with each other over the whole disk of the leaf.

5. *L. grandifolia*. Frond pinnate; leaflets opposite, elliptic-lanceolate, pointed. Fructification half way between the rib and the margin.—Gathered in Malacca.—We know this merely from a pencil sketch taken by the younger Linnæus, marked with the native country of the plant, and a note saying it "probably constitutes a new genus, of which Aublet's tab. 365 and 366, and an *Adiantum* of Smeathman's, are other species." This was perhaps written at Sir Jos. Banks's; but if so, we cannot account for Mr. Dryander's having omitted this species, which appears to be one of the most remarkable of the whole number. The frond consists of two pair of opposite, slightly stalked, leaflets, three or four inches long, with a terminal one still longer. A line of fructification lies midway between the rib and the margin, on each side of the former; but none of the lines extend either to the base or the summit, by near an inch.

6. *L. linearis*. Swartz n. 4. 318. t. 3. f. 3.—Frond pinnate, linear; leaflets very numerous, fan-shaped, finely crenate and fructifying at their outer edge.—Native of various parts of New Holland. We have it from Port Jackson. About a foot high, with a dark polished stalk, tapering and zigzag at the base. The leaflets are imperfectly opposite, reflexed, small, broad and very short, so as to give a remarkable narrowness to the shape of the whole frond.

7. *L. falcata*. Dryander. n. 3. t. 7. f. 2.—Frond pinnate; leaflets somewhat crescent-shaped, entire, wavy.—Gathered by Aublet in Guiana.—About a foot high, with several pair

pair of rather close *leaflets*, each about an inch long, slightly falcate backward, wavy at their upper edge, along which runs the line of fructification. The terminal *leaflet* is irregularly shaped.

8. *L. heterophylla*. Dryandr. n. 4. t. 8. f. 1. — Frond pinnate; leaflets entire or serrated; the lower ones somewhat rhomboid-lanceolate, pointed; the upper rhomboid and very obtuse; the uppermost confluent. — Gathered by Mr. Robertson at Malacca. A span high, with very various, slightly distant *leaflets*, the longest of which measure scarcely an inch.

9. *L. cultrata*. Swartz. n. 7. (*Adiantum cultratum*; Willd. Phytogr. fasc. t. 14. t. 10. f. 2.) Frond pinnate; leaflets oblong, obtuse, wavy at their upper margin; the terminal one elongated jagged. Native of the coast of Malabar. — Frond about five inches high, with a green *stalk*, 10 or 12 pair of alternate, stalked, horizontal *leaflets*, and a singularly jagged, elongated, upright terminal one.

10. *L. flabellulata*. Dryandr. n. 5. t. 8. f. 2. — Frond pinnate; leaflets fan-shaped, finely toothed; the lower ones of the old plants compound. Native of China, Macao, and Sumatra. — The *leaflets* are almost semicircular at their fructifying edge, which stands outwards, not uppermost.

11. *L. trapeziformis*. Dryandr. n. 6. t. 9. — Frond doubly pinnate; leaflets quadrangular, abrupt; the lowermost fan-shaped. — Gathered in Grenada by Smeathman; see our n. 5. — A large and handsome fern, each branch of whose *frond* consists of above a dozen pair of oblong quadrangular leaflets, fructifying at their upper and outer margins.

12. *L. guianensis*. Dryandr. n. 7. (*Adiantum guianense*; Aubl. Guian. 962. t. 365.) — Frond doubly pinnate; its branches spreading, tapering; leaflets crowded; the lower lunate; middle ones square; upper fan-shaped. — Gathered by Aublet at the bottoms of little hills in the forests of Guiana. This is a very handsome fern, two or three feet high, with a longish *stalk*, and about six pair of nearly opposite, tapering, widely spreading *branches*, each composed of innumerable, crowded, light green *leaflets*, more or less rounded in their upper or fore-part, which is bordered with a broad brown line of fructification.

13. *L. stricta*. Dryandr. n. 8. Swartz Ind. Occ. 1722. (*Adiantum strictum*; Swartz Prodr. 135.) — Frond doubly pinnate; branches erect, contracted; leaflets trapeziform. — Native of Jamaica, Porto Rico, and Panama. — No figure of this species has yet appeared.

14. *L. media*. Brown n. 3. — Frond doubly pinnate; deltoid; leaflets obovato-rhomboid, coriaceous; the lower ones lobed; the rest entire; with a solitary uninterrupted line of fructification at the fore edge; the barren ones serrated at the top; stalk square. — Gathered by Mr. Brown in the tropical part of New Holland.

15. *L. trichomanoides*. Dryandr. n. 9. t. 11. — Frond doubly pinnate; leaflets membranous, linear-clubshaped, abrupt. — Gathered at Dusky bay, New Zealand, by Mr. A. Menzies. A delicate species, a span high, with slender creeping downy roots, and smooth brown stalks. The *leaflets* vary in size and breadth, but are nearly wedge-shaped, decurrent and confluent, of a light green colour and somewhat membranous texture, so as much to resemble a *Trichomanes* or *Hymenophyllum*; their summit abrupt, crenate or jagged. Line of fructification sometimes very short; the *involucrum* broadish, scarcely ever reflexed, but finally deciduous, along with the capsules.

16. *L. tenera*. Dryandr. n. 10. t. 10. — Frond triply pinnate, triangular; leaflets obovate, somewhat rhomboid, ent. — Native of the East Indies; sent to sir Joseph Banks by the Moravian missionaries from the island of Nicobar. It appears to us as truly pinnate as any of the others, rather

than pinnatifid, though the ultimate divisions, or *leaflets*, are decurrent; these are broader and more rounded than in the last, as well as lobed or cut.

17. *L. microphylla*. Swartz n. 14. 319. — Frond lanceolate, triply pinnate; leaflets wedge-shaped, dilated and crenate at the top. Gathered near Port Jackson, New South Wales, by Dr. White. This elegant species is a foot and a half, or more, in height; the whole *frond* of a narrow lanceolate figure, with slender, lax, pinnate branches, and small, light green dotted *leaflets*, which are wedge-shaped, tapering at the base, always crenate at the summit, as is also the *involucrum*. Every *leaflet* is suddenly dilated opposite to each end of the fructifying line.

The three last species are naturally allied to the genus *Davallia* (see that article), with which they agree as to habit, and occasionally even in the short round figure of their fructification and involucre, which in general however are continued in a submarginal line.

LINDSAY, JOHN, in *Biography*, a learned nonjuring divine, who was educated at St. Mary-Hall, Oxford. He had a congregation in London, among whom he regularly officiated, and was employed by Mr. Bowyer as a corrector of the press. He translated Mafon's "Vindication of the Church of England;" and wrote "A Short History of the Royal Succession;" and "Remarks on Whiston's Scripture Politics." He died in 1768, aged 82.

LINDSAY, Sir DAVID, a Scotch poet, was a native of the county of Fife, and educated at the university of St. Andrews. He was at the battle of Pavia, and on his return to Scotland James V. appointed him master of the herald's office. He wrote several poems, some of which have been printed, particularly his *Satires on the Clergy*. He died in 1557, aged 61. There was another of this family named David likewise, who was born about the year 1527; he was a zealous promoter of the reformation, and died in 1592. He wrote the History of Scotland from 1437 to 1542.

LINDSEY, THEOPHILUS, was born at Middleswich, in Cheshire, June 20th, 1723, old style. His father, Mr. Robert Lindsey, was an opulent proprietor of the salt-works in that neighbourhood; his mother's name was Spencer, a younger branch of the Spencer family, in the county of Buckingham. Theophilus was the second of three children, and so named after his godfather, Theophilus, earl of Huntingdon. He received the rudiments of grammar learning at Middleswich, and from his early attachment to books, and the habitual seriousness of his mind, he was intended by his mother for the church. He lost some time by a change of schools, till he was put under the care of Mr. Barnard of the free-school of Leeds, under whom he made a rapid progress in classical learning. At the age of eighteen he was admitted of St. John's college, Cambridge, where, by exemplary diligence and moral conduct, he obtained the entire approbation of his tutors. As soon as he had finished his studies at college, taken his first degree, and had been admitted to deacon's orders, he was nominated by sir George Wheeler to a chapel in Spital square, London. Soon after this, he was, by the recommendation of the earl of Huntingdon, appointed domestic chaplain to Algernon, duke of Somerset. The duke, from a great regard for his merit, determined to procure him a high rank in the church, but an early death deprived Mr. Lindsey of his illustrious patron. In 1754, he accompanied the present duke of Northumberland to the continent, and on his return he supplied, for some time, the temporary vacancy of a good living in the north of England, called Kirkby-Wilf: here he became acquainted with Mr. archdeacon Blackburne, and in 1760 married

ried his daughter-in-law. From Kirkby Mr. Lindsey went to Piddletown, in Dorsetshire, having been presented to the living of that place by the earl of Huntingdon: this, through the interest of the same patron, he exchanged, in 1764, for the vicarage of Catterick, in Yorkshire. Here he resided nearly ten years, an exemplary pattern of a primitive and conscientious pastor, highly respected and beloved by the people committed to his charge. Besides his various and important duties as a parish clergyman, Mr. Lindsey was ever alive, and heartily active, in every cause in which the principles of truth and right reason were concerned. We accordingly find him, in 1771, zealously co-operating with Mr. archdeacon Blackburne, Dr. John Jebb, Mr. Wyvil, and others, in endeavouring to obtain relief in matters of subscription to the thirty-nine articles: the object of these gentlemen was simply this, that the clergy of the established church might be permitted to hold their preferments upon condition of merely subscribing their belief of the holy scriptures, instead of the thirty-nine articles. The question was brought before the house of commons in 1772, but after a very animated discussion, it was lost by a great majority. Considering the issue of this debate as an absolute disappointment and refusal of all their just and righteous demands, he began to consider what course he should take to satisfy his conscience, and in a short time explicitly avowed his intentions of resigning his living. He had, probably, for some years, had doubts with respect to the doctrine of the Trinity, and other leading topics of the established faith, and early in the year 1773 an anonymous writer, under the signature of Lælius, started the subject of the impropriety of persons remaining in the church who could not conscientiously conform to her principles: to this Mr. Lindsey, in a letter to a friend, most feelingly alludes; "The subject of Lælius's last letter may give one many a pang. I cannot say that I have been for many years a day free from uneasiness about it." In the following November he wrote to the prelate of his diocese, informing him of his intention to quit the church, and signifying, that in a few days he should transmit to him his deed of resignation. The bishop endeavoured to persuade him to remain at his post, but he had made up his mind that duty required the sacrifice, and he was resolved to bear the consequences. When the act was done, he said he felt himself delivered from a load which had long lain heavy upon him, and at times nearly overwhelmed him. Previously to his quitting Catterick, Mr. Lindsey delivered a farewell address to his parishioners, in which he stated his motives for quitting them, in a simple and very affecting manner, pointing out the reasons why he could no longer conduct, nor join in their worship, without the guilt of continuing insincerity before God, and endangering the loss of his favour for ever. He left Catterick about the middle of December, and after visiting some friends in different parts of the country, he arrived in London in January 1774, where he met with friends, who zealously patronized the idea which he entertained of opening a place of worship, devoted entirely to Unitarian principles. A large room was at first fitted up for the purpose in Essex-street in the Strand, which, after overcomng some legal obstacles, the owners by the magistrates in the way of registering it, was opened April 17, 1774. The service of the place was conducted according to the plan of a liturgy which had been altered from that used in the established church by the late Dr. Samuel Clarke, rector of St. James's church, Piccadilly, London. Mr. Lindsey published the sermon which he preached on the opening of his chapel, to which was added an account of the liturgy made use of. About the same time he published his "Apology," of which several editions were called for in the course of a few years. This was fol-

lowed by a still larger volume, entitled "A Sequel to the Apology," which was intended as a reply to his various opponents, and likewise to vindicate and establish the leading doctrines which he professed, and on account of which he had given up his preferment in the church. This work was published in 1776, and in 1778 he was enabled, with the assistance of his friends, to build the chapel of Unitarianism, and to purchase the ground on which it stands. In the summer of 1793, Mr. Lindsey, with the aid of his friend the Rev. Dr. Disney, conducted the services of the place, upon strict Unitarian principles, to a respectable and numerous congregation. He then resigned the whole into the hands of his very able coadjutor, notwithstanding the earnest wishes of his hearers that he should still continue a part of the services. Though he had quitted the duties of the pulpit, he continued to labour in the cause, by his publications, till he had attained his eightieth year. In 1802 he published his last work, entitled "Consistency of the Divine Government, shewing that every Thing is from God, and for good to all." The object of this piece, which has been reprinted for general circulation by a society for promoting Christian knowledge, &c. is to vindicate the Christian religion, those gloomy notions which are too often attached to its providence, and to shew that the government of the world is the wisest that could have been adopted, and that afflictions and apparent evils are permitted for the general good. From this principle Mr. Lindsey derived consolation through life, and upon it he acted in every difficult and trying season. On his death-bed he spoke of his sufferings with perfect patience and meekness, and when reminded, by a friend, that he doubtless was enabled to bear them with so much fortitude in the recollection of his favourite maxim, that "Whatever is, is right;" no, said the dying Christian, with animation that lighted up his countenance, "Whatever is, is best." This was the last sentence which he was able distinctly to articulate: he died November 3, 1808. Besides the works already referred to, he published two dissertations: 1. On the Preface to St. John's Gospel; 2. On praying to Christ: "An Historical View of the State of the Unitarian Doctrine and Worship from the Reformation to our own Times;" and several other pieces. Among controversial writers Mr. Lindsey takes a very respectable place, as his "Vindication of Priesthood," and his "Examination of Mr. Robinson's Plea for the Divinity of Christ," will shew. In every character of life which this excellent man sustained, he acted his part with honour and integrity, and for his exertions in the cause of truth and rational Christianity, whatever may be thought of his particular opinions, many will rise up and call him blessed. Ours, equally devout, equally humble, equally pious men, will be forgotten when the name of Theophilus Lindsey shall be held in veneration, because to humility, purity, and perseverance, he added a courageous avowal of what he believed to be the truth: he bore public testimony, in opposition to the penal laws, in matters of faith, that still exist on our Statute-book, to the unity of God at the hazard of all. Two volumes of his sermons have been published since his death. Monday Mag. Dec. 1808.

LINDUM, in *Ancient Geography*, a town of Britain, in the country of the Coræti, which by the 5th Dec. of Antonine is situated between Caudeboræ or Ancaster, and Begeboræ or Louthborough. This is universally agreed to be Lincoln, which was a Roman colony, and a place of great importance in ancient times. Baxter, without sufficient authority, contends that Lindum was the Lindum in which so many of the Romans were slain by the Britons in their great revolt under Boadicea. See LINCOLN.

LINDUM was also the name of a place in the country of the

the Dumnii; which, in both the sound and signification of the name, bears so great a resemblance to Linlithgow, that it is most probably the same place, though its situation does not exactly agree with that assigned by Ptolemy, who is far from being correct in this particular,

LINDY, in *Geography*, a town of Africa, in Querimba, S. lat. $9^{\circ} 58'$. E. long. $41^{\circ} 4'$.

LINE, in *Geometry*, a quantity extended in length only, without either breadth or thickness.

A line is supposed to be formed by the flux or motion of a point; and is to be conceived as the termination or limit of a surface, and not as a part of that surface, however small.

There are two kinds of lines; viz. *right* lines, and *curve* lines.

If the point A moves towards B (*Pl. X. Geometry, fig. 1.*) by its motion it describes a line: and this, if the point go the nearest way towards B, will be a right or straight line, whose definition therefore is the nearest or shortest distance between any two points. or a line, all whose points tend the same way. If the point go any way about, as in the lines A C B, or A c B, it will trace out either a crooked line, as the upper A c B; or else two or more straight ones, as in the lower A C, C B.

Right lines are all of the same species: but *curves* are of an infinite number of different species; we may conceive as many as there are different compound motions, or as many as there may be different ratios between their ordinates and abscissas.

Curve lines are usually divided into *geometrical* and *mechanical*. The former are those which may be found exactly and securely in all their points. (See *GEOMETRICAL line.*) The latter are those, some or all of whose points are not to be found precisely, but only tentatively, or nearly.

Accordingly, Descartes and his followers define *geometrical* lines, those which may be expressed by an algebraic equation of a determinate degree; which equation is also called *locus*.

The same persons define *mechanical* lines those which cannot be expressed by an equation of a determinate degree. Others, considering that those called by Descartes *mechanical* lines, notwithstanding their not being of a determinate degree, are not less precise and exact, and consequently not less geometrical than the others; it being this precision which constitutes the geometricity of the line: for this reason, choose rather to call those lines which are reducible to a determinate degree, *algebraical* lines; and those which are not, *transcendental* lines.

Lines are also divided into those of the *first order*, *second order*, *third order*, &c. See *CURVE*.

Sir Isaac Newton enumerated seventy-two lines of the third order, and Mr. Stirling found four more; since that Mr. Stone has found two others, which had escaped Sir Isaac and Mr. Stirling. The two species added are to be reckoned among the hyperbolico-parabolical curves. Enumer. Lin. Tert. Ordin. Linea. Tert. Ordin. Newtonianæ, Oxon. 1717. Svo. Phil. Transf. N^o 476. § 6. See *CURVE*.

Lines, considered as to their positions, are either *parallel*, *perpendicular*, or *oblique*; the construction and properties of each whereof, see under *PARALLEL*, *PERPENDICULAR*, &c.

Euclid's second book treats mostly of lines, and of the effects of their being divided, and again multiplied into one another.

LINES, *Algebraic*, are divided into different orders, according to the degree of their equations. These degrees are

estimated, as in determined equations, by the degree of the highest term of the equation.

Thus $a + by + cx = 0$, is a general equation, expressing the nature of lines of the first order, or of straight lines.

The equation $a + by + cx + dyy + exy + fxx = 0$, represents the lines of the second order; that is, the conic sections, and the circle, which is one of them.

And the equation $a + by + cx + dyy + exy + fxx + gyy + hxy + ixx + lxx = 0$, expresses in general the lines of the third order. And the lines of the fourth and higher orders may be expressed in the like manner. See *Cramer* *Introd. à l'Analyse des Lignes Courbes*, p. 52, seq. Mr. Cramer uses the terms *lines* of the second, third, fourth, &c. order, and *curve* of the second, third, fourth, &c. order, indifferently. Sir Isaac Newton has made a distinction, according to him. See *CURVE*.

LINES, *circular*, *converging*, *diverging*, *generating*, *heli-spherical*, *hyperbolic*, *logislic*, *magnetical*, *normal*, *proportional*, *quadrature*, *reciprocal*, *robervalian*, and *vertical*. See the respective adjectives.

LINE of the *Apsides*, in *Astronomy*, is the line which joins the apses; or it is the greater axis of the orbit of a planet.

LINE, *Fiducial*, the line or ruler which passes through the middle of an astrolabe, or the like instrument; and on which the sights are fitted; otherwise called *albidude*, *index*, *dioptra*, and *medicinium*.

LINE, *Horizontal*, a line parallel to the horizon.

LINES, *Isochronal* and *Meridian*. See the adjectives.

LINE of the *Nodes*, in *Astronomy*, is the line which joins the nodes of the orbit of a planet, or the common section of the plane of the orbit with the plane of the ecliptic.

LINE, *Horizontal*, in *Dialling*, is the common section of the horizon, and the dial-plate.

LINES, *Hourly*, or *Hour-lines*, are the common intersections of the hour-circles of the sphere, with the plane of the dial. See *HORARY*, and *Hour-circles*.

LINE, *Subsylar*. See *SUBSYLAR*.

LINE, *Equinoctial*, is the common intersection of the equinoctial, and the plane of the dial.

LINE, *Contingent*. See *CONTINGENT*.

LINES, *Dialling* and *Meridian*. See the respective adjectives.

LINE, in *Fencing*, is that part of the body directly opposite to the enemy, wherein the shoulders, the right arm, and the sword, ought always to be found; and wherein are also to be placed the two feet, at the distance of eighteen inches from each other.

In this sense, a man is said to be in his line, to go out of his line, &c.

LINE, in *Fortification*, is sometimes taken for a ditch, bordered with its parapet; and sometimes for a row of gabions, or sacks of earth, extended lengthwise on the ground, to serve as a shelter against the enemy's fire.

When the trenches were carried on within thirty paces of the glacis, they drew two lines, one on the right, and the other on the left, for a place of arms.

For the difference between trenches or approaches, and lines, see *INTRENCHMENT*.

Lines are generally made to shut up an avenue or entrance to some place; the sides of that entrance being covered by rivers, woods, mountains, morasses, or other obstructions, not easy to be passed over by an army. When they are constructed in an open country, they are carried round the place to be defended, and resemble the lines surrounding a camp, called lines of circumvallation. Lines are likewise thrown

thrown up to stop the progress of an army; but the term is most commonly applied to the line which covers a pass that can only be attacked in front. For constructing such a line in the place most convenient for the purpose, let a rope be run quite across the way along the intended place of the line, pegging it to the ground at the distance of every four or five yards; and at the distance of about ten or twelve feet before the line, towards the enemy, let such another line or row of stakes be carried in a position parallel to the first rope. When the labourers are properly ranged within these limits, let them dig up the earth in this breadth, and throw it on the other side of the first rope, until a bank of about five or six feet thick, and six or seven feet high, be raised, sloping the sides according to the declivity necessary for the earth's rolling naturally down the bank; and let the digging be continued till the ditch is about five or six feet deep, the breadth of the bottom being about one-third of the breadth staked out at top: the bank may be rendered more firm by being trod or rammed down. Let the inner side of the bank be pared with the spade into such a slope, as a man standing upright may easily touch with his arm extended straight before him; and at the foot of this bank, let a foot-bank or step be raised, of such a height, as a man standing on it may easily fire his musket over the bank, or let it be about four feet and a half lower than the top of the bank or breast-work. A gentle slope may also be made to the foot-bank, that the troops may more easily ascend it; and let the crown or top of the breast-work be sloped so, that a musket laid flat on it may strike the ground with its shot, about five or six feet beyond the ditch. The bank or breast-work will, in this case, secure the troops behind the lines from the enemy's fire; and when they stand on the foot-bank, they are more than two-thirds covered, and, consequently, the troops within may make three of their shots tell for one of the enemy; and by going off the foot-bank, they may be quite covered, while they load again; so that with this advantage, they are in no great danger of being forced from the lines, unless the enemy are greatly superior in number and cannon.

The following Table shews the dimensions of lines commonly constructed, and the rate of expence attending the construction of them.

Breast-Work.			Ditch.			Expence.	
Thickness at top.	Height within.	Height without.	Upper breadth.	Lower breadth.	Depth.	Solid Content.	Days' work.
Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	
4	$7\frac{1}{2}$	6	8	$2\frac{3}{4}$	5	$4\frac{3}{4}$	1
5	$7\frac{1}{2}$	6	10	$3\frac{1}{4}$	$5\frac{1}{2}$	$6\frac{1}{4}$	$1\frac{1}{2}$
6	$7\frac{1}{2}$	6	12	4	6	8	2
7	$7\frac{1}{2}$	6	14	$4\frac{1}{2}$	$6\frac{1}{2}$	10	$2\frac{1}{2}$
8	$7\frac{1}{2}$	6	16	$5\frac{1}{2}$	7	12	3
9	$7\frac{1}{2}$	6	18	6	$7\frac{1}{2}$	15	$3\frac{1}{2}$

The day's work here is for one yard in length; and in the first, a hundred men will complete a hundred yards in length of this kind of lines in one day; two hundred men in half a day, &c. The lines above described are called temporary lines, and chiefly serve a present emergency. When lines are thrown up at leisure, and designed for longer duration, then the ditch is usually eighteen feet broad at

top, seven or eight feet deep, and the sides of the ditch are sloped, so as to leave only six feet breadth at bottom; the breast-work, or parapet, is about seven feet thick on the top or crown, and seven or eight feet high. The heights, depths, and breadths, of the several parts of a line well designed and finished, are exhibited in *Plate VI. Fortification, fig. 3*, in which *IL* represents the ground line, or surface of the place; *AB* the breadth of the ditch at the top; *CD* its breadth at the bottom; *FAC* the slope or scarp of the parapet and ditch; *DBK* the counterescarp; *FF* the top or crown of the parapet or breast-work; *EG* the inner slope of the parapet; *HG* the top of the foot-bank; *HI* the slope of the foot-bank; and *BKL* a small sloping bank, called the glacis. This section or profile may be drawn, by laying off in the ground-line, from any scale of equal parts, the distances $a = 6$ feet, $ab = 4$, $bc = 1\frac{1}{2}$, $cd = 7$, $dA = 4\frac{1}{2}$, $Af = 6$, $fg = 6$, $gB = 6$, and $BL = 5$ feet. Through a, b, c, d, f, g, B , draw lines perpendicular to *IL*. Make $aH = 2\frac{1}{2}$ feet = bG , $cE = 7$ feet, $dF = 6$, $fC = 8$ feet = gD . Draw *IH, HG, GE, EF, FAC, CD*, and *DB*, which continue, till it meets the line *FL*, and the profile is constructed.

When lines are made to cover a camp, or a large tract of land, where a considerable body of troops is posted, the work is not made in one straight, or uniformly bending line; but at certain distances, the lines project in salient angles, called redents, redans, or flankers, towards the enemy. The distance between these angles is usually between the limits of two hundred and two hundred and sixty yards; the ordinary flight of a musket-ball, point-blank, being generally within those limits; although muskets, a little elevated, will do effectual service at the distance of three hundred and sixty yards. In *Plate VI. Fortification, fig. 4*, are shewn the forms of the usual lines, where the figures *CAB, cab*, are the redents or flankers; *AC, AB, ac*, ab , the faces; *CB, cb*, the gorges; *AD, ad*, the capitals; *Bb* the curtain; and the angles *CAB, cab*, the salient or flanked angles. The distance of the salient angles is about two hundred and forty yards at a mean; the length of the capital is usually between forty and fifty yards, and the length of the gorges is also about sixty or seventy yards.

To make a plan of lines with redents; draw the line *EEEE*, &c. (*Plate VI. Fortification, fig. 5*.) in such a manner, that, wherever there is a bend or angle, it may be either at once, twice, or thrice, &c. the length of about two hundred and forty yards from one another; so that there may be a redent where there is an angle. In this line, lay off the distance of two hundred and forty yards from *E* to *E*, *E* to *E*, &c. reckoning from the bends towards each end, whether it happens that the line will or will not be exactly measured by a repetition of the two hundred and forty yards. At each point, *E*, draw the capital *EF* in a perpendicular position to the direction of the line in that point, and make the capitals about forty or fifty yards long. On each side of *E*, take the half gorges *EG, EG*, each of about thirty or thirty-five yards, and draw the faces *FG, FG*; and thus the out-line, or mauler-line, of the curtains and redents is formed. Parallel to each curtain and face draw lines, within, at the distances from the mauler-line of seven feet, eight feet, twelve feet, and eighteen feet; then the breadth of seven feet represents the plan of the parapet, that of one foot its inner slope, that of four feet the top of the foot-bank, and that of six feet the foot-bank slope. On the outside of the mauler-line, draw lines at the distance of $10\frac{1}{2}$, $16\frac{1}{2}$ and $22\frac{1}{2}$ feet parallel to each curtain and face; and these will represent the plans of the scarp, ditch,

ditch, and counter-scarp; observing that the salient angles of the counter-scarp are rounded before the angles of the redans. A plan of this kind formed from a small teale, as of twenty yards to an inch, is usually represented by four parallel lines; one without the outer-line, representing the counter-scarp or out-line of the ditch, and two within, representing the breadth of the parapet of the foot-bank. In some cases, a short line is hastily formed by a number of *chevaux de frise* chained together; and in countries abounding with wood, a line may be formed by laying, in a position pointing to the enemy, the stems of trees and their larger branches, piled on one another to a sufficient height, and the interstices filled with earth; such a work is called an *abatis*. See Robertson's *Marine Fort.* p. 2. See.

LINE, *Fundamental*, is the first line drawn for the plan of a place, and which shows its area.

LINE, *Capital*, in *Fortification*. See **CAPITAL**.

LINE, *Central*, is that drawn from the angle of the centre, to that of the bastion.

LINE of *Defence*. See **DEFENCE**.

LINE of *Defence* *sechant*. See **DEFENCE**.

LINE of *Defence* *razant*. See **DEFENCE**.

LINE of *Approach*, or *Attack*, signifies the work which the besiegers carry on under covert, to gain the moat, and the body of the place. See **APPROACH**.

LINE of *Counter-approach*. See **COUNTER-approach**. See **PLATE VI. Fortification, fig. 6.**

LINE of *Circumvallation*, is a line or trench cut by the besiegers, within cannon-shot of the place, which ranges round their camp, and secures their quarters against any relief to be brought to the besieged. See **CIRCUMVALLATION**.

LINE of *Contravallation*, is a ditch bordered with a parapet, which serves to cover the besiegers on the side of the place, and to stop the sallies of the garrison. See **CONTRAVALLATION**.

LINE of *Communication*, are those which run from one work to another. See **PLATE VI. Fortification, fig. 7.** See also **COMMUNICATION**. But

The **LINE** of *Communication*, more especially so called, is a continued trench, with which a circumvallation, or contravallation is surrounded; and which maintains a communication with all its forts, redoubts, and tenailles.

LINE of *the Base*, is a right line, which joins the points of the two nearest bastions.

To LINE a *Work*, signifies to face it, chiefly with brick or stone; i. e. to strengthen a rampart with a firm wall, or to encircums a parapet or moat with good turf, &c.

LINE, *Individed*, in *Fortification*. See **REDANS**.

LINEs, among *Trappers*, are used to express the strings by which they catch birds. The large and small land birds are taken by them with equal ease, and sometimes the water-fowl.

These lines are made of long and small cords, knotted in different places, and containing in length as many fathom as the places where they are to be laid require. Plovers, and the larger wild-fowl, are very conveniently taken by them. When these strings are to be used, they must be lined with the strongest bird-line that can be got, and then coming to their haunts before the evening flights, that is, before sun-set; or, for the morning flights, at least two hours before day, the sportsman is to carry a parcel of small sticks, each about two feet long, and sharpened at both ends, but having a little flat at one end like a fork. The plain end of each stick is to be stuck into the ground, in such a manner, that the stick standing upright, its upper, or forked end, may be about a foot and a half from the surface. The lined strings are then to be carried along all these sticks, in different rows,

some higher than others. Every row of the sticks is thus to be filled, and the whole haunt covered with the lines. The plover, and other birds that fly low, when they come to their haunts, fly directly in amongst the strings, and are taken in great numbers; the whole flight coming in at once, and covering all the place, so that those which are not yet alighted, have no opportunity of seeing the distress of their companions. There is no need for the sportsman to be constantly upon the watch for the taking of the birds; for when once they are taken they cannot loosen themselves, so that he may come and take them up at his own time. The water-fowl may be easily taken, in the same manner, by observing their haunts, and stretching these lines, in several rows, across the brook, or river, some higher, and some lower, the lowest lying almost at the edge of the water. These must never be used on moonlight nights on the occasion; for the shadow of the strings, in the water will then fright them away.

LINE, in *Genealogy*, is a series of succession or relations in various degrees, all descending from the same common father.

LINE, *Direct*, is that which goes from father to son; which is the order of ascendants and descendants. See **DIRECT**.

LINE, *Collateral*, is the order of those who descend from some common father, related to the former, but out of the line of ascendants and descendants. In this are placed uncles, aunts, cousins, nephews, &c. See **COLLATERAL**. See also **CONSANGUINITY** and **DESCENT**.

LINE, in *Geography* and *Navigation*, is used by way of eminence for the equator or equinoctial line.

The line in the heavens is a circle described by the sun in his course on the 20th day of March, and the 23d of September. The line on the earth is an imaginary circle answering to that in the heavens. It divides the earth from east to west, into two equal parts, and is at an equal distance from the two poles; so that those who live under the line have the poles always in their horizon.

The latitudes commence from the line.

The seamen have sometimes practised the ceremony of christening their fresh men, and passengers, the first time they cross the line. See **BAPTISM**.

LINEs, in *Heraldry*, the figures used in armories to divide the shield into different parts, and to compose different figures.

They are of different forms, and were it not for this, many arms would be one and the same, for a chief wavy differs from a plain chief, by the lines which compose them, and the heralds shew particular reasons for all these different forms of lines.

These lines, according to their forms and names, give denomination to the pieces or figures which they form, except the straight or plain lines, which are carried evenly through the escutcheon, and are four, viz. the perpendicular line, the horizontal, the diagonal line dexter, and the diagonal line sinister.

The crooked lines, which are carried unevenly through the escutcheon, rising and falling, are these: first the engrailed or engrailed, and inverted or invected; these, when represented together, are somewhat known the one from the other, being opposite to one another, both being made, as it were, of semicircles: the engrailed with the points upward, the invected with the points downward. But this is not a sufficient distinction: for suppose the space between them which they form be a fess, then the whole is only engrailed, not invected; for the fess engrailed must have the points on both sides turned towards the field, and the convex

or gibbose parts toward the fess itself, and so of a bend, chevron, and other proper figures of heraldry; and if these be inverted, then the convex parts of the lines are towards the field; but these lines are better distinguished when placed by way of bordure, with the letters within a bordure engrailed or inverted.

These two lines are more hard to be distinguished, when the field is divided into two equal parts, of different colours, as parted per pale, parted per fess, &c. Here we know not whether the line be engrailed or inverted, except we follow this rule, that the form of the line must be applied to the colour first named. The French terms for these two lines are, for the engrailed, *engraillé*, and for the inverted, *canalé*; and the Latin writers express engrailed by *ingreditatus*, *imbriatus*, and *striatus*, and the inverted by the words *inversus* and *conculcatus*.

The wavy, or waved line, is such an one as is formed in representation of the waves of the sea, as parted per fess wavy in arms and other waved lines, as the wavy bars all express that the person got his honours by sea service.

Nebulee is another name of a line in heraldry: it expresses a clouded line; the French call it *nuage*, and the Latins *nebulosa linea*. This also has been given to persons who have been eminently skilled in navigation.

Crenelle, or embattled lines, represent the battlements of a house, and are said to represent in heraldry the skill in architecture, for which the first of the family was famous; they were also given sometimes for eminent services, in assaulting or defending castles in time of war, and sometimes only as emblems of a house to express a person who bore them being of a noble house or family; for of old, none were suffered to embattle their houses but persons of great distinction.

The Latin writers in heraldry use for the words *crenelle*, the terms *pinatus* and *pinnis asperatus*, according to Uredus in his blazons, and Sylvester Petra Sancta in his *murales pinnales*.

There is another line of this kind in heraldry, which Leigh calls the battle-embattled line: this has one degree of embattling above another. When the upper points in this kind of line are represented sharp, it is called *campagne*, as if the lines ending in points represented bastions, or the outer works of cities and camps; and when the upper points are rounded, it is called *crenelle embattled arrondi*.

The indented line is notched for at the edges, that it represents the teeth of a saw, and has its name from the Latin *dens*, a tooth, or from the law term *indenture*, a sort of deed, the top of which is always notched like the teeth of a saw.

The dancette is another line, very much resembling the indented line, but that it is always much smaller; it is therefore said by the heralds to be the same in quality, but not in quantity. The dancette differs also from the indented line, in that it always consists but of a few teeth, though never less than three, according to Mr. Holmes, in his Office of Armory; whereas the indented line has always a great many teeth. The French express our indented line by the term *danche* or *dentille*; and the dancette, when it has but very few teeth, and those very long, by the term *cinque*, which Menestrier takes to be the letter M, with its legs extended from side to side of the shield, because many who carry a partition, or fess, after that form, have the family name beginning with that letter. The Latin writers express the term indented by *dentatus*, *indentatus*, and *denticulatus*; and when the teeth are very long, as in the dancette, they call them *dentes decurvi*. See also NEBULE and RAGUED.

There are yet two other lines mentioned by the heraldry

writers: the first is the *pate* or *dovetail* line, so called from its resemblance to a sort of joint used by our carpenters, in which one part goes alternately all the way down between two others: this is called by Morgan the inclave, or labelled line, because the points, as they proceed from the ordinary, such as the chief or fess, represent not amidst the points, or rather the ends of the labels. The other line is called *urde* or *champagne* by Fresne; and by Upton, *vair*, because its points are formed like pieces of the fur, called by heralds *vair*.

The two last of these are of very little use, the others are the common lines of arms, and are called the attributes or accidents of armorial figures which they form; and if any other lines are found in the figures or engravings of arms, which are not reducible to the one or the other of these, they are called *irregular*, and by the French heralds *classe*. The knowledge and use of these forms of lines are necessary in the science of heraldry to distinguish and difference many armorial bearings.

LINE, *Latellid*. See LABELLED.

LINE, *Lateral*, *linea lateralis*, in *Ichthyology*, a name given by naturalists to a line or streak, with which many kinds of fish are marked, passing along their sides. Few fish are without this line; but it is variously formed in the several kinds, and makes a very considerable article in their description, if not in the distinction of the species. In some species it is made of a series of little points, or holes, as appears to the eye; of this nature is the line in eels, &c. In some others it is formed of a sort of duct, running along the centre of a great number of scales. This is its structure in the generality of fishes.

This line, in various kinds of fish, varies also in regard to number, situation, figure, and other properties. In regard to number, there is no line observed in the *syngnathus* and *petromyza*, in almost all other fish, there is one on each side; and, finally, in some there are as it were two lines on each side: an instance of this we have in the *ammodontæ*. In regard to the situation, the differences are these: 1. In some it is near the back, as in the *clupea*, *salmons*, *perch*, and the like. 2. In others it is placed nearer the belly, and runs parallel with it, as in the *cyprinæ*. 3. In some it is placed in the centre of each side between the back and the belly, as in the *carassius*. 4. In some it is placed against the interstices of the muscles, or *spina dorsalis*, as in the *muræna*. And, 5. In some it is placed above the interstices, as in the *ammodontæ*, &c. It has been supposed by many, that this *linea lateralis* was always parallel to the interstices of muscles; but this is evinced to be an erroneous opinion, by the observation of the *perch* and *mackerel*. In regard to the differences of figure, this line is in some straight, as in the *coregonæ*, *salmons*, &c. 2. In others it is crooked, as in the *cyprinæ*, the *perch*, &c. and in the generality of fish is smooth to the touch, but in some it is rough and aculeated, as in the *trachurus* and *pleuromæni*. See *dentatus* of FISHES.

LINE of the Banquet, in the *Mange*. See BANQUET.

LINE of a Vell. See SQUARE and VELL.

LINE of Division, in *Mechanick* and *Gunners*. See DIRECTION.

LINE of Gravitation of a Large Body, is a line drawn through its centre of gravity, and according to which it tends downward.

LINE of the point of Descent of a Large Body. See DESCENT and CENTRE.

LINE of a Piece of Cannon. See PROPORTIONS.

LINES, in *Opticks*. Time, being by, or by horizontal and parallel lines, compose the object, which is seen and has

tween which all music, since the invention of counterpoint, has been written.

The staff in canto fermo, or plain song, consisted only of a single line, drawn through or between the points or dots of different elevation, to aid the priests in chanting: then two, three, and, finally, four lines composed the staff for Gregorian notes in the missals and mass books, in Roman Catholic churches; and these have never been increased. Secular music for the virginal, spinnet, harpsichord, and organ, from the time of queen Elizabeth to the end of the seventeenth century, was written on a staff of six lines, both in the treble and the base. At the beginning of the last century, all music, except the tablature for the lute and guitar, began to be constantly written on and between five lines, called *spaces*, with the occasional use of short additional lines, for notes that go higher or lower than the regular staff. The lines and spaces in all music are counted from the bottom, so that the lowest is the first, the highest in canto fermo the fourth, and in figurative music the fifth. See STAVE, STAFF, PORTER, and RIGHE.

LINE, in *Inland Navigation*, is often used to express the principal part of a canal, and thus to distinguish it from its branches.

LINEs of *Deviation*, denote lines on the parliamentary plans of some canals, shewing the distances within a hill it is intended that the cutting of the canal should be continued.

LINE, *Geometrical*, in *Perspective*, is a right line drawn in any manner on the geometrical plane.

LINE, *Horizontal*. See HORIZONTAL.

LINE, *Terrestrial*, or *Fundamental Line*, is a right line, wherein the geometrical plane, and that of the picture, or draught, intersect one another.

Such is the line *NI* (*Plate I. Perspective, fig. 3.*) formed by the intersection of the geometrical plane *LM*, and the perspective plane *HL*.

LINE of the *Front*, is any right line parallel to the terrestrial line.

LINE, *Vertical*, is the common section of the vertical, and of the draught.

LINE, *Visual*, is the line, or ray, imagined to pass from the object to the eye.

LINE of *Station*, according to some writers, is the common section of the vertical and geometrical planes. Others mean by it, the perpendicular height of the eye above the geometrical plane; others, a line drawn on that plane, and perpendicular to the line expressing the height of the eye.

LINE, *Obj. line*, is any line drawn on the geometrical plane, whose representation is sought for in the draught or picture.

LINE of *Distance*. See DISTANCE.

LINEs on the *plain Scale*, in *Trigonometry*, are the line of chords, line of sines, line of tangents, line of secants, line of semi-tangents, line of leagues. The construction and application of these lines, see under SCALE, SAILING, &c.

LINEs on *Gunter's Scale*, are the line of numbers, line of artificial sines, line of artificial tangents, line of artificial versed sine, line of artificial lines of rhumbs, line of artificial tangents, of the meridian line, and line of equal parts. The construction and application of these lines, see under GUNTER'S SCALE.

LINEs of the *Sector*, are the line of equal parts, or line of lines; line of chords, line of sines, line of tangents, line of secants, line of polygons, line of numbers, line of hours, line of latitudes, line of meridians, line of metals, line of solids, line of planes; the construction and use of these, see SECTOR.

LINE, in the *Art of War*, is understood of the disposition of an army, ranged in order of battle; with the front extended as far as may be, that the several corps of cavalry and infantry which compose it, may not be cut off or flanked by the enemy.

An army usually consists of three lines; the *first* is the front, van, or advance-guard; the main body forms the *second*, in which is the general's post; the *third* is a reserved body, or rear-guard. The term *line*, as expressing a military arrangement for battle, was not known till the 16th century. Before that period, when armies were ranged in order of battle upon three lines, these several lines were denominated in the manner above stated; but the terms advance-guard, main body, and rear-guard, are never used in modern times, except when an army is on its march: when drawn up for action, or in the field for review, they are denominated *lines*.

The second line should be about three hundred paces behind the first, and the reserve at about five or six hundred paces behind the second.

The artillery is likewise distributed along the front of the first line. The front line should be stronger than the second, that its shock may be more violent, and that, by having a greater front, it may more easily close on the enemy's flanks.

Each line is so drawn up, that the wings or extremities always consist of some squadrons of horse, whose intervals are supported by infantry platoons. The battalions are posted in the centre of each line; sometimes they are intermixed with squadrons of horse, when a considerable body of cavalry is attached to the army. The space of ground which in each line separates the different corps from one another, is always equal in extent to the front that is occupied by them. These intervals are left in order to facilitate their several movements, and to enable them to charge the enemy without confusion. It is a general rule, that the intervals or spaces which are between each battalion and squadron belonging to the *second* line should invariably correspond with the ground that is occupied by the battalions and squadrons which constitute the *first* line; in order that the *first* line, on being forced to fall back, may find sufficient space to rally, and not endanger the disposition of the *second* line, by precipitately thronging and pressing upon it. Each line is divided into right and left wings; each wing is composed of one or more divisions; each division is composed of one or more brigades; and each brigade is formed of two, three, or four battalions. Battalions are formed in line at a distance of twelve paces from each other, and this interval is occupied by two cannon, which are attached to each battalion. For the difference between the Prussian and French mode of arrangement, and other particulars, see ARMY, BATTLE, COLUMN, ENGAGEMENT, and TACTICS.

The LINE is a term frequently used to distinguish the regular army of Great Britain from other establishments of a less military nature. All numbered, or marching regiments, are called *the line*. The guards are an exception to this rule. The marines, fencible, militia, volunteer, and yeomanry corps, together with the life-guards, are not comprehended under this denomination. The term *line*, however, has not been applied with sufficient precision and discrimination. Strictly speaking, *line*, in military matters, denotes that solid part of an army which is called the main body, and has a regular formation from right to left. Upon the whole, it may be observed, that the term is generally misapplied, and that it cannot, with strict propriety, be used to distinguish any particular establishment from another.

LINE, *To*, from the French *aligner*, is to dress any given body of men, so that every individual part shall be so disposed as to form collectively a straight continuity of points from centre to flanks.

LINE of March, denotes the orderly succession of the component parts of an army that is put in motion.

LINEs of March, are bodies of armed men marching in given points to arrive at any straight alignment on which they are to form. The line is said to be well *dressed*, when no part is out of the straight alignment. That this may be effected, at the word *dress*, which is given by the commander, it is immediately to commence from the centre of each battalion, the men looking to their own colours, and the correcting officers lining them upon the colours of their next adjoining battalion.

LINE-firings are executed separately and independently by each battalion.

LINE of Fire. See FIRE.

LINE, *To form the*, is to arrange the troops in order of battle, or battle array.

LINE, *Inversion of the*, is a manœuvre which is effected by facing a battalion or line to the right about, instead of changing its position by a countermarch; sometimes it may be necessary to form to a flank with its rear in front. The column, with its line in front, may arrive on the left of its ground, and be obliged immediately to form up and support that point, so that the right of the line will become the left. Part of a second line may double round on the extremity of a first line, thereby to outflank an enemy. These, and various other movements, may be found necessary, and they can only be practised with safety and expedition by the inversion of the line.

LINEs, *Retiring*, denote bodies of armed men that have advanced against an opposing enemy in order of battle, withdrawing themselves with regularity from the immediate scene of action. On this occasion, it is of the greatest moment, that the line should be correctly dressed before it faces to the right about; and the battalions will prepare for the retreat in the manner preferred for the single one, by receiving the caution, that "the line will retire."

LINEs of Support, are lines of attack, which are formed to support one another. If there are several, the second should outflank the first, the third the second, the advanced one being thereby strengthened and supported on its outward wing.

To LINE Men. Officers and non-commissioned officers are said to *line* the men belonging to their several battalions, divisions, or companies when they arrive at their dressing points, and receive the word *dress* from the commander of the whole. When a single battalion halts, it is dressed or lined on its right centre company, and must, of course, be in a straight line. When several battalions dress from the centre of each on its next colour, the general line will be straight, provided all the colours have halted regularly in a line. On these occasions, every thing will depend upon the two centre dresses of each battalion.

To LINE a Coast, under the immediate pressure of invasion, requires not any great ability and exertion in the commanding officer of the particular district against which an insult may be offered, but it is moreover necessary, that every individual officer in the different corps should minutely attend to the particular spot on which he may be stationed. The English coast, especially where there are bays, is almost always intersected by narrow passes through the rocks or sand-hills. On this account, when any body of men receives orders to line a specified extent of ground, the officers who are entrusted with the several parts of a battalion or

brigade, should take care to make the most of their men, and to extend their files in such a manner, as not only to present an imposing front from the crown of the hill, but to be able, at a moment's warning, to carry their whole strength to prevent the enemy from getting upon the flanks by suddenly rushing up the gap. Much coolness is required on these occasions.

To LINE Hedges, &c. to plant troops, artillery, or small arms, along them under their cover, to fire upon an enemy that advances openly, or to defend them from the horse, &c.

To LINE a Street or Road, is to draw up any number of men on each side of the street or road, and to face them inwards. This is frequently practised on days of ceremony, when some distinguished person is received with military honours on his way through places where troops are stationed.

LINE, *To break the*, is to change the direction from that of a straight line, in order to obtain a cross-fire.

LINE, *Turning out of the*. The line turns out without arms whenever the general commanding in chief comes along the front of the camp. When the line turns out, the private men are drawn up in a line with the bells-of-arms; the corporals on the right and left of their respective companies; the piequet forms behind the colours, with their accoutrements on, but without arms. The sergeants draw up one pace in the front of the men, dividing themselves equally. The officers draw up in ranks according to their commissions, in the front of the colours; two ensigns taking hold of the colours. The field-officers advance before the captains. The camp-colours on the flanks of the parade are to be struck, and planted opposite to the bells-of-arms; the officers' spontoons are to be placed between the colour, and the drums piled up behind them; the halberts are to be planted between and on each side the bells-of-arms, and the hatchets turned from the colours.

LINE, or *Line of Battle*, in *Naval Tactics*, is applied to the disposition of a fleet on the day of engagement; on which occasion the vessels are usually drawn up as much as possible, in a straight line, as well to gain and keep the advantage of the wind, as to run the same board. See ENGAGEMENT.

This right line, or long file, is prolonged from the keel of the hindmost to that of the foremost, and passes longitudinally through the keels of all the others, from the van to the rear; so that they are, according to the sea-phraze, in the wake of each other. In the line, or order of battle, all the ships of which it is composed are close hauled, upon the starboard or larboard tack, about fifty fathoms distant from each other. When a fleet is drawn up in line, in presence of an enemy, it should be formed in such a manner as that the ships may mutually sustain and reinforce each other, and yet preserve a sufficient space in their stations, to work or direct their movements with facility during the action. The line close-hauled is peculiarly chosen in the order of battle, because, if the fleet, which is to windward, were arranged in any other line, the enemy might gain the weather-gage of it; and even if he thinks it expedient to decline that advantage, it will yet be in his power to determine the distance between the adverse fleets in an engagement, and to compel the other to action. The fleet to leeward, being in a line close-hauled, parallel to the enemy, can more readily avail itself of a change of the wind, or of the neglect of its adversary, so as to get to windward of him; or, at least, so as to avoid coming to action, if the enemy is much superior, or to prevent him from escaping, if he should attempt it. Besides, in this order, the sails of each

each ship are so disposed as to counteract each other, and, therefore, the ships in general neither advance nor retreat during the action, and are thus enabled to keep their station, and to prosecute the battle with vigour, and without disorder. Whilst the uniformity of the line is preserved, the admiral's orders may be readily communicated by signals from the van to the rear; disabled ships may be more easily discovered and relieved; and the situation and circumstances of the enemy's line will be open to the view of the commander-in-chief. Moreover, the ships of the line should not only be sufficiently close to sustain each other, but they should be of the larger sort, with the weightier metal. Many advantages concur to recommend the larger ships in a line of battle; they overlook those of an inferior rate, which are accordingly laid open to the fire of their mucketry. In a high sea they can more safely employ the artillery of their lower deck than a smaller ship; and if both are obliged to shut their lower-deck ports, the advantage of the three-decked ships, with regard to their cannon, will yet be considerable; they have three tier against two, and two against one. The same superiority subsists, in case they are disabled, when the upper deck is incumbered with the ruins; the large ships, being higher between decks, are less incommoded with the smoke, and their cannon is managed with greater facility; the large ships, having greater solidity of frame, are better calculated to resist the effects of battle and tempest. In general also they sail better than the small ones, except in fine weather; for, in a fresh wind, when the sea becomes agitated, they have always the superiority. The fire-ships do not succeed so well against large ships as the smaller ones; the artillery will sink them, or oblige them sooner to relinquish their design; and they are easily towed away by the great long boats. The line of a fleet, which has many capital ships, need not be so much inclosed as that of an enemy which has fewer. The former may be also less numerous, without being weaker. This circumstance, however, should not exclude a certain number of the third and fourth rates, which are necessary in all naval armaments.

The weather-line and the line to leeward have their several advantages and inconveniences. The chief advantage of the former are, that it may approach the enemy, so as to determine the time and distance of the action; if it is more numerous than the lee-line, it may easily appoint a detachment to fall upon the van and rear of the latter, and inclose it between two fires; it is little incommoded by the fire or smoke of the cannon, and may dispatch the fire-ships, under cover of the smoke, upon the disabled ships of the lee line, or so as to oblige the enemy to break the line and bear away. But the weather-line has also its defects; when the sea is rough, and the wind boisterous, it cannot readily fight with the lower deck battery; it cannot decline the action without the dangerous expedient of forcing through the enemy's line; and if it keeps the wind, the lee-line may inclose and totally destroy it. The disabled ships of the weather-line must tack, to avoid falling into the enemy's fleet; and if they are much shattered, they may be altogether separated from their own fleet, particularly if they are in the rear of the line.

The advantages of the line to leeward are these: the ships of the former may use the guns of their lower decks, without the hazard of taking in such water at the ports in stormy weather, which the line to windward cannot do without great danger. The lee-line, though it cannot so easily double upon the van and rear of the enemy, and inclose them between two fires, may, nevertheless, have opportunities of tacking, and cutting off a part of the enemy's rear. The disabled ships to leeward are more easily removed from the

line than those to windward; and the lee-line can with greater facility avoid the action than its adversary, which is a circumstance very favourable to an inferior squadron. But the defects of the lee-line are, that it cannot decide the time and distance of the battle, which may commence before it is sufficiently formed; and it will, perhaps, be attacked by an enemy bearing down upon it in regular order. The fire and smoke of the weather-line are a great inconvenience to it; and it cannot easily break the enemy's line with its fire-ships, which are very slowly and with great difficulty conveyed to windward. The admiral's ship always preserves her station in the centre of the line. The line is said to be formed a-breast when the ships' sides are all parallel to each other, on a line which crosses their keels at right angles. This is most frequently used in pursuing or retreating, with the wind right aft, so that the line forms a perpendicular with the direction of the wind. Falconer's Mar. Dict.

The two modes of engagement by the line to windward and to leeward have been particularly illustrated; and also the method of cutting or breaking the line of battle, lately put in practice to great advantage, by John Clarke, Esq. of Eldin, in his "Essays on Naval Tactics;" a second edition of which was printed at Edinburgh in 1804, 4to. See TACTICS.

LINE is also a name given to several small cords of different sizes, and used for various purposes at sea. They are smaller than ropes, and formed of two or more fine strands of hemp; as *house-line*, made of three strands, used to seize blocks into their straps and the clews of sails, and to marl the skirts of sails to their belt-ropes; *log-line*, made of three or more strands, and used for the log, &c.; and *mar-line*, made of two strands, and used for the same purposes as house-line. Some ropes are, from their situation, termed lines, as *bow-lines*, *ban-lines*, *chue* or *clew-lines*, *Fancy-line*, which is a rope used to over-haul the brails of some fore and aft sails; *furling-lines*, *girt-lines*, *head-lines*, *keech-lines*, which are ropes used to truss up the sails; *life-lines*, for the preservation of the seamen, which are worn hawser-laid rope, and made fast with two half-hitches round the strap of the lift-block, and jeer or tye-blocks in the middle of the yard; *naue line*, *slab-line*, *spilling-lines*, *tow line*, and *tracing-lines*; which see respectively.

LINE, *Ship of the*, is a vessel large enough to be drawn up in the line, and to have a place in a sea-fight. See SHIP.

LINE, *Knave*, in a Ship. See KNAVE.

LINE of Measures, is used by Oughtred to denote the diameter of the primitive circle in the projection of the sphere in plano, or that line in which the diameter of any circle to be projected falls.

In the stereographic projection of the sphere in plano, the line of measures is that line in which the plane of a great circle, perpendicular to the plane of the projection, and that oblique circle which is to be projected, intersects the plane of the projection; or it is the common section of a plane, passing through the eye-point and the centre of the primitive; and at right angles to any oblique circle which is to be projected, and in which the centre and pole of such circle will be found.

LINE, *Measure of a*. See MEASURE.

LINE of Demarcation, or *Alexandrian Line*, is a meridian passing over the mouth of the river Maragnon, and by the capes of Honna, and Malabrigo; so called from pope Alexander VI. who, to end the disputes between the crowns of Castile and Portugal about their boundaries, in 1493, drew an imaginary line on the globe, which was to terminate the pretensions of each. By which partition the East Indies

fell to the lot of the Portuguese; and the West Indies, then newly discovered, to the Caribians.

LINE, Bowling, Bunt, Crow, Furlong, Log, Rhumb, and Water; see under the respective adjectives.

LINE also denotes a small French measure, containing the 12th part of an inch, or 144th part of a foot.

The geometers, notwithstanding its smallness, conceive the line subdivided into six points.

The French line answers to the English barley-corn.

LINE, Angling. The best materials for making these lines are fine and even horse-hairs; the hair should be round and twisted even, for that greatly strengthens it; and all the hairs should be of an equal bigness, or as nearly so as may be. They should be laid in the water about a quarter of an hour after twisting, that it may be seen which will shrink; they are then to be twisted over again. In this last twisting some intermingle silk among them, but that is not so well. Lines made entirely of silk are not bad; but those of silk and hair mixed are never found to do well. The best colours for a line are forrel, white, and grey; the two last are best for angling in clear waters; the former in muddy ones. The pale watery-green is also a very good colour, and may be made thus: boil in a quart of alum-water a large handful of marygold-flowers; there will arise a scum which must be taken off; then add to this liquor copperas and verdigris, of each half a pound, beat to powder together; boil these up together; then put the hair into this liquor, and let it lie ten or twelve hours; it will obtain a watery blueish green colour, which will not wash out afterwards.

LINE of Equat.d Bodies. See *EQUATED BODIES*.

LINES, Gauge, Plum, and Rear. See the several adjectives.

LINE White, in Printing. See *WHITE*.

LINEA ALBA, in Anatomy, is a white line in the abdomen, formed by the union of the tendons of the abdominal muscles. See *OBLIQUUS externus abdominis*.

LINEA Mediana. See *MEDIANA*.

LINEA Nubosa. See *NEBULOSA Linea*.

LINEA Seminalis, is a line following the outer edge of the *RECTUS abdominis* muscle; which see.

LINEÆ Transversæ, lines crossing the rectus abdominis. See *RECTUS*.

LINEAL DESCENT. See *DESCENT*.

LINEAL Exegesis. See *EXEGESIS*.

LINEAMENT, a fine stroke or line observed in the face, and forming the delicacy thereof; being that which preserves the resemblance, and occasions the relation of likeness, or unlikeness, to any other face.

It is by these that physiognomists pretend to judge of the temper and manners of people.

LINEAMENT is also used by the painters for the outline of a face. See *CONTOUR*.

LINEANS PUNCTUM. See *PUNCTUM*.

LINEAR LEAF. See *LEAF*.

LINEAR Numbers, are such as have relation to length only. See *NUMBER*.

Such *e. gr.* is a number which represents one side of a plane figure. If the plane figure be a square, the linear number is called a *root*.

LINEAR Problem, in Mathematics, is that which may be solved geometrically, by the intersection of two right lines. *E. gr.* to measure an inaccessible height by the means of two unequal sticks, &c.

This is also called a *simple problem*, and is capable but of one solution.

LINEATORES, in the Hippodrome at Constantinople, were the same with the *designatores* in the Circus at Rome. See *HIPPODROME*, *CIRCUS*, and *DESIGNATOR*.

LINEN, in *Geography*, a town of Germany, in the county of Tecklenburg; 7 miles S.S.E. of Tecklenburg.

LINEN, in the *Manufactures*. There are various sorts of linen, the principal materials of which are cotton, flax, and hemp. The linen trade of Europe is chiefly in the hands of the Russians, Germans, Swits, Flemings, Hollanders, and French.

Linen is the staple of Ireland, as it was of Scotland; but it was long neglected. The Scots at present are not, however, in so bad a situation in respect to this trade, as the French were in the reign of king Henry IV. or the Irish at the Revolution; where, by the force of public encouragement, it has arrived to an extraordinary pitch, and it is to be hoped will daily advance: the Scots have it not to begin, and they are improving and extending it to a very great degree.

The balance of trade between England and Scotland, and England and Ireland, is on the English side; and so far as England and its dependencies can be served with linen from Scotland and Ireland, instead of Holland, France, Germany, and Russia, so far will England be a gainer by this change in the course of trade. The more linen the Scots and Irish can sell in England, the more of the English commodities will they be able to purchase; and it may be reasonably supposed that their demands from England will always increase in proportion to the increase of their people and linen manufactures. It is then evidently the interest of England to promote and advance the manufacture of linen in Scotland and Ireland, and to give them all reasonable advantages in the trade, in preference to foreigners; where the balance of trade is against us, and this seems to be the sense of the nation, since all foreign linen, for home consumption, pays a duty. Post. Dict. Com.

The linen trade of this country is regulated by several statutes.

No person shall put to sale any piece of dowlas linen, &c. unless the just length be expressed thereon, on pain of forfeiting the same. (28 Hen. VIII. cap. 4.) Using means whereby linen-cloth shall be made deceitfully, incurs a forfeiture of the linen, and a month's imprisonment. (Stat. 1 Eliz. cap. 12.) Any persons may set up trades for dressing hemp or flax, and making thread for linen-cloth, &c. 15 Car. II. cap. 15.

By the 43 Geo. III. c. 69. all former duties on linen cloth, silks, cottons, and calicoes, are repealed; and in lieu thereof other duties are imposed upon all goods which shall be printed, stained, painted, or dyed in Great Britain, according to a schedule annexed to the act; and by 50 Geo. III. c. 26. certain export duties are imposed; the said duties to be paid by the printer, raiser, painter, or dyer. By 49 Geo. III. c. 98. certain duties and customs are imposed upon French linens, (or lawns.) By 43 Geo. III. c. 69. every calico printer, and every printer, painter, or raiser of linens, cottons, or stuffs, shall pay annually for a licence 10*l.* The printing or staining of calicoes must be for exportation; because by 7 Geo. II. c. 7. the use of printed, painted, stained, or dyed calico for wearing apparel is prohibited, on pain of 5*l.* to the informer, on conviction: and a person offering such for sale, unless for exportation, forfeits 20*l.* half to the informer, and half to the poor. This prohibition, however, does not extend to calicoes dyed wholly blue: and it shall be lawful to use stuff made of linen yarn and cotton wool manufactured, and printed or painted in Great Britain, provided the warp thereof be wholly linen yarn.

yarn (9 Geo. II. c. 4.) By 14 Geo. III. c. 72. it is enacted that no greater duty shall be paid for stuffs made of raw cotton wool within this kingdom than $3\frac{1}{2}d.$ a yard, 43 Geo. III. c. 69. and that any person may use the same in apparel or otherwise: and every piece is to have three blue stripes in both selvages, and to be stamped at each end with a stamp provided by the officers of excise, and instead of the word *calico*, used for foreign calicoes, each piece shall be marked with the words *British Manufactory*. If stuffs made wholly of cotton, and printed, painted, stained, or dyed stuffs, (mullins, neckcloths, and fustians excepted,) without such mark shall be exposed to sale, they shall be forfeited, and 50*l.* for each piece. If any person shall counterfeit such stamp, or knowingly sell such stuffs with a counterfeit stamp, he shall be guilty of felony without benefit of clergy. If any person shall import any calicoes, mullins, or other stuffs made of linen yarn only, or of linen yarn and cotton wool mixed, or wholly of cotton wool, in which shall be wove in the selvedge any such blue stripe, he shall forfeit the same, and 10*l.* for each piece. Every such printer, painter, stainer, or dyer, shall give notice in writing, at the next office, of his name and place of abode, and where he intends to work, on pain of 50*l.* (10 Anne, c. 19. 25 Geo. III. c. 72.) By 1 Geo. II. c. 34. any person, undertaking to print, paint, &c. any silks, linens, or stuffs, at any other place than the place of his usual residence or exercise of his trade, shall first make entry of the place, and pay the duties, on pain of 50*l.*, and forfeiture of the goods. Officers may enter at all times by day or night to take account, &c. and the penalty of obstructing the officer in the execution of his duty is 200*l.* (10 Anne, c. 19. 25 Geo. III. c. 72.) Goods shall be entered once in six weeks on oath before the collector or supervisor, on pain of 50*l.* (10 Anne, c. 19.) No person shall begin to print, stain, paint, or dye any goods before they have been measured and marked, on pain of forfeiting the same, and also 20*l.* for every piece. (25 Geo. III. c. 72.) If any printer shall wilfully cut out or deface such frame mark, he shall forfeit 50*l.* Concealing goods, or avoiding duty, incurs a forfeiture of 50*l.*: and all goods found in a place, of which no notice has been given, or the value thereof, shall be forfeited. (10 Anne, c. 19. 25 Geo. III. c. 72.) Nor shall goods be kept in unentered places on pain of forfeiting 50*l.* and the goods. 20 Geo. III. c. 72.) Within six weeks the duties shall be cleared, on pain of forfeiting double. (10 Anne, c. 19.) Nor shall they be removed before the officer hath taken account of them and stamped them, on pain of 50*l.* and seizure. (10 Anne, c. 19. 25 Geo. III. c. 72.) Goods surveyed shall be kept separate from those unsurveyed, on pain of 50*l.*: and goods untamped may be searched for and seized. (10 Anne, c. 19. 25 Geo. III. c. 72.) The person in whose custody such goods are found shall forfeit 100*l.* 5 Geo. c. 11. 27 Geo. III. c. 31.

Calicoes, &c. that shall not have three blue threads in the selvedge, shall be deemed foreign calicoes, and on being printed or dyed, shall be marked at each end with the words "for 12*l.* calicoes for exportation;" and every dealer who shall have any such goods in his custody (except dyed throughout of one colour) or any stuffs made wholly of cotton wool wove in Great Britain, commonly called "British Manufactory," (mullins, neckcloths, and fustians excepted,) not having such blue threads, shall forfeit 200*l.* and every such piece found in his custody. (25 Geo. III. c. 72.) The owner or printer of any piece or remnant of calicoe or foreign mullins and calicoes shall, before they be presented to the officer, mark the same at both ends with a frame mark, containing his name and place of abode, and

also the name by which such goods are commonly known (except such as are dyed throughout of one colour) on pain of forfeiting 10*l.* for every piece or remnant. The owner or printer of any linens or stuffs made of cotton mixed, or wholly of cotton wool wove in Great Britain, called "British Manufactory or Mullins," shall mark the same at both ends (fustians, velvets, velverets, dimities, and other figured stuffs excepted) with a mark, containing his name and place of abode, and the name and quality of such goods, with the ready money price thereof, before the same are presented to the officer in order to be printed or dyed: on pain of forfeiture and seizure, and 20*l.*; and if any such piece be marked at a less price than the real value, the same may be seized and forfeited, and the owner shall forfeit 20*l.* If the frame mark be defaced, the same shall be renewed on notice; but if any person shall counterfeit or forge any frame mark, he shall forfeit 100*l.*: and if any person counterfeit the stamp, it is felony without benefit of clergy. (25 Geo. III. c. 72. 27 Geo. III. c. 31.) If any person shall knowingly sell any of the goods with a counterfeit stamp, he shall forfeit 100*l.* and stand two hours in the pillory. (10 Anne, c. 19. 13 Geo. III. c. 56. 25 Geo. III. c. 72.) By 27 Geo. III. c. 31. if any person shall knowingly sell any such goods with counterfeit stamp, thus intending to defraud his majesty, he shall be guilty of felony without benefit of clergy. Every person who hath paid the duties, or bought the goods of any person who hath paid the duties, may export the same, and shall be allowed all the duties in drawback, as set forth in 43 Geo. III. c. 69. Sched. C. on conforming to certain prescribed conditions. (25 Geo. III. c. 72. 25 Geo. III. c. 74.) By the 4 Geo. III. c. 37. which establishes the corporation of the English Linen Company for making cambrics and lawns, it is enacted that the commissioners of excise, where there shall be a manufactory of cambrics or lawns, or of goods known under that denomination, shall appoint the supervisor or other officer to seal the same, for which they shall have such fee as the commissioners shall appoint: the manufacturer to give notice in writing to the officer, of the finishing of every piece, before it is taken out of the loom, who shall seal the same at both ends; on pain that such manufacturer, taking the same out of the loom without having given such notice, and having the same sealed as aforesaid, shall forfeit 5*l.*; and every such piece shall be forfeited, and may be seized by any officer of the customs or excise, and the officer, with convenient speed after notice, shall mark and also number each piece; and make entry in writing, in books to be provided at the expence of the manufacturer, of the number set to each piece, the length thereof, and the number of threads in the warp, on pain of 10*l.* If the officer shall mark any not made in England, or after the same is taken out of the looms, he shall forfeit 50*l.* for each piece to him who shall sue, and forfeit his office, and be incapacitated to hold any other office of trust under the crown. If any person shall offer to the officer any bribe, he shall forfeit 50*l.*; and if he shall by bribery, or otherwise, prevail upon the officer to commit such offence, he shall forfeit 100*l.*, and stand in the pillory two hours. And the officer shall yearly, in the month of June, transmit to the commissioners an account of all goods which he shall have stamped, and a copy of the entries made, on pain of dismissal; and he, or his executors, shall deliver up the seals, on demand from the commissioners, on pain of 200*l.* Cambrics and lawns made in England found untamped, shall be forfeited, and may be seized by any officer of the customs or excise, and after condemnation shall be sold; and every person who shall sell or expose to sale, or have in his custody for

for that purpose, any cambrics or lawns made in England, unmarked, shall forfeit 200*l.* such goods not to be sold, or worn in this kingdom, but to be exported, and to be sold only on condition of exportation. Nor shall they be delivered out of the warehouse until bond be given, to the satisfaction of the collector, in double penalty of the goods, that the same shall be exported, and not re-landed. To counterfeit the seal appointed by this act, or import any foreign cambrics or lawns having such counterfeit mark thereon, or expose the same to sale, knowing the stamp thereon to be counterfeited, is felony without benefit of clergy. All goods condemned in pursuance of this act, and all pecuniary forfeitures not otherwise directed shall be paid for and recovered in any of his majesty's courts, in the name of the attorney-general, or of such officer as afore said; and applied, after deduction of charges, half to the king, and half to the officer seizing, in writing, or suing, according to the directions of this act. The penalties may be sued for, levied, and enforced as by the laws of excise, or in the courts at Westminster; and employed half to the king, and half to him that shall deliver, inform, or sue. (10 Anne, c. 19. 24 Geo. II. c. 40. 25 Geo. III. c. 72.) All utensils and instruments for printing, painting, staining, or dyeing such goods, in custody of the said person, or any other, shall be liable to all arrears of the duty, and to all penalties concerning the same, in like manner as if such person was the lawful owner. 10 Anne, c. 19. 25 Geo. III. c. 72. 28 Geo. III. c. 37.

Stealing of linen, stuffs, cotton goods, &c. from whitening-houses or drying houses, to the value of 10*l.* or knowingly buying or receiving such stolen goods, is felony without benefit of clergy. (18 Geo. II. cap. 27.) Such also is breaking into houses, shops, &c. and destroying any linen cloth, or implements used in the manufacturing of it, by 4 Geo. III. cap. 37. See LARCENY.

A new manufacture was set on foot some time ago in London, for embellishing linen with flowers and other ornaments of gold leaf. The linen looks whiter than most of the printed linens; the gold is extremely beautiful, and is said to bear washing well. See STEFF.

There are many substances from which a juice or dye is obtained, that will stain linen of different colours. The juice of the anacardium, rubbed on linen or cotton, gives a reddish-brown stain, which soon deepens in the air into a black, and which has not been discharged by washing and boiling, with soap or alkaline ley. Hence the anacardium is said to be used for marking linen and cotton cloths, and to be known all over India by the name of marking-nut. The juice of the cashew-nut, called by some the anacardium of the West Indies, differs from the oriental anacardium in its coloring quality; that lodged between its fibres being such a pale, and giving to linen, cotton, or paper, only a brownish stain, which is durable, but does not change at all towards blackness.

Several species of the toxicodendron, or poison-wood, contain in their leaves a milky juice, which in drying becomes of a deep black, and communicates the same colour to the linen on which it is dropped: the linen thus stained, boiled with soap, came out without the least diminution of its colour, nor does strong ley of wood-ashes make any change in it. Phil. Transf. vol. xlix. for 1755.

Dr. Lewis has found, that the milks of wild poppies, garden poppies, dandelion, hawk-weed, and fow-thistle, gave brown or brownish-red stains, which were discharged by washing with soap; the colourless juice which issues from hop-stalks when cut, stains linen of a pale reddish or brownish-red, extremely durable: the juice of flues gave

likewise a pale brownish stain, which, by repeated washings with soap, and wetting with strong solution of alkaline salt, was darkened to a deeper brown; on baking the flues, their juice turns red, and the red stain which it then imparts to linen is, on washing with soap, changed to a pale blueish, which also proves durable. See DYEING of Thread.

The late Dr. Samille has recommended the following method of marking linen, so as not to wash out again: take vermilion, as much as will lie on a half-crown piece, of the felt of steel a piece about the size of a small money; grind or levigate them well together with hand oil: the composition may be diluted or thinned at pleasure.

LINEN, *Fossil*. See AMIANTHUS and ASBESTOS.

LINEN, *Milk*. See MILK.

LINEN, *White*. See WHITE.

LINEN, *Bleaching of*. See BLEACHING.

LIN-FOU, in *Geography*, a town of Corea; 20 miles S. of Haima.

LING, in *Agriculture*, a provincial term applied to the plant usually known by the name of *HEATH*.

By 4 & 5 W. c. 23. no person shall do any new drains, hills, heaths, moors, forests or chases, or other wastes, burn between February 2, and June 24, any grass, ling, heath, furze, gois or fern, on pain of being committed to the house of correction, for any time not exceeding one month, nor less than 10 days, then to be whipped and kept to hard labour.

LING, in *Ichthyology*, the English name for a kind of fish, which is a species of the genus, with two fins on the back, with a bearded mouth, and with the upper jaw longest. See GALT'S *Moine*.

Ling is eaten raw, both fresh and cured, for the table.

This fish abounds about the Scilly isles, on the coasts of Scarborough, and those of Scotland and Ireland, and forms a considerable article of commerce. In the Yorkshire seas they are in perfection from the beginning of February to the beginning of May, and some till the end of that month. They spawn in June, at which time the males separate from the females. When the ling is in season, its liver is very white, and abounds with a fine floured oil, which afterwards becomes red, like that of a bullock, and affords no oil. This oil is said to be hoarded up in the cellular membranes of fishes, to return into their blood, and support them in the engendering season. Great quantities of this fish are salted for exportation, and for home-consumption: for this purpose it must measure twenty-six inches or upwards from the shoulder to the tail, in order to be entitled to the bounty on exportation. Those under that size are called *dreadles*. Pennant.

LINGA, in *Geography*, one of the smaller Swedish islands, near the N. coast of Mainland. N. lat. 60° 44'. W. long. 1° 27'.—ALFO, one of the same group of islands near the E. coast of Mainland. N. lat. 60° 34'. W. long. 1° 6'.—ALFO, one of the same cluster, near the S.W. coast of Unit. N. lat. 61° 2'. W. long. 1° 12'.—AISO, one of the small western islands of Scotland, near the S. coast of South Uth. N. lat. 57° 5'. W. long. 7° 14'.

LINGA Sound, a bay on the W. coast of the Island of Stronsa. N. lat. 59°. E. long. 0° 28'.

LINGA, or *Lizum*, as it is pronounced in the southern and eastern parts of the peninsula, in *Hindoo Mythology*, is a symbol to which great veneration is paid, and much mysticism attached, by the extensive sect of Hindoos called Saivas, or the worshippers of Siva, the destructive, or rather regenerative power of their god. This type of Siva is represented of a conical form, and is seen in almost all parts of India, of various sizes, in stone, wood, clay, metals, &c.

It may be supposed that Siva, being, among his other attributes, a personification of fire, as the most destructive of elements, was typified by a cone with its apex upwards, the form naturally assumed by flame; and that to this form enthusiasts have, in the wildness of their imagination, fancied allusions, and directed analogies, that, in the progress of time, have more and more bewildered them: until at length such an inextricable mass of mysticism hath been accumulated referring to this symbol, as to wear an appearance almost of ridicule. The Linga being the symbol of Siva, his votaries are reminded of it, and of its archetype by any thing conical or erect; a hill, a tree, any pyramidal object, a mast or pole, &c. Lingas are seen of enormous size; in the cavern of Elephanta for instance, marking unequivocally that the symbol in question is at any rate as ancient as that temple, as they are of the same rock as the temple itself; both, as well as the floor, roof, pillars, pilastres, and its numerous sculptured figures, having been once one undistinguished mass of granite, which excavated, chiselled, and polished, produced the fire cavern, and forms that are still contemplated with so much surprise and admiration. The magnitude of the cones, too, further preclude the idea of subsequent introduction, and together with gigantic statues of Siva and his consort, more frequent and more colossal than those of any other deity, necessarily, as before noticed, coeval with the excavation, indicate his paramount adoration, and the antiquity of his sect. (See ELEPHANTA and KARLY.) Lingas are seen also of diminutive size for domestic adoration, or for personal use: some individuals always carrying one about with them, and in some Pradhan families one is daily constructed in clay, placed, after due sanctification by appropriate ceremonies and prayers, in the domestic shrine, or under a tree or shrub sacred to Siva, the Bilva (*Cratæva marmelos*) more especially, and honoured by the adoration of the females of the household. This ceremony is called *Linga-puja*, i. e. the worship of the Linga, a beautiful plate of which, with a particular description, is given in Moor's *Hindu Pantheon*, where "a pious female is represented in plate 22, propitiating Mahadeva (another name of Siva) in his generative character, indicated by the Linga, inserted in its appropriate receptacle the *Argha*, or *Yoni*, mysterious types of nature, particularly discussed in future pages. The devout female may be imagined as invoking the deities, typified by their symbols, for the blessing of fruitfulness, its reverse being deprecated by both sexes, as the most afflictive visitation of divine displeasure. It is explained hereafter, how certain ceremonies called *Sradha*, to be performed by the offspring of deceased parents, are essential to the repose of a departed soul." P. 68. See *SRADHA*, *YONI*, and *MERU*.

A sect of Hindoos worship almost exclusively the Linga, as the symbol of their deity: this sect is called *Lingaja*, *Lingancita*, and *Lingi*. Another sect, exclusive worshippers of the *Yoni*, or the female power, are called *Yonija*; the former being apparently the same as the Phallic emblem of the Greeks, the *membrum virile*; and the latter *puendum muliebre*, rarely, however, seen in India in an indecent form. "The mystery in which the real history of these emblems is veiled, renders it extremely difficult to give a clear account of the origin or tendency of the rites by which we see their votaries honour them. That they had their origin in nature and innocence we may admit, without admitting likewise the propriety of their continuance to a period when nature and innocence are no longer seen unobscured: knowing, however, so little of the genuine history of these rites and symbols, it is but a reasonable extension of charity to suppose that their origin was philosophical though my-

sterious, and that their observance, though offensive to delicacy, is not criminal.

"It is some comparative and negative praise to the Hindoos, that the emblems under which they exhibit the elements and operations of nature, are not externally indecorous. Unlike the abominable realities of Egypt and Greece, we see the Phallic emblem in the Hindoo exhibitions without offence; and know not, until the information be extorted, that we are contemplating a symbol, whose prototype is obscene. The plates of this work may be turned and examined over and over, and the uninformed observer will not be aware that in several of them he has viewed the typical representation of the generative organs or powers of humanity. The external decency of the symbols, and the difficulty with which their recondite allusions are discovered, both offer evidence favourable to the moral delicacy of the Hindoo character. I am not, however, prepared to deny the appearance, in many instances, of strong evidence to the contrary; the disgusting faithfulness of natural delineations, and the combinations so degrading to human nature, observable on some of the temples and sacred equipages of the Hindoos, are deeply offensive to common delicacy and decency; and I continue of opinion that such objects of depravity, publicly offered to juvenile contemplation, cannot fail of exciting in such untutored, especially female, minds, ideas obnoxious to the innocence that we love to think an inmate there." (*Hin. Pan.* p. 382.) Something on this topic, and an instance of the adoration of the Linga in a magnificent temple, occur under the articles *IDOLATRY* and *JERY*. See also *PHALLUS*. The similarity of Phallic and of Linga worship, and other Grecian, Egyptian, and Hindoo coincidences, are learnedly discussed by major Wilford in the third, fourth, sixth, and eighth volumes of the *Asiatic Researches*. See *GENTOOS* and *LOTOS*, in this work.

LINGAJA, a sect of Hindoos, who adore, it is said, exclusively, the Linga, a symbol of Siva. See *LINGA*, and *SECTS of Hindoos*.

LINGAN, in *Geography*, a river of Ireland, which runs into the Suir; 2 miles below Carrick-upon-Suir.

LINGANCITA, a sect of Hindoos, the same with *Lingaja*, who exclusively worship Siva under the symbol of a Linga or Phallus. See *LINGA*, and *SECTS of Hindoos*.

LINGAPOUR, in *Geography*, a town of Hindoostan, in Dowlatabad; 15 miles S. of Nurmul.

LINGAY, one of the smaller western islands of Scotland, near the S.W. coast of Harris. N. lat. 57° 40'. W. long. 7°.

LING-CHAN, a town of Corea; 76 miles E.N.E. of Han-tcheon.

LINGEN, a city of Westphalia, and capital of a county of the same name; formerly fortified, but now barely surrounded with a ditch, and small. It is the seat of the regency of the united counties of Linggen and Tecklenburg, and of the deputations of the war and domain chamber of Minden, and has a Calvinist, a Lutheran, and a Roman Catholic church. The academical gymnasium of this place was founded in 1697 by William III., prince of Orange. About a quarter of a mile distance from the town, N. of it, is the passage over the Embs, called the "Lingen Ferry." —Also, a county of Westphalia, bounded on the N. by the bishopric of Munster, on the E. by the bishopric of Osnabruck, on the S. by the county of Tecklenburg, and on the W. by Bentheim. At the peace of Tilsit it was ceded by Prussia to Westphalia. It has mines of coal and quarries of stone. The chief town of the upper division of the county is Linggen, and that of the lower Ibbenbühren.—Also, an island

island in the East Indian sea, near the S. coast of Malacca, about 100 miles in circumference, and 50 miles from the N.E. coast of the island of Sumatra. S. lat. $0^{\circ} 10'$. E. long. $104^{\circ} 40'$.

LINGENDES, CLAUDE DE, in *Biography*, a French Jesuit, and one of the most celebrated preachers of the period in which he flourished, was born at Moulins in the year 1591. He entered the order when he was sixteen years of age, and after completing his studies to the satisfaction of his superiors, became eminent as an instructor in rhetoric and polite literature. His chief talent was soon discovered by the eloquence of his pulpit discourses, and for six and thirty years he attracted crowded audiences by the excellence of his compositions, and by his fine elocution. Besides the labours of the pulpit, he presided eleven years over the college of his native place, and afterwards filled the post of provincial of the order in France. He died in 1660, at the age of sixty-nine, while he was superior of the Jesuits' seminary at Paris. He was author of a popular work, entitled "Monita quedam ad Vitam bene Ordinandam," which has been frequently reprinted: "Votivum Monumentum ab Urbe Molinensi, Delphino oblatum;" and of Latin sermons, entitled, "Concionum quadragesimalium Argumenta," which have been published in 4to. and 8vo. and which have been translated into the French language, and much read in the original and translation. Gen. Biog.

LINGHOLM, in *Geography*, a small island among the Orkneys, near the W. coast of Stronfa. N. lat. $50^{\circ} 59'$. E. long. $0^{\circ} 27'$.

LINGI, a sect of Hindoos, worshippers of the Linga, a Phallic emblem of Siva, the destructive and regenerative power of the Indian triad. See LINGA, SECTS of Hindoos, and SIVA.

LINGICOTTA, in *Geography*, a town of Africa, in Kullo. N. lat. $12^{\circ} 30'$. W. long. $9^{\circ} 10'$.

LINGLEBACH, JOHN, in *Biography*, a painter of grotesque subjects, fairs, mountebanks, landscapes, &c.; born at Frankfort on the Maine in 1625; who having early acquired some knowledge of the art of painting, went to Rome for his improvement, but returned to his native country at the age of 25, to practise in his own native style. He did indeed acquire in Italy a slight taste for the classic, which he exhibited by introducing splendid ruins sometimes in his landscapes; but in general his taste is Dutch, and his style also, particularly in colouring and effect. His pictures are in general pleasing, having very much the tone of those of Adrian Vandewelt, though not finished so minutely, and indeed differing in choice of subject. He was frequently employed by eminent artists to insert figures and animals in their landscapes; and his ingenuity in the management of his pencil, enabled him so to assimilate his touch to that of the painter who employed him, that it is not easy to discover his hand. He died in 1687, at the age of 62.

LING-NGAN, in *Geography*, a city of China, of the first rank, in Yun-nan. N. lat. $23^{\circ} 38'$. E. long. $102^{\circ} 42'$.

LINGNIANY, a town of Lithuania; 32 miles E. of Wukomierz.

LINGONES, in *Ancient Geography*, a people of Gallia Cisalpina, near the Po, and north of the Boii, in the northern part of Bolognese and in Ferrara. They formed leagues of amity with the Boii, and, like them, they were Gauls in their origin; and their descent has been traced by some authors from the Lingones of Gallia Transalpina, where they inhabited a territory near the present Langres. Their towns in Italy were Forum Corneli, Claterna, Faventia, Solonæ, and Batrium. Traces of the same people have been also discovered in Upper Germany.

LING-QUAN-Y, in *Geography*, a town of China, in the province of Chen-li; 50 miles S.W. of Si-ngan.

LING-TAO, a town of China, of the first rank, in Chen-li, situated on the Tie-tan river, which falls into the Hoang-ho, or Yellow river. Gold is found in great quantities in the sand of the neighbouring rivers and brooks. The country is very mountainous, and abounds with wild bulls, and an animal resembling a tyger, whose skins are very valuable. The vallies are fertile in corn, and the pastures near the rivers supply food for cattle. Upon this city depend two cities of the second class, and three of the third. N. lat. $25^{\circ} 22'$. E. long. $106^{\circ} 34'$.

LING-TCHEOU, a town of Corea; 28 miles S.S.W. of Koang-tcheou.

LINGUA GROSSA, a town of Sicily, in the valley of Demona; 9 miles W. of Taormina.

LINGUA, Tongue, in *Anatomy*. See DEGLUTITION and TONGUE.

LINGUA Avis, Bird's-tongue, in the *Materia Medica*, the seed of the ash-tree, or ashen-keys.

LINGUA Cervina, in *Botany*, Hart's Tongue, a species, or with Plumier, Tournefort, and others, a genus of the fern tribe. See ASPLENIUM and SCOLOPENDRIUM.

LINGUA Medica, in *Laws*. See MEDIETAS.

LINGUE FRÆNUM, in *Anatomy and Surgery*. See FRÆNUM.

LINGUADO, in *Ichthyology*, the name of a West Indian fish, in shape resembling a toad.

LINGUALIS, in *Anatomy*, an epithet applied to some parts about the tongue. The lingual artery is a large branch of the external carotid. (See ARTERY.) For the lingual glands, see DEGLUTITION; for the lingualis muscle, see DEGLUTITION; and for the lingual nerve, see NERVE.

LINGUATULA, in *Ichthyology*, a species of *pleuronectes*; which see.

LINGUATULA, in *Natural History*, a genus of the vermes mollusca class and order: body depressed, oblong; mouth placed before, surrounded with four passages. Of this genus there is but a single species; viz. the *Serrata*, which inhabits the lungs of a hare.

LINGULA, in *Ichthyology*, the name of an extremely small fish of the foal-kind. It is known from the rest of this genus not only by its smallness, but by a ridge of small scales, which run along the line over the spine, and are much more elevated and distinguishable, both to the eye and touch, than those of the rest of the body. It is a well-tailed fish, and much firmer in its flesh than the foal, but is very scarce, and is of little value, because of its thinness. It is caught in the Mediterranean.

LINGULACA, a name by which several authors, particularly some of the older naturalists, have called the *foal fish*.

LINGULATUM FOLIUM, in *Botany*. See LEAF.

LINGUMPILLY, in *Geography*, a town of Hindoostan, in Mysore; 30 miles S.W. of Tadameri.

LINHARES, a town of Portugal, in the province of Tras los Montes; 19 miles S. of Miranda. — Also, a town of Portugal, in the province of Beira; 5 miles S.W. of Calorico.

LINHAY, in *Rural Economy*, a provincial word applied in Devonshire to signify an open field.

LINIERES, LA, in *Geography*, a town of France, in the department of the Charente; 15 miles S.W. of Angoulême.

LINIMENT, LINIMENTUM, from the Latin *linire*, to anoint gently, in *Pharmacy*, a form of external medicine, made

made of unctuous substances, used to rub on any disordered part.

The liniment is of a mean consistence between an oil and an unguent.

The use of liniments is to soften asperities of the skin, moisten parts that need humectation, and resolve the humours that afflict the patient and give him pain. There are various kinds of liniments used, according to the various occasions.

LINIMENTUM ALBUM, P. L. 1745; *Unguentum spermaceti*, P. L. 1787; *Unguentum cetacci*, P. L. 1809, ointment of spermaceti, is formed as follows: take oil-olive three ounces, spermaceti six drachms, white wax two drachms; melt all together over a gentle fire, stirring it till it is perfectly cold.

This liniment may be applied in cases of excoriation, where, on account of the largeness of the surface, the ointment with lead or calamine might be improper.

LINIMENTUM ERUGINIS, *Liniment of Verdigris*, P. L. 1809; *Unguentum Aegyptiacum*, P. L. 1720; *Mel Aegyptiacum*, P. L. 1745; *Oxymel eruginis*, P. L. 1787, is prepared by dissolving an ounce of powdered verdigris in seven fluid-ounces of vinegar, and straining it through a linen cloth; then adding gradually fourteen ounces of clarified honey, boil it down to a proper consistence. This preparation is intended only for external use.

LINIMENTUM AMMONIÆ Fortius, *strong liniment of ammonia*, is formed by shaking together a fluid-ounce of solution of ammonia, with two fluid-ounces of olive oil, until they unite.

LINIMENTUM AMMONIÆ Carbonatis. See **LINIMENTUM Volatile**.

LINIMENTUM ARESII, P. L. 1720; *Unguentum e gummi elemi*, P. L. 1745; *Unguentum elemi compositum*, P. L. 1787, is a composition formed by melting a pound of elemi with two pounds of prepared suet; then removing it from the fire, and immediately mixing in ten ounces of common turpentine, and two fluid-ounces of olive oil; then straining the mixture through a linen cloth. See **ELEMI**.

LINIMENTUM CAMPHORÆ, *Camphor liniment*, is prepared by dissolving half an ounce of camphor in two fluid-ounces of olive oil. This is a simple solution of camphor in oil, which readily dissolves it. The same solution also affords an useful method of giving camphor internally in a liquid form, by rubbing it in this state first with mucilage, and then adding any aqueous vehicle. One drachm of the oil contains, as thus prepared, fifteen grains of camphor. See **CAMPHOR**.

LINIMENTUM CAMPHORÆ Compositum, *Compound camphor liniment*, is prepared by mixing six fluid-ounces of solution of ammonia with a pint of spirit of lavender in a glass retort; then, by the heat of a slow fire, distilling a pint; and lastly in this distilled liquor dissolving two ounces of camphor. See **CAMPHOR**.

LINIMENTUM HYDRARGYRI, *Mercurial liniment*, consists of the following ingredients; *viz.* strong mercurial ointment and prepared lard, of each four ounces, an ounce of camphor, 15 minims (of which to make a fluidrachm) of rectified spirit, and four fluid-ounces of solution of ammonia. It is prepared by first powdering the camphor with the addition of the spirit, then rubbing it with the mercurial ointment and the lard, and, lastly, adding gradually the solution of ammonia, and mixing the whole together. This combination requires that the camphor should be powdered by the smallst possible quantity of spirit, and if the other substances be added in the manner above directed, it will form a mass of uniform consistence without separating; and it will be considerably thicker than the other liniments are. It is an useful combination for the dissolution of indolent swellings or collections of fluid; but if it be frequently or largely

applied, it will affect the mouth more rapidly than the mercurial ointment will do.

LINIMENTUM SAPONACEUM, *Linimentum saponis compositum*, or *compound soap-liniment*, a form of medicine prescribed in the London Pharmacopœia, and meant to supply the place of the ointment well known by the name of *epididymæ*. It is made thus: take spirit of rosemary a pint, hard Spanish soap three ounces, camphor one ounce; dissolve the camphor with the rosemary spirit, and then add the soap; and macerate in the heat of a fluid-bath until it be melted.

A liniment of this kind may be prepared by rubbing an ounce of camphor, with two ounces of Florence oil, in a mortar, till the camphor be dissolved. This anti-spasmodic liniment may be used in obstinate rheum, tismus, and in some other cases, accompanied with extreme pain and tension of the parts.

LINIMENTUM TEREBINTHINÆ, *Turpentine liniment*, is formed by adding half a pint of oil of turpentine to a pound of resin cerate previously melted, and stirring. This liniment is very commonly applied to burns; and its first introduction into practice for this purpose is owing to Mr. Kentish of Newcastle.

LINIMENTUM VOLATILE, P. L. 1745; *Linimentum ammoniac*, P. L. 1787; *Linimentum ammoniac carbonatis*, *liniment of carbonate of ammonia*, is formed by shaking together a fluid-ounce of solution of carbonate of ammonia with three fluid-ounces of olive-oil, until they unite. Or this liniment may be prepared by shaking together an ounce of Florence oil, and half an ounce of spirit of harts-horn. If the patient's skin is able to bear it, the liniment, made with equal parts of the spirit and oil, will be more efficacious. Sir John Pringle observes, that in the inflammatory quinsy, a piece of flannel moistened with the liniment and applied to the throat, to be renewed every four or five hours, is one of the most efficacious remedies; and that it seldom fails, after bleeding, either to lessen or carry off the complaint.

A liniment for burns may be made by shaking well together, in a wide-mouthed bottle, equal parts of Florence oil, or of fresh drawn linseed oil, and lime-water. This is found to be an exceeding proper application for recent scalds or burns. It may either be spread upon a cloth, or the parts affected may be anointed with it twice or thrice a day.

A liniment for the piles may be made by mixing two ounces of emollient ointment, and half an ounce of liquid laudanum, with the yolk of an egg, and working them well together.

LINING, in *Canal-Making*, signifies a thickness or coat of puddle, sometimes applied to the bottoms and sides of canals, to prevent them from leaking, as *qrst*, *Plate I. Canals*, *fig. 15*.

LINING of Hot-beds, in *Gardening*, is the art or practice of applying a proper layer of hot dung to the sides of the beds, to revive and keep up the declining heat of them. It is essentially necessary, in the culture of plants on dung hot-beds, in the early seasons in winter or spring, until May. As these hot-beds generally, in from three or four to five or six weeks, according to their substance, begin to decline in their degree of heat, they require of course a revival to continue them in regular heat; which, in dung hot-beds, can only be effected in this manner. It is applied to one or both sides, as there may be occasion, or as heat may be wanted.

Hence in this way, by the occasional repetition of two, three, or more linings, a hot-bed may be continued in a proper degree of heat several months, as exemplified in early cucumber and melon hot-beds; which, without the aid of occasional

occasional linings, would not retain sufficient heat to forward their respective plants, &c. to proper perfection.

The dung for this purpose should be of the best fresh horse stable kind, moist and full of a steamy lively heat, being prepared in the manner described under *Hot-Bed*, and in proper quantity to make the lining substantial, as 15 or 18 inches wide, and as high as the dung of the hot-bed; as, when too slender, they do not effect the intended purpose, especially in early beds, or when the heat is considerably decreased.

And in early hot-bed work, care should be taken, according to the extent of the bed or beds and season of the year, to allot and reserve a sufficiency of dung for linings: early beds in very cold weather will generally require more substantial and frequent linings than later made beds in the advanced spring months; and some hot-beds, for slight or temporary uses, just to raise plants for two or three weeks, will sometimes require but very little or no linings. Hot-beds made late, as in the beginning or any time in May, will need but very trifling linings, or some not at all, except in particular uses, as when plants are rather backward in growth, the weather cold, and the bed declined much in heat, when, probably, even in May, or beginning of June, a final moderate lining may become necessary.

It is necessary that the requisite linings should always be applied to the respective hot-beds in proper time, which may be ascertained by examining the state of heat; not letting them decline too considerably before they are applied, but to continue always a moderately lively heat, but never violent. Linings are sometimes applied by degrees, raising them only half-way at first; adding more in height in a few days, and thus proceeding till they are raised to the height of the hot-beds.

And in application of linings, it is generally necessary to line only one side at a time, commonly the back part of the bed first; and in a week or fortnight after, to line the front side, and both ends, if necessary; or in particular cases of the hot-bed having suddenly declined, or been permitted to decrease very considerably in heat before applying the lining, to line both sides moderately at once, about 12 or 15 inches in width, but only as high as the dung of the bed at first; being afterwards a little augmented by degrees, according as the dung of the lining settles.

The general requisite thickness or substance of the linings is from 12 to 15 or 18 inches width in dung, and as high as the dung of the bed, or sometimes a few inches higher; but for early beds of cucumbers, melons, or other plants of long continuance in hot-beds, they should generally be laid from 15 to 18 inches in width at bottom, as conceived necessary, narrowing the width gradually upwards to 8, 10, or 12 inches at top, which may be raised at once to the full height of the dung of the bed, or a few inches higher up the side of the frame, to allow for settling: but with a strong lining, great caution should be used in raising it much above the dung of the hot-bed, especially when made of very strong, hot, steamy dung, for fear either of its throwing in a too strong heat above to burn the internal earth of the bed, or imparting a copious rank steam to penetrate within the frame, which would steam-scald the tender plants which may be contained therein.

As soon as the linings are raised to the intended height, it is proper in general to lay a stratum of earth at top two inches thick, close up to the bed or bottom part of the frame, sloping a little outward to throw off the fallow wet of rain, snow, &c.; which top-covering of earth is essential, both to keep the heat of the linings from escaping too considerably above, in order that it may be directed more ef-

fectually to its intended purpose of imparting its whole principal heat internally to the revival of that of the bed, and prevent the strong steam arising immediately from the rank dung from entering the frame at bottom, or through any small crevice, or at top, when the lights are occasionally raised for the admission of fresh air; as the rank dung steam thus produced, without being moderated and corrected by first passing through a stratum of earth, if it should enter within the frame considerably, would prove very pernicious to most plants, and be the total destruction of some particular kinds.

And constant care must be taken, that as the heat of the linings declines to any extent, they must, as just noticed, be renewed by a supply of fresh hot dung. This may sometimes be effected by turning over, and shaking up the same dung mixedly together, directly forming it again into a lining: or some of the best or least decayed or exhausted parts of the old lining may only be used, mixing it up properly with a good supply of new dung, applying it immediately in a proper substantial lining as before. In either of these ways, fresh air is entangled, by which a new fermentation and heat is brought on. However, where the dung of the linings is greatly exhausted, fresh dung should mostly be used in the renewal of the heat.

And linings of hot dung are sometimes used substantially, in working some sorts of forcing-frames, in raising early flowers and fruits, by applying the dung against the back of the frame, two or three feet in width at bottom, narrowing gradually to a foot and a half, or less, at the top, raising the whole according to the height of the frame, from four or five to six or seven feet; which heating considerably against the whole back of the frame, communicates the heat internally, by which the different plants are forwarded to early production; supporting the internal heat by renewing the linings, as already directed. See *Forcing-Frames*, and *Garden-FRAME*.

Linings of dung are also sometimes used in supporting the heat of nursery hot-beds for young pine-apple plants, and some other exotics of the hot-house or stove, both in dung and tan-bark hot-beds, under proper frames and glasses; as well as those wintered in these detached hot-beds distinct from the hot-house, &c. in which a constant regular heat, almost equal to that of the stove, must be supported; so that, when the natural heat of the bed is on the decline, a strong lining of hot dung must be applied, half a yard or two feet wide below, narrowing moderately upward, and continued on both sides occasionally: and as the heat of them subsides, it must be immediately renewed by a supply of fresh dung, either worked up with the best of that of the declined dung; or, if this be too much decayed, wholly of new: and thus the hot-beds maintained in a proper degree of heat from the autumn until the spring season, when they become unnecessary.

And the decayed dung of the different linings, when done with, becomes excellent manure for the kitchen-garden departments.

LINING, in *Map-Making*, denotes the marking of the length, breadth, or depth of any thing, according to design, by a cord, rubbed with white or red chalk, fastened at the extremities, and forcibly pulled up in the middle, or towards one end, then let fall perpendicularly, if meant to be straight, or thrown sideways to form a curve. Accuracy in the later performance requires practice.

LININGS, in *Sail-Making*, signify the canvas sewed on the backs and middle of a sail, to strengthen it.

LINITAN, in *Geography*, a small island in the East

India.

Indian sea, five miles north from the island of Serangan, to which it belongs. S. lat. 5° 36'. E. long. 125° 21'.

LIN-KIANG, a city of China, of the first class, in the province of Kiang-ni, situated on the banks of the river Yu-ho. Its soil is good, and the climate is healthful; but it is so much deserted that the Chinese say, "one hog would be sufficient to maintain the whole city two days." Four cities of the third class belong to its district. One of its villages is the general mart for all the drugs sold in the empire; and this circumstance gives it some degree of celebrity. N. lat. 27° 58'. E. long. 115°.

LINKLO, in *Botany*, a kind of water-plant among the Chinese, the fruit of which is of a triangular pyramidal form, prominent every way, with a green thick rind, that grows reddish towards the apex, and, when the fruit is dried, grows black. The internal substance is exceeding white, its taste like that of the chestnut, three or four of which it equals in bulk. The plant is found in standing waters, and has very slender leaves, that spread themselves over a large extent on the surface of the water, and the fruit lies concealed under water in great numbers.

LINKÖPING, in *Geography*, a small and neat town of Sweden, in East Gotland, situated on the river Stöng, near lake Roxen; containing an episcopal palace, a cathedral, and the house which is the residence of the governor of East Gotland. It has three churches and a public seminary; 96 miles S.W. from Stockholm. N. lat. 58° 26'. E. long. 15° 18'.

LINKNESS, a cape of Scotland, on the N.W. coast of the island of Stronfa; 1½ mile S.W. of Huipness. N. lat. 59° 4'. E. long. 0° 26'.

LINLEY, JOHN, in *Biography*, an eminent music professor and organist, long resident at Bath, where he had served an apprenticeship under Chilcot, the organist of that city. Linley loved music, was a studious man, equally versed in the theory and practice of his art. Having a large family of children, in whom he found the seeds of genius had been planted by nature, and the gift of voice, which, in order to cultivate, he pointed his studies to singing, and became the best singing master of his time, if we may judge by the specimens of his success in his own family. He was not only a masterly player on the organ and harpsichord, but a good composer, as his elegies and several compositions for Drury-lane theatre evinced. His son, Thomas, who was placed under Nardini at Florence, the celebrated disciple of Tartini, was a fine performer on the violin, with a talent for composition; which, if he had lived to develope, would have given longevity to his fame. Being at Grimthorpe, in Lincolnshire, at the feat of the duke of Ancaster, where he often amused himself in rowing, fishing, and sailing in a boat on a piece of water, in a squall of wind, or by some accident, the boat was overset, and this amiable and promising youth was drowned at an early age, to the great affliction of his family and friends, particularly his matchless sister, Mrs. Sheridan, whom this calamity rendered miserable for a long time; during which, her affection and grief were distilled in verses of the most sweet and affecting kind on the sorrowful event. The beauty, talents, and mental endowments of this "Sancta Cecilia rediviva," will be remembered to the last hour of all who heard, or even saw and conversed with her. The tone of her voice and expressive manner of singing were as enchanting as her countenance and conversation. In her singing, with a melodious toned voice, a perfect shake and intonation, she was possessed of the double power of delighting an audience equally in pathetic strains, and songs of brilliant execution, which is allowed to very few singers. When she had heard the Agujuri, and the Danzi, afterwards Madame

Le Brun, she astonished all hearers by performing their bravura airs, extending the natural compass of her voice a fourth above the highest note of the harpsichord, before additional keys were in fashion. Mrs. Sheridan died at Bristol in 1792.

Mrs. Tickel, her sister, was but little inferior to her in beauty and talents, and Mr. Linley's other daughters continued to excite the admiration of all who knew them, in a manner worthy of the family from which they sprung.

Mr. Linley, the father of this nest of nightingales, from being assistant manager of Drury-lane theatre, lived to become joint patentee, and, for some time, sole acting manager; in which capacity, he gave more satisfaction, and escaped censure, public and private, by his probity and steady conduct, more than is often allowed to the governor of such a numerous and forward family. This worthy and ingenious man died November 1795.

LINLITHGOW, in *Geography*, a royal borough and county town of Linlithgowshire, or West-Lothian, Scotland. It is situated on the road between Edinburgh and Stirling, at the distance of 16 miles from the metropolis. This town has claims to considerable celebrity, both on account of the connection of its history with some of the most important transactions of the kingdom, and of the noble remains of former magnificence with which it is adorned. As the reader will find mentioned in the following article, the name of this place is purely of British origin, and peculiarly descriptive in its application. During the reign of David I., Linlithgow formed a part of the royal demesnes, and had a castle and a grange, at which that monarch and his successors frequently resided. When Alexander III. died, an event which happened before this town obtained its charter, it was governed by two bailies, as we learn from a writ addressed to them by Edward I., dated the 28th of August 1296, requiring them to make payment of some arrears, due to the king of Norway, by the firm of the town. In the year 1298, the same monarch encamped his army on the height immediately to the east of Linlithgow on the night before the battle of Falkirk, in which the celebrated patriot, sir William Wallace, was defeated through the treachery of Cumming. This town was formerly a place of very considerable commerce, opulence, and splendour, but all these advantages began gradually to decay, after the union of the two crowns, in the person of James VI. It once had an exclusive right of trade from the water of Craigh to the mouth of the Avon. Blackness castle was then assigned to it as a port, and at this place many warehouses were erected, some of which are still standing. A custom-house was likewise situated here, till removed in the last century to Borrowstowness, through the interest of the Hamilton family.

The period at which Linlithgow was first constituted a royal borough by charter is uncertain, but it has doubtless existed in that capacity from a very early period. In the reign of David I. it is declared by act of parliament one of the principal burghs of the kingdom. Since that time it has received several charters, all of which were confirmed in 1540 by a writ of *Novodamus* from James V. The government of this town at present is vested in a provost, four bailies, a dean of guild, twelve merchant counsellors, and the deacons of the eight incorporated trades. The principal manufacture now carried on is that of leather: shoemaking is a thriving business. The woollen trade is also considerable, and about a mile from the town there has lately been established a very extensive bleach field, which gives employment to nearly 300 persons.

The present condition of Linlithgow, with respect to exterior view, is much inferior to what it formerly was.

From the antiquity of many of the houses, the whole exhibits, at first sight, a ruinous and decayed appearance. There are, however, a number of good buildings still to be found. It consists chiefly of one street, extending nearly a mile in length, from east to west. This is intersected by a variety of smaller streets or lanes. The ruins of the palace stand on a rising ground, immediately overlooking the town. They are evidently the remains of a once magnificent and superb mansion. The situation of these ruins is extremely fine, and such as, in ancient times, would render it well calculated for defence. The eminence on which it is situated runs a considerable way in an extensive lake, which conduces greatly to the ornament both of the town and cattle. The first foundation upon this spot is said to have been at least coeval with the period of the Gadeni. There seems reason to believe it was afterwards the site of a Roman station. Fordun says that Edward I. erected a *pila* here in 1300. This, however, is doubtful, as it is unquestionably true that there was a royal residence here before that period, which cannot be supposed to have been unfortified in those times. It is very probable that this monarch only repaired it for his reception in 1301, previous to passing his Christmas in it, which he did that year. During the civil dissensions between Bruce and Baliol, this castle was taken by stratagem, through the means of one Binnoch or Binny, who secretly favoured the cause of Bruce. Binnoch, being accustomed to supply the fortrefs with hay, was well known, and had free access at all times. Under these circumstances he proposed to Bruce to conceal some armed men in his cart, which should be apparently loaded with hay. These being admitted, secured the guards, and made themselves masters of the place. For this service Binnoch was rewarded with some lands in the neighbourhood. In the reign of Edward III. this castle was again seized by the English. In 1424 it was destroyed by fire, as well as the greater part of the town. The name of the person by whom the former was rebuilt is unknown. It became a fixed royal residence soon after the accession of the house of Stewart to the throne of Scotland; and was several times assigned as a jointure-house to the queens of that kingdom. In October 1488, this palace was delivered to the rule of lord Hailes and Alexander Home, two of the principal leaders of the rebellion against James III., one of the mildest monarchs that ever graced a throne, whose melancholy fate every feeling heart must pity and bewail. In 1517 it was seized by Stirling and his followers, who had attempted to assassinate Melburne; but was soon afterwards retaken by assault by De la Bastie, the regent's lieutenant, when the assassins were fortunately secured. James V. resided for the most part in this palace, during his minority. The battle of Linlithgow was fought on the 4th September 1526, with the view of rescuing that prince from the domination of the earl of Angus. In this action, the earl of Lennox, the friend of James, was slain, after quarter given, by sir James Hamilton. To the last-mentioned monarch and to James VI. this palace was indebted for much of its magnificence and grandeur. Over the inside of the grand gate there formerly stood a statue of pope Julius II. with the triple crown, who sent a consecrated sword and helmet to James V. This piece of sculpture, after escaping for more than a century the fury of the reformers, ultimately fell a sacrifice to the pious zeal of a blacksmith. The whole palace is constructed of hewn stone, and covers about an acre of ground. It has in the centre a handsome square, one side of which is more modern than the others, having been built by James VI. In one portion of this building is a very superb room, 90 feet long, 30 feet 6 inches wide, and 33 high. At one end is a gallery with three arches,

probably intended for musicians. The parliament-chamber, in which the unfortunate queen Mary was born on the 8th December 1542, has likewise been an elegant apartment. The whole was kept in good repair till the year 1746, when being used as a barrack, a great part of it was accidentally burnt by the king's troops. Since that period it has been suffered to fall into ruins. The church of Linlithgow, which is appended to the palace, is a very fine building. Some of the windows are particularly beautiful. In this edifice the aisle is still shewn, in which James IV. is said to have seen an apparition, warning him of the impending fate of the battle of Flowden, in which that monarch and the flower of his nobility were slain. As there is no doubt but a person in an unusual habit did accost that prince, when attending the evening service in this aisle, it is supposed to have been a stratagem of the queen's, to dissuade him from his intended enterprize against England, which a credulous and superstitious age converted into a supernatural and prophetic admonition. The church is adorned with a handsome spire, surmounted with an imperial crown. A number of statues formerly decorated the outside, but were all destroyed by the reformers, except that of the patron of the church, the archangel St. Michael. The house from which Hamilton shot the regent Murray, in the reign of queen Mary, is still standing. This murder is one of the most deliberate recorded in the annals of history. The town-house, erected in 1668, is a commodious and elegant structure. In front, but at some distance from it, there was formerly an antique cross, ornamented with grotesque figures, and having eight spouts at different elevations, from which the water was poured. This having become much decayed, a new one, of similar construction, has lately been erected. Linlithgow anciently possessed a variety of religious establishments. In 1290 the inhabitants founded a convent of Carmelites, or White friars, on an eminence south of the town, still called Friars' Brae. St. Magdalen's on the east, situated at the foot of Pilgrim's hill, was formerly a *hospitium*, or place of entertainment for strangers. The Dominican or Black friars had likewise a monastery here. All these buildings were demolished by the earl of Argyle, lord James Stewart, and John Knox, when they visited Linlithgow in their progress of reform. Linlithgow rendered itself conspicuous by the part its inhabitants took in the grand rebellion. It had its full share in the miseries of that distracted period. The solemn league and covenant was publicly burned here, on the anniversary of the restoration in 1662, by the inhabitants themselves, without any authority from government. This town ranks as the sixth among the royal boroughs of Scotland. Since the union, it has been associated with Lanark, Selkirk, and Peebles, in the privilege of sending one representative to parliament. Winzet, the famous polemical antagonist of John Knox, was master of the Linlithgow school, when chosen by the Catholic clergy to defend their principles and rights.

The parish of Linlithgow is about five miles in length, and three in breadth: it is in general well cultivated and enclosed. Coal is abundant in different parts of it, but no pits are at present wrought. There is likewise plenty of lime-stone, but free-stone is scarce. Copper-ore has been found in one spot; and in the southern extremity there is a silver mine, which is said to have been formerly wrought to great advantage. The population of the whole parish, according to the parliamentary returns of 1801, amounted to 3594 persons; the houses were estimated at 746. Sinclair's Statistical Account of Scotland.

LINLITHGOWSHIRE, or WEST Lothian, a county on the southern shore of the Frith of Forth in Scotland.

LINLITHGOWSHIRE.

land. It is separated from Edinburghshire on the east and south-east by the rivulets Priece and Amow, except at Mid-cadder, where the latter county intrudes somewhat more than a mile into Linlithgowshire. On the west it is divided from Stirlingshire, first by the Linn-burn, and after its junction with the Avon, by that river, till it discharges itself into the Forth. A part of Lanarkshire forms the boundary on the south-west, while the waters of the Forth wash its coast for the extent of fourteen miles on the north. The form of this county is that of an irregular triangle. Its medium breadth from north to south is little more than seven miles, and its medium length about sixteen. It contains nearly 112 square miles, or 57,008 Scottish acres. The parishes amount to 13 in number, comprising, according to the parliamentary returns of 1800, a population of 17,844 persons.

The aspect of this county, except towards the south, where it consists chiefly of moor-moats and morafs, is that of a level and well cultivated district, diversified by a variety of small hills: these are most numerous in the middle and western parts of the county. Beginning at Bowden, the more remarkable of them form a range which runs through the centre of the county in an oblique direction from north-west to south-east. In the northern district they are less elevated than towards the middle and western parts, and are more variously distributed. In general they are both useful and ornamental, nearly the whole of them affording abundant pasture; many of them being clothed with woods; and not a few of them containing valuable minerals.

Soil and Climate.—This county exhibits a great diversity of soils, as well as a variety of climate. Almost every kind of clayey soil is to be found in different parts of it. About 7000 acres are composed of light gravel and sand, and nearly the same extent of that species which is usually called loam. The high rocky land extends to about 10,000 acres, and the moor to somewhat better than 1000. Such parts of this county as border on the Forth, have a temperate and an excellent climate. The upper or south-western part, however, is not so much favoured. Its elevated situation with the proximity of the moors and moorlands, either in this county or the neighbouring one of Lanark, render it bleak and damp during the greater part of the year.

The lands of this county are possessed by between thirty and forty landholders whose estates vary from 2000 to 60000 *per ann. val.* besides a few of inferior rental. About a third part of the county consists of wood and pasture lands, or is laid down with artificial grasses. The cause of this great proportion of pasture grass seems to be the vicinity of Edinburgh. The agriculture of this county is similar to that of the other Lothians. The upper portions are the poorest, but even in the highest moors of that district, art and industry are making rapid changes and improvements. The grub-worm is perhaps more destructive in this than in most other counties. This insect generally begins its depredations in May or June, especially if the lands have been formerly in grass, or over-run with moss, and the crops are blighted which is apt to be the case, from the dry east winds which prevail during these months. Not above one-sixth of the whole county remains uncultivated. Great attention is paid to the forming of plantations, particularly in the neighbourhood of gentlemen's seats, which tend in no small degree to enliven the scenery of this cultivated district. The shores of the Forth are peculiarly ornamented both by nature and art. Bowden park, the seat of the earl of Roseberry, is laid out with plantations, formed in the very best taste, and in a manner well calculated to shelter the soil, and exhibit the aspect of the country around to great advantage. On

the coast, Linlithgowshire rises suddenly into a ridge adorned by culture and well wooded. From hence westward by the ancient seat of the Dundas family, and by Hopetoun-house, a series of views are to be met with not inferior to any in the kingdom. The scenery in the immediate neighbourhood of Queensferry is peculiarly fine, the Forth here forming a narrow strait, which expands suddenly on both sides into an extensive bay, with richly ornamented banks. At various points of the coast the views are different, the water assuming the appearance of a lake, a noble river or broad sea, according to the situation from which it is seen. In one spot, a little distance from the shore, stands Hopetoun-house, one of the most superb and magnificent seats in this kingdom. It is situated on a noble and extensive lawn, stretching to the distance of more than a mile from the front of the house, and forming a sort of terrace along the banks of the Forth, which winds round it, and presents the view of a wide extensive lake, interspersed with islands, and enlivened by a variety of shipping. Behind the house the ground is more various, breaking into hills, vallies, and promontories, which shoot into the Forth. To a considerable distance the grounds seem well wooded and enclosed; the house itself is flanked with a noble plantation, which serves to shelter it from the northern blasts. At the extremities of this vast and magnificent scenery a variety of mountains arise of different forms and at different distances. In short, every thing the eye can contemplate in the whole scene, or its appendages, is great and noble. The situation of the house, and its architecture, are also equally objects of admiration. It was planned and begun by the celebrated architect Sir William Bruce, and finished by Mr. Adams. Some of the apartments are grand and spacious, but they are in general of moderate size, which is perhaps the only defect of its contrivance. It abounds with paintings.

With the exception of free-stone and coals, there are no minerals of any importance in the county. In the Balligat-hills there was formerly a valuable lead mine, but being now fought in vain is supposed to be exhausted. A free-stone quarry, in the neighbourhood of Queensferry, is one of the finest in the kingdom. More than three acres have been already excavated. This stone is exported in great quantity, both as materials for building, and in the shape of grinding-stones. Coal abounds in different parts of the county; but is chiefly wrought in the neighbourhood of Borrowstoness. Here is one of the most extraordinary coal mines in the world: it extends under the Forth half way across. Formerly there was a building, or moat, about half a mile from the shore, where there was an entry down into the pit formed under the sea. This building being in the shape of a quay, vessels were brought along side of it, and loaded with the coals raised from the pit and deposited here. This mine was extremely profitable, but at last an unexampled high tide overwhelmed the whole, before the colliers could effect their escape. This did not discourage the daring adventurers. A new mine was opened, and continues to be wrought at this day to a great extent. For the purpose of rendering the coal in the upper parts of this county more extensively useful, it has been proposed to cut a canal from Glasgow to Edinburgh, which might likewise bring to the eastward, at a cheap rate, a portion of the treasures contained in the hills of Lanarkshire. To these useful productions of the mineral description in this county, may be added iron-stone, whin-stone, grey granite, and shell marl. On the south side of Dundas-hill is a basaltic rock, 250 yards in length, and 60 or 70 feet high. The masses are in an irregular state, formed like pillars, separated by channels; but not a few of them exhibit regular

lar and well defined prisms. The stone of which these are composed is of a light bluish colour.

The royal boroughs in this county are Linlithgow and Queensferry. The former is the shire town, and situated in the interior of the county. The latter stands on the coast of the Forth, about nine miles west from Edinburgh. It was formerly of more importance than at present; it being now totally destitute of trade. A particular account of these boroughs will be found under their respective names.

Borrowstowness, or Bo-ness, is the principal sea-port town in this county. It is a borough of barony, governed by a bailiff appointed by the duke of Hamilton. The houses in this place are low and crowded, and much injured in appearance, by the smoke of the numerous salt pans with which it abounds. The produce of these pans, and of the coal-works in the neighbourhood, are the chief articles of export from this town. The harbour is considered very safe. About thirty sail of shipping belong to persons resident on the spot. Many others frequent this harbour in the course of trade. The imports are usually tallow, hemp, timber, flax, and flax-seed. The herring-fishery is carried on here, but, being hazardous and precarious, scarcely deserves notice in mentioning the commerce of this port. Kineel house, belonging to the duke of Hamilton, is beautifully situated on the shore of the Forth, not far from the town. The village of Bathgate stands on the southern declivity of the hills which bear its name, and form a part of the range already mentioned, as running through the centre of the county. Here, as well as in the village of Whitburn, situated on the most southern road between Edinburgh and Glasgow, a number of weavers are employed by the Glasgow manufacturers. At present neither of these places is of much importance: but is the event of the proposed canal, formerly noticed, being carried into effect, it is not improbable they would soon rise into considerable distinction. Besides these, there are few other villages in this county which do not, however, require particular notice.

Among the antiquities of this county is the termination of the celebrated Roman barrier, or wall of Antoninus. It enters Linlithgowshire near the village of Inner Avon, and proceeds by Kineel house to the village of Carriden, behind the church of which, it is probable, the last or nineteenth fort, counting from the Clyde, was stationed, though no remains of the work can now be discovered beyond the inclosures of Grange. Two miles east from Carriden, and one and three quarters west from Abercorn, is Blacknefs castle, which, from its situation with regard to the wall, seems not improbably to have been the Roman port on the Forth. In Abercorn parish, on a point north-east from the church, Abercorn castle was formerly situated. It was one of the strong holds of the Douglasses, and was taken by storm, after a long siege, by James II. during his contest with that family. After this it was never repaired, and Buchanan mentions it as a ruin in his time. The most ancient monastery in Scotland was situated here, as we learn from the venerable Bede, after whose time it is not mentioned in history. In Torphechen parish was a house for the knights of St. John; it was founded by king David I. This preceptory was a place of refuge, or sanctuary. In the church-yard is a stone with a St. John's cross on it, and four similar ones at the distance of a mile each. This parish is also distinguished by four great stones, situated about a mile east of the village, which are said to have been a Druidical temple. In Kirkliston parish is another remarkable stone, known to the inhabitants by the name of the *Cat Stone*. It is four feet and a half high, and eleven feet

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and a half in circumference. The form is that of an irregular prism. On one side is the following inscription, rudely, but deeply, cut, the explanation of which has puzzled many antiquaries. "IN OC. TUMVLO JACI UETTA DUCTA." The church of Dalmeny may likewise be ranked among the antiquities of this county. Concerning the date of its erection nothing is known. Its architecture is of that middle fort which has received the appellation of Saxon. It is a small building, apparently with Grecian windows, but upon investigation, the shafts are found to be disproportionate. The eastern portion of this church is vaulted with semicircular arches, having mouldings chiefly in the form of stars and other decorations. Sinclair's Statistical Account of Scotland. Chalmer's Caledonia.

LINNÆA, in *Botany*, so called in honour of the great Swedish naturalist, (see LINNÆUS,) appears by the journal of his Tour to Lapland to have been chosen by himself to commemorate his own name, when he gathered it at Lykfele, May 29, 1732. Former botanists had called this elegant and singular little plant *Campanula serpyllifolia*; but Linnæus, prosecuting the study of vegetables on the only certain principles, the structure of their parts of fructification, soon found this to constitute a new genus. He reserved the idea in his own breast, till his discoveries and publications had entitled him to botanical commemoration, and his friend Gronovius, in due time, undertook to make this genus known to the world. It was published by Linnæus himself in the *Genera Plantarum*, ed. 1, in 1737, and the same year in the *Flora Lapponica*, with a plate, being moreover mentioned in the *Critica Botanica*, p. 80, as "a humble, despised, and neglected Lapland plant, flowering at an early age," like the person whose name it bears. Linn. Gen. 319. Schreb. 418. Willd. Sp. Pl. v. 3. 340. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 606. Juss. 211. Lamarck Illustr. t. 536. — Class and order, *Didynamia Angiospermia*. Nat. Ord. *Aggregate*. Linn. *Caprifolia*, Juss.

Gen. Ch. Cal. Perianth double; that of the fruit inferior, of two or four leaves; the outermost of which are opposite and minate; the others elliptical, concave, erect, hispid, closed around the germen, permanent: that of the flower (the proper one) superior, of one leaf, in five erect, narrow, acute, equal, deep segments. Cor. of one petal, above twice as long as its perianth, bell-shaped, its border in five rather deep, obtuse, nearly equal divisions. Stam. Filaments four, awl-shaped, inserted into the bottom of the corolla, two of them much the smallest; anthers compressed, versatile. Pist. Germen roundish, interior; style thread-shaped, straight, the length of the corolla, inclining; stigma globose. Peric. Berry dry, ovate, of three cells, clothed with the hispid glutinous perianth of the fruit, deciduous. Seeds roundish, two in each cell.

Eff. Ch. Calyx double; that of the fruit of two or four leaves; that of the flower superior, in five deep divisions. Corolla bell-shaped. Berry dry, of three cells.

Obs. The two outer or smaller leaves of the inferior calyx are often wanting. When present they are like the inner ones in shape, though smaller in size, and stand like them close to the germen, being totally distinct from the bractæ, which are a little remote from them, lanceolate and acute.

1. *L. Lorealis*. Linn Sp. Pl. 880. Fl. Suec. 210. t. 1. Fl. Lapp. ed. 2. 214. t. 12. f. 4. Engl. Bot. t. 433. Fl. Dan. t. 3. (*Campanula serpyllifolia*; Bauh. Prodr. 35.)—Native of dry stony mossy ancient fir woods, in Sweden, Siberia, Russia, Switzerland, Scotland, and North America, flowering in May and June. Linnæus describes it in his Lapland Tour, v. 1. 20, as clothing masses of stones,

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being

being interwoven with ivy, in a picturesque manner. It was first discovered in Britain, June 2d, 1795, by the late professor James Beattie of Aberdeen, in an old fir wood at Mearns in that county.

The *root* is fibrous and perennial. *Stems* trailing, creeping, perennial, woody, round, leafy, somewhat hairy, often reddish, a little branched, very long and slender. *Leaves* evergreen, opposite, stalked, roundish or ovate, veiny, crenate in the fore-part, paler beneath, bearing a few scattered hairs on the upper side. Flowering *branches* erect, three or four inches high, with a pair or two of leaves near the bottom, naked above, terminating in two equal flower-stalks, with a pair of small leaves at their origin, and each bearing one drooping *flower*, accompanied by two small, lanceolate, slightly remote, opposite *bracts*, which, like the stalks, calyx and germen, are clothed with glandular viscid hairs. The *flowers* are of a delicate pink, especially within, being pale white or yellowish externally. They are said in the *Flora Suecica* to be very fragrant at night, smelling like Meadow-sweet. An infusion of the leaves, with milk, is esteemed a specific, among the Swedes, in rheumatic and febrile disorders. The inhabitants of Weß Bothnia cure painful complaints in the feet of their sheep, with a cataplasm or fomentation made of this herb. The smoke of it when burnt is thought by the Norwegians beneficial in the scarlet fever, and its decoction in the itch.

This is the only known species of *Linnaea*. The right honourable sir Joseph Banks is possessed of a drawing, made by an artist who was employed many years ago to delineate plants in the East Indies, which represents a plant answering to the same generic characters, but of which no specimens having ever been seen, the drawing is supposed to be a forgery. The younger Linnaeus, when in England, was much interested by the sight of it, but endeavoured in vain to ascertain its truth.

LINNEAN System of Botany. See BOTANY, FLOWERS, and SEXUAL System.

LINNÆUS, CHARLES, afterwards *VON LINNÉ*, in *Bio-graphy*, the most eminent of modern naturalists, whose labours and abilities rendered his favourite science of Botany first more phil. sophical, and then more popular, than it had ever been in any other age, was born at Råshult, in the province of Småland, in Sweden, May 13th, old style, 1707. His father Nicholas Linnaeus was assistant minister of the parish of Stenbrohult, to which the hamlet of Råshult belongs, and became in process of time its pastor or rector; having married Christina Broderfson, the daughter of his predecessor. The subject of our memoir was their first-born child. The family of Linnaeus had been peasants, but some of them, early in the 17th century, had followed literary pursuits. In the beginning of that century regular and hereditary surnames were first adopted in Sweden, on which occasion literary men often chose one of Latin or Greek derivation and structure, retaining the termination proper to the learned languages, as Melander, even when the name itself was not taken from thence, as Retzius. A remarkable Linden-tree, *Tilia europæa*, growing near the place of their residence, is reported to have given origin to the names of Lindelius and Tiliander, in some branches of this family; but the above-mentioned Nicholas is said to have first taken that of Linnaeus, by which his son became so extensively known. Of the taste which laid the foundation of his happiness as well as his celebrity, this worthy father was the primary cause. Residing in a delightful spot, on the banks of a fine lake, surrounded by hills and valleys, woods and cultivated ground, his garden and his fields yielded him both amusement and profit, and his infant son

imbibed, under his auspices, that pure and ardent love of nature for its own sake, with that habitual exercise of the mind in observation and activity, which ever after marked his character, and which were enhanced by a rectitude of principle, an elevation of devotional taste, a warmth of feeling, and an amiableness of manners, rarely united in those who so transcendently excel in any branch of philosophy or science, because the cultivation of the heart does by no means so constantly as it ought keep pace with that of the understanding. The maternal uncle of Nicholas Linnaeus, Sveno Tiliander, who had educated him with his own children, was also fond of plants and of gardening, so that these tastes were in some measure hereditary. The young Charles, as he tells us himself, was no sooner out of his cradle, than he almost lived in his father's garden. He was scarcely four years old when he heard his father descant, to a rural party, on the distinctions and qualities of some particular plants, culled from the flowery turf on which they were seated, and this first botanical lecture was ever after remembered as an epocha in his scientific life. He never ceased to enquire of his father concerning the names and properties of all the productions of the garden and the fields, that he could possibly procure; nor did the economy of insects, even at this early period, escape his attention. His youthful inaptitude for retaining the names of natural objects, sometimes tired and displeased his instructor, whose wholesome authority in time corrected this defect, and perhaps early prevented his falling into the error of those desultory speculators of nature, who have agreed to despise that methodical and didactic precision of ideas, which, for want of early discipline, they could never attain. The memory of Linnaeus, indeed, like his powers of perception, was naturally good, and his sight was always remarkably acute. The vivacity and brilliant expression of his eyes are said to have lasted through life, and indeed are displayed in most of his portraits.

These flowery studies however were obliged to give way, in some measure, to less agreeable occupations, and unhappily the private tutor proved a man of less winning manners than the beloved parent. Thus at seven years of age grammar had but an unequal contest with botany in the mind of the young student. Nor was he much more fortunate when removed in 1717 to the grammar-school of Wexio, the master of which, as his disgusted pupil relates, "preferred stripes and punishments to admonitions and encouragements." Such a system was near extinguishing all the talents it was intended to cultivate, and when the youth was committed, two years afterwards, to the care of a more judicious and amiable private tutor than before, the horrors of the rod seem still to have predominated over his taste for learning. In 1722 he proved competent, nevertheless, to be admitted to a higher form in the school, and his drier studies were now allowed to be intermixed and sweetened with the recreations of botany. In 1724, being 17 years of age, he was removed to the superior seminary, or *Gymnasium*, and his destination was fixed for the church. But the original inclinations of his mind, and its early prejudices, here grew but the more apparent. He had no taste for Greek or Hebrew, ethics, metaphysics or theology; but he devoted himself with success to mathematics, natural philosophy, and a scientific pursuit of his darling botany. The *Chloris Gothica* of Bromelius, and *Hortus Upsalensis* of Rudbeck, which made a part of his little library, were calculated rather to fire than to satisfy his curiosity; while his Palmberg and Tillands might make him sensible how much more than they had accomplished still remained to be done. His own copies of these books, used with the utmost care and neatness, are

now before us. His literary reputation however made so little progress, that, when his father paid a visit to Wexio, in 1726, his tutors, like the sapient instructors of Newton at Cambridge, gave him up as a hopeless dunce. They advised that he should be put apprentice to a shoemaker, tailor, or some other handicraft trade, rather than be forced to pursue an object, for which he was evidently unfit. Fortunately, the disappointed parent met with a better counsellor in Dr. Rothmann, the lecturer on natural philosophy, who encouraged him to hope much from the inclination of his son to natural knowledge and practical observation, and recommended that he should be directed to the study of medicine. This good advice was supported with the gratuitous offer of taking the young man into his own house, for the year during which he was still to remain at the *Gymnasium*, which was gladly accepted. The worthy preceptor gave his pupil a private course of instruction in physiology on the Boerhaavian principles, and was rewarded by the success of his endeavours. He first suggested to Linnæus the true principles upon which botany ought to be studied, founded on the parts of fructification, and put the system of Tournefort into his hands, in the knowledge of which he made a rapid progress. Its very imperfections proved useful, in prompting him to attempt something more complete hereafter.

In 1727 Linnæus was matriculated at the university of Lund, having, on the 19th of August, undergone with credit the examination of the Dean, and even of the Professor of Eloquence, Papke. He devoted himself to the study of medicine, lodging at the house of a physician, Dr. Stobæus, whose library and museum of natural history, afforded the greatest delight and assistance to his ardent mind, and the study of which often robbed him of several hours of his natural repose. In the same house was a German student named Koules, eager like himself for instruction, and their friendship was mutually beneficial. Dr. Stobæus being infirm in health and spirits, Linnæus was allowed to relieve him occasionally from the labours of his profession, and soon became a great favourite. While botanizing in the country, in the spring of 1728, our young naturalist met with that accident, whatever it was, which he always attributed to the sting or bite of his supposed *Furia infernalis*, an animal whose existence has been doubted by many persons, and by some positively denied. We need not here repeat what is said under the article *FURIA*. His pupil Solander has recorded several cases of this accident or disease, and describes the animal as if he had seen it, in the *Nova Acta Upsalienfis*, v. 1. 55. In the ensuing summer Linnæus passed the vacation under his paternal roof. Here he met with his former patron Rothmann, by whose advice he was induced to quit Lund for Upsal, as a superior school of medicine and botany. But the slender support which his father could afford him, a capital of about \$7 sterling, being totally inadequate, he was, in this new situation, reduced to the greatest necessity. Private pupils were not to be procured by a poor unknown student. He was obliged to trust for chance to a meal; and when he relates that he had no way of mending his shoes but by folded paper, seems to have felt the want even of the cobbler's education which had been recommended to him. He had offended his old friend Stobæus by quitting Lund, and though he had brought with him a splendid Latin testimonial, from the Rector of that university, in which he was called *Pellissimus ornatusque dominus*, and was declared "to have conducted himself with no less diligence than correctness, so as to gain the affection of all who knew him," he seems to have obtained nothing more than a royal scholarship, which was conferred

upon him on the 16th of December, but of the value of which we are not informed. It appears however by the above account to have been totally insufficient for his maintenance. He nevertheless did not relax in his studies; but attended the lectures of the younger Rudbeck, then Professor at Upsal, as well as the medical ones of Professor Reberg; and made critical manuscript remarks upon all that he saw and heard.

In the autumn of 1729 his botanical taste and application raised up for him a new and very estimable patron, in the learned Dr. Olaus Celsius, Professor of Divinity, who met with him by chance in that academical garden, the fame of which he was destined hereafter to immortalize. This gentleman had then been intent, for above 30 years, upon the illustration of the plants mentioned in the Holy Scriptures, on which he published a very celebrated work in 1745, having travelled to the East on purpose to render it more perfect. He soon discovered the merit of Linnæus, took him under his protection, and allowed him the full use of his own rich library. The friendship of such a man soon procured him further advantages. The son of Professor Rudbeck, and other young men, became his private pupils, by which his finances were improved. Nothing however seems to have been recollected with so much satisfaction to himself, in relating the events of this part of his life, as his intimate scientific friendship with Peter Artedius, who afterwards called himself Artedi, and became to famous in the knowledge of fishes and of umbelliferous plants. They passed some time together subsequently in Holland, when Linnæus witnessed the melancholy fate of his friend, who was accidentally drowned at Amsterdam; of which he has prefixed so pathetic an account to the *Ichthyologia* of Artedi, published by his means.

During his studies, under the roof of Celsius, Linnæus met with a review of Vaillant's treatise on the Sexes of Plants, which first led him to consider the importance, and great varieties of form, of the stamens and pistils, and thence to form a new scheme of arrangement founded on those essential organs. He drew up an essay in opposition to the librarian of the university, who had published a work *de Nuptiis Plantarum*, and shewed it to Celsius, who communicated it to Rudbeck, and the performance was honoured with the high approbation of both. This led the way to his being appointed to lecture in the botanic garden, as an assistant or deputy to the latter, whose advanced age rendered some relaxation necessary. The lectures of Linnæus began in the spring of 1730. He had previously solicited from the Professor the humble appointment of gardener to the university, which was refused, only on the ground of his being fit for a better situation. Now finding himself authorized to take the direction of the garden, he reformed and greatly enriched it. He was taken into the house of Rudbeck, as tutor to his younger children, and by this means had the use of a very fine collection of books and drawings. His mornings being devoted to the duties of his station, his evenings were spent in preparing some botanical works. It was now that he began to write his *Bibliotheca Botanica*, *Classes Plantarum*, *Crucis Botanica* and *Genera Plantarum*, though these books were not given to the world till about seven years afterwards, when he printed them in Holland, during his stay there.

A new object now engaged all the attention of our emulous young naturalist. The conversations of Rudbeck, concerning the natural history of England, and the curiosities he had seen there, excited an insatiable desire in Linnæus to visit the same country. To this he was perhaps the more immediately prompted, by some little circumstances, which

made his residence at Upsal uncomfortable. These were, the jealousy of Dr. Rosen, who was ambitious of succeeding Rudbeck whenever his Professorships should become vacant, and who by his success as the only practising physician at Upsal, was likely to prove a formidable rival; as well as some domestic chagrin, which he thus relates. "The faithless wife of the librarian Norrelius lived at this time in Rudbeck's house, and by her Linnæus was made so odious to his patroness, that he could no longer stay there."—In the end of the year 1731 he retired to his native place, and soon received, from the Academy of Sciences at Upsal, an appointment to travel through Lapland, under the Royal authority, and at the expence of the Academy.

After a visit to Lund in the spring of 1732, Linnæus set out from Upsal, May 12th, on his Lapland expedition. He travelled on horseback, but slenderly provided with baggage, and after visiting the Lapland alps on foot, and descending to the coast of Norway, of which he has given a most picturesque and striking description, returned by Tornea, and the east side of the Bothnian gulf, to Abo, and so to Upsal, which he reached on the 10th of October, having performed a journey of near 4000 English miles. The particulars of his interesting expedition have lately been given to the public, in an English translation of the original journey written on the spot, illustrated with wooden cuts from his own sketches, making two octavo volumes. This document, a faithful transcript of his own mind, and written solely for his own use, gives a most amiable and respectable idea of the character and acquirements of this celebrated man, at this period of his life.

Having learned the art of assaying metals during ten days' residence at the mines of Biörknäs, near Calix, in the course of his tour, he next year gave a private course of lectures on that subject, which had never been taught at Upsal before. The jealousy of Rosen, however, still pursued him; and this rival descended so low as to procure, partly by intreaties, partly by threats, the loan of his manuscript lectures on botany, which Linnæus detected him in surreptitiously copying. Rosen had taken by the hand a young man named Wallerius, who afterwards became a distinguished mineralogist, and for whom he now procured, in opposition to Linnæus, the new place of *adjunct*, or assistant, in the medical faculty at Lund. But the basest action of Rosen, and which proved envy to be the sole source of his conduct, was, that having married the niece of the archbishop, he obtained, through his lordship's means, an order from the chancellor to prevent all private medical lectures in the university. This, for which there could be no motives but conscious inferiority and malice, deprived Linnæus of his only means of subsistence, and the students of any information which might endanger their reverence for his rival. He is said to have been so exasperated, as to have drawn his sword upon Rosen, an affront with which the latter chose to put up, as, doubtless, became the prosperous nephew of an archbishop; but Linnæus cannot be excused of having, for some time afterwards, indulged feelings of passionate resentment, and even of meditated revenge. These, however, his better principles and dispositions, after a while, entirely subdued, and Rosen, towards the close of his life, was glad of the medical aid of the man he had in vain endeavoured to crush.

Disappointed in his views of medical advancement, Linnæus turned his thoughts more immediately to the subject of mineralogy. In the end of the year 1733, he had visited some of the principal mines of Sweden, and had been introduced to Baron Reuterholm, governor of the province of Dalecar, or Dalecarlia, resident at Fahlun. This place

Linnæus has perpetuated in the memory of botanists, by his *Lichen Fahlunensis*, a production more resembling some ramification of the neighbouring copper ores, than any thing of vegetable origin. At the persuasion, as well as at the expence, of the governor, he travelled through the eastern part of Dalecarlia, accompanied by seven of his ablest pupils, and the unpublished journal of his tour exists in his library. At Fahlun he gave a course of lectures on the art of assaying, which was numerously attended, and here he first became acquainted with Browallius, then chaplain to the governor, afterwards bishop of Abo. This judicious friend advised Linnæus to take his doctor's degree, in order to pursue the practice of physic, in which he had already at Fahlun met with much success, and he further recommended him to aim at some advantageous matrimonial connection. Dr. John Moræus, a physician of the place, though at first not prepossessed in favour of our young adventurer, whose medical success had encroached on his own, allowed him to pay his addresses to his eldest daughter; but their union was for the present deferred.

In pursuit of the plan pointed out by Browallius, Linnæus, having scraped together about 15*l.* sterling, now entered on his travels, with a view of obtaining his degree at the cheapest university he could find, and of seeing as much of the learned world as his chances and means might enable him to do. In the beginning of the year 1735 he set out, after visiting his father, lately become a widower, in company with another medical student, named Sobberg. At Hamburg his skill and honesty unfortunately stood in his way. The brother of one of the burgomasters was possessed of a specimen of that reputed wonder, a Hydra with seven heads, the awe and admiration of all who beheld it, upon which its owner, in the true mercantile style, had fixed an enormous hypothetical value. His golden dream was destroyed by Linnæus, who proved the monster to be artificial.

After a stay of eight days at Amsterdam, Linnæus proceeded to Harderwyck, where, having offered himself as a candidate, and undergone the requisite examinations, he obtained his degree June 23, 1735. On this occasion he published and defended a thesis, entitled *Hypothesis Nova de Febrium Intermitantium Causâ*, in the dedication of which, to his *Mæcenates et Patronos*, it is remarkable that, among the names of Rudbeck, Rothmann, Stohæus, Moræus, &c. we find that of Rosen. The hypothesis here advanced, most correctly so denominated, is truly Boerhaavian. Intermittent fevers are supposed to be owing to fine particles of clay, taken in with the food, and lodged in the terminations of the arterial system, where they cause the symptoms of the disorder in question. If we smile at the theory, we cannot but admire the ingenuity with which it is supported, and the extent of the author's knowledge and observation; nor is the theory itself at all less respectable, than those which make a figure in the humoral pathology, universally taught at that period, by some of the greatest medical philosophers of any age.

In Holland Linnæus became acquainted with Dr. John Frederick Gronovius (see GRONOVIV.), who assisted him in publishing the first edition of the celebrated *Systema Naturæ*, consisting of eight large sheets, in the form of tables; which edition is now a great bibliothecal curiosity. He also procured access to the illustrious Boerhaave, who encouraged him to remain in Holland; but this advice could scarcely have been followed, had he not met with a patron in Burmann, of Amsterdam, who was then preparing his *Thesaurus Zeylanicus*, and who received Linnæus into his house, as his guest for some months, during which period he printed his

Fundamenta Botanica, a small octavo of 36 pages, in the form of aphorisms, which contains the very essence of botanical philosophy, and has never been superseded nor refuted. The subsequent performances of the author himself, and of his followers, have been excellent, in proportion as they have kept to the maxims of this little book. After Linnæus had been a few months under professor Burmann's roof, he was introduced by Boerhaave to Mr. George Clifford, an opulent banker, whose garden at Hartecamp was one of the richest in the world, and who thought himself happy in the opportunity of procuring such a man to study and superintend his collection, as well as to make known to the world any novelties it might contain. Linnæus was therefore removed to Hartecamp, where, as he says, "he lived like a prince," more glorious, no doubt, than an Asiatic despot, in the innumerable vegetable tribes which daily offered their homage at his feet. With an ample library, as well as garden, at his command, in both which he had unlimited powers to supply any defects that he might discover, he had now the means of cultivating his beloved science without restriction or impediment, and appears to have been truly sensible of the happiness of his lot. He now wrote and printed his admirable *Flora Lapponica*, the plates of which were supplied by the contributions of a society at Amsterdam. This work, one of the happiest literary compositions of its author, is strikingly characteristic of the state of his mind at the time it was written. It is redundant in observation and reflection, on every subject which could be interwoven with its professed object, conveyed in the most engaging style; a style independent of studied phraseology, flowing directly from the heart, and deriving its principal charm from the delight which the author takes in what he has to communicate. The enthusiasm with which his imagination retraces every idea of his Lapland expedition, turns the wild scenes of that country, even in the mind of his reader, into a paradise, inhabited by all that is innocent and good. His effusions resemble the longings of an exiled Swiss; and are in fact incipient symptoms of that oppression of the heart, which, after a while, rendered his abode in Holland, with all its scientific charms, no longer tolerable, to one born in the purer air of Sweden, and nurtured amongst her Lapland alps.

The prosperous condition of Linnæus, under the patronage of Mr. Clifford, afforded him much more than a selfish gratification, when he met with his old friend Artdi, at Amsterdam, destitute of the means of prosecuting his studies, obtaining his degree, or even of supporting himself with credit or decency. "He had spent all his money in London;" an accident not peculiar to a poor Swedish student; and would now have been destitute but for the exertions of his friend, who recommended him to Seba, to whom the learning and abilities of Artdi were peculiarly serviceable, in completing the third volume of his magnificent *Thesaurus*, chiefly devoted to fishes. We have already alluded to the unfortunate catastrophe of this young man, and a short sketch of his life is given in its proper place. See ARTEDE.

In 1736, after having written his *Musa Cliffortiana*, Linnæus was sent by Mr. Clifford to England, and was introduced to the lovers and teachers of natural science, at Oxford and London more especially. Of his reception from the Sherardian Professor, we have already spoken. (See DILLENIUS.) He was strongly recommended by Boerhaave, in a letter which still exists, to sir Hans Sloane; but this indefatigable collector neither understood nor cared for these improvements in botanic science which he might have learned from his visitor. Linnæus found more intel-

ligent and communicative friends in Dr. Shaw, the oriental traveller, professor Martyn the elder, the well-known Philip Miller, and the celebrated Peter Collinson. (See COLLINSON.) These men of true science admired his genius and valued his friendship; they promoted his wishes by every means in their power, enriching him with books; and supplying him plentifully with plants, both for his own herbarium, and the garden of his patron at Hartecamp. He was much struck with what he saw of London, and has celebrated it in an expression which has often been repeated, calling this famous city the "*pneûm saliens in vitello orbis*." Of his observations on the natural history of this country, nothing is preserved but a tradition, that the golden bloom of the furze on the commons near London, especially Putney-heath, delighted him so much, that he fell on his knees in a rapture at the sight. He was always an admirer of this plant, and laboured in vain to preserve it through a Swedish winter in his greenhouse; as we in England are obliged to shelter the Cape shrub in a stove, though it covers walls in the open air at Paris.

On his return to Holland, he continued the impression of his *Genera Plantarum*, which appeared in 1737. In October, 1736, he was made a member of the Imperial Academy *Natura Curiosorum*, by the title, according to the custom of that body, of Dioscorides secundus. He was now tempted by Boerhaave to undertake a botanical expedition to the Cape of Good Hope and to America, at the public expence, and flattered with the expectation of a Professorship in Holland at his return; but he neither chose to encounter the hazards of the undertaking, nor to give up his prospects at home. He would not however leave the benefactor to whom he owed so much, till he had accomplished all that was to be expected from him. He printed in 1737 the *Viridarium Cliffortianum*, an octavo catalogue of his friend's garden, disposed according to his own sexual system; of which he published, later in the same year, at Leyden, an exemplification under the title of *Methodus Sexualis*, in which all the known genera of plants are so arranged by name only. This year also produced his magnificent *Hortus Cliffortianus*, in folio, in which all the plants of Mr. Clifford's collection, whether living or dried, are enumerated, with many descriptions and highly interesting remarks, an almost complete detail of synonyms, and some of the most exquisite plates ever seen in any book. This splendid volume was not published, but only given away by Mr. Clifford. It was begun and completed in nine months. In the intervals of this labour the *Critica Botanica*, an octavo volume, was written and printed. This is an entertaining commentary and illustration of part of the *Fundamenta*, from section 210 to 324, relating to nomenclature and specific characters. It is a book not so much known as it deserves, being very rare. These severe labours however proved too much for the health of Linnæus, and he conceived that the autumnal air of Holland, as is very probable, did not agree with him. Though he had every luxury and indulgence at his command, and was caressed by his patron, and by all who came near him, with the most flattering attentions, he longed to return to his native country. Having left Mr. Clifford, he could not refuse his assistance for a while to Professor Adrian Van Royen at Leyden, in the arrangement and description of the garden there, which seems rather to have displeased his late patron, and not perhaps without reason, after the strong inducements he had offered to retain him. Linnæus excused himself as well as he could, and while giving his assistance to Van Royen, composed and printed the *Classes Plantarum*, which is a complete view of all the botanical systems ever known. Here also he published his friend Artdi's

Artedi's *Ichthyologia*. Boerhaave made another attempt to induce him to visit some exotic regions, offering him a medical appointment at Surinam, which it is happy he did not accept. His friend and great favourite Barfch, who was sent in his stead, fell a sacrifice to the climate, and to the neglect and ill usage he received from the governor, as Linnæus has feelingly related in his *Flora Suecica*, under the genus *Barfcha*.

Linnæus remained at Leyden till the spring of 1738, when he had an interesting interview with the great Boerhaave, then on his death bed. "I have lived out my time," said the venerable invalid. "I have done what I could, may God preserve thee, from whom the world expects much more. Farewell!" Whether the climate of Holland co-operated with dejection of spirits in our young Swede, in consequence of news he received respecting a rival in the affections of his mistress, and in the esteem of his intended father-in-law, or whether his literary labours were too unremitting, his departure was prevented by a very formidable intermittent fever. The skill of Van Swieten, and the renewed attentions of the amiable Clifford, who received him again under his roof with the most liberal and indulgent kindness, after some weeks restored him so far, that he was able, though still weak, to set out on his journey. On reaching the more elevated country of Brabant, he felt in one day quite renovated, his whole frame being, as he expresses it, "freed from some great burthen." He carried a very handsome introductory letter from Van Royen to Anthony de Jussieu, the physician, who made him acquainted with his brother, the famous Bernard de Jussieu. (See JUSSIEU.) He inspected the botanic garden, the herbariums of Tournesfort, Vaillant, the Jussieus, &c.; visited the neighbourhood of Fontainebleau, which he has celebrated for its *Orchidea*, formed an acquaintance with Reaumur and other distinguished naturalists, and was admitted a corresponding member of the *Académie des Sciences*.

How he conversed with Reaumur and others, who knew no language but their own, and for the same reason, how he contracted so close a friendship with Mr. Collinson at London, it is not easy to conceive. He confesses a peculiar inaptitude, and, we think, a blameable indifference, for the learning of languages, declaring in his diary that in all his travels he learnt "neither English, French, German, Laplandish, nor even Dutch, though he stayed in Holland three whole years. Nevertheless, he found his way every where, well and happily." By the journal of his Lapland tour, and other manuscripts, it appears that Latin was sufficiently familiar to him; and if fastidious critics, who are not competent to follow his ideas, may sometimes censure the style of part of his writings, they have chiefly taken their liberty with the *Amoenitates Academicæ*, not remarking the great variety of style in the essays which compose those volumes, and which are chiefly writ en by the pupils whose inaugural dissertations they were. The matter indeed was mostly communicated by the Professor, whose office it was to defend each thesis, in conjunction with the candidate, against all opposers. Thus these essays are always quoted as the works of Linnæus, though their language is rarely his own; and is indeed so various, that it could not be supposed all to come from one author.

After leaving Paris, Linnæus took his passage at Rouen for Sweden, and landed at Helsingborg, from whence he proceeded to Fahlun, visiting his father for a few days in his way. His reception from the lady of his choice was favourable, and they were formally betrothed to each other. Before they could marry, it was necessary that some prospect of an advantageous establishment should be discovered.

Stockholm was thought a promising theatre for a young man of talents in the medical profession, but talents are usually what those who employ a young physician, are of all things least able to judge of. If fortune or prejudice do not stand his friend, the skill of Hippocrates, Celsus or Boerhaave will scarcely be discerned. The scientific merits of Linnæus were not overlooked, as he was unanimously chosen a member of the Upsal academy, the only one then in Sweden; yet the homage he had so lately received abroad, seems to have made him a little unreasonable on this head, and he declares that he would certainly have quitted his native country, "had he not been in love." To this all-powerful deity therefore, and not to his merits, or to the wisdom of his countrymen in discerning them, was Sweden, in the first instance, indebted for the possession of her Linnæus. From his country however flowed his most abundant reward; for whatever emolument his matrimonial connexion might afford, it certainly brought him little happiness or honour. After passing the winter of 1738 in the capital, he began to make his way in some departments of medical practice, so that by the following March he had considerable employment. At this time a plan was formed for establishing a literary society at Stockholm, which afterwards rose to great eminence, and still continues to flourish, having published numerous volumes of Transactions, in the Swedish language. Triewald, Höpken and Alstroem, (whose family was ennobled by the name of Alstroemer.) were, with Linnæus, the first members: and the infant society, being incorporated by royal authority, was augmented with all the most learned men of the country. Its objects were declared to be natural philosophy, natural history in all its branches, chemistry, medicine, anatomy, surgery, mathematics, economy, commerce, arts and manufactures. So wide a range might have been feared to have endangered its success; but though, in its progress, these various studies have, from time to time, predominated by turns, they seem not to have clashed with each other. Part of its transactions has been published in Latin at Venice, under the title of *Analeſta Tranſalpina*, which is some reproach to other countries of Europe, where they are so very little known.

A most flattering mark of public approbation was, soon after, conferred on Linnæus, without any solicitation. Count Tessin, marshal of the Diet, which was then sitting, gave him an annual pension of 200 ducats from the board of mines, on condition of his giving public lectures on botany and mineralogy at Stockholm. The same nobleman also obtained for him the appointment of physician to the navy, and received him into his house. His practice now increased greatly among the nobility, and he found himself in so prosperous a condition that he would no longer delay his marriage, which took place at Fahlun, June 26. 1739. After a month he returned to Stockholm. He was, by lot, the first president of the new academy; and as that office was to be but of three months' duration, after the French plan, he resigned it in September, and on that occasion delivered an oration in Swedish, on the wonderful Economy of Insects, which was printed in the Transactions; and a Latin version of it may be found in the *Amœnitates Academicæ*, v. 2. His example was followed by all the succeeding presidents.

The death of professor Rudbeck in 1740, gave Linnæus a hope of succeeding to the botanical chair at Upsal, one of the greatest objects of his ambition. The prior claims of his former rival, Rosen, on account of his standing in the university, could not however be set aside. Wallerius also rose up in opposition to the claims of Linnæus. It happened however that Roberg resigned the professorship of physic about this time, and by the exertions of count Tessin, who

who applied to the chancellor, count Gyllenborg, a compromise took place. Rosen obtained the professorship of botany, and Linnæus that of medicine, whilst Wallerius gained only censure for the illiberality with which he had prosecuted his claims. By an amicable adjustment which was confirmed by authority, the two new professors afterwards divided their official duties between them, so as best to suit the talents of each.

A war chancing to break out between Sweden and Russia, Linnæus was apprehensive that he should be obliged to attend the fleet, instead of which however, he received the much more agreeable order to travel through *Æland*, *Gothland*, &c. for the purpose of investigating the natural history and produce of those countries. He was accompanied by six of his pupils, and spent four months of the summer of 1741 in his expedition, of which an account was published at Stockholm in 1745; before he began his lectures at Upsal, to which place he removed in the autumn, he delivered a Latin oration "On the Benefit of travelling in one's own Country," printed in the 2d vol. of the *Amazitates*, and translated by Mr. Stillingfleet in his Miscellaneous Tracts. This composition has been much and justly admired.

The next year Linnæus undertook the reform of the Upsal garden, a new green-house was erected; an old house of stone, built by the great Olaus Rudbeck, who, having suffered so much by fire, would not admit a bit of wood into the structure, "was converted," as Linnæus says, "from an owl's nest into a lodging fit for the Professor." In 1743 the garden was in a state to receive those copious supplies of exotics, which the new Professor, in consequence of his extensive foreign correspondence, was enabled to procure. He was this year chosen a member of the academy at Montpellier. His reputation continued to increase both abroad and at home; he became secretary of the Upsal academy, and was employed on some public occasions to do the honours of the university. The death of his father-in-law obliged him to pay a visit to Fabun, but he seems to have gained little by this event, except the old medical library of Dr. Moræus, which still makes a part of his own. In 1746 he travelled to West Gothland; an account of his journey, which occupied two months, was published the following year.

In 1745 Linnæus published the first edition of his *Flora Suecica*, and in 1746 his *Fauna Suecica* came out. These works are models for such compositions, especially their second editions, published many years afterwards, with specific names, and many valuable additions.

A medal of this distinguished man was struck by some of his friends in 1746, dedicated to count Tessin. He soon after received the rank and title of Archiater, unsolicited, from the king, and was the only Swede chosen into the new-modelled academy of Berlin. All these honours, however, though he was by no means indifferent to such, appear to have given him less delight at this moment, than the acquisition of the herbarium made by Hermann in Ceylon, which an apothecary at Copenhagen unknowingly possessed. Being desirous of becoming better acquainted with the nature of this collection, its owner was recommended to Linnæus, who soon discovered to whom it had originally belonged, and rejoiced at recovering a treasure which had been supposed irrecoverably lost. He laboured day and night, as he tells us, in examining the flowers, and hence originated his *Flora Zeylanica*, published at Stockholm in 1747. This herbarium, as well as that of Chisford, is now in the possession of Sir Joseph Banks.

The exertions, and domestic as well as foreign reputation, of Linnæus, had now rendered botany extremely popular

in Sweden, and its interests were combined with those of commerce in various distant expeditions and speculations. Many of the principal merchants, as well as the nobility, had acquired a taste for natural history, and were proud to further the views of their distinguished Professor, who was now considered an honour to the nation. Several of his most intelligent pupils were sent to such distant countries, as he thought most worthy to be explored; as the East Indies, China, North and South America, and the Holy Land. (See HASSELIQVIST, KALM, and LÖFELING.) Their discoveries enriched his works and his herbarium. The latter also received important and very interesting communications from Gmelin and others, who had visited Siberia, and the original collections of Magnol and Sauvages were transmitted from Montpellier. Gronovius also furnished many Virginian specimens, gathered by Clayton. Such communications, from all parts of the world, grew more and more frequent as Linnæus advanced in life, as did also the academical honours which every literary body was proud to confer upon him. In 1749 appeared his *Materia Medica*, written in the same systematic and didactic style as the rest of his works. Of this numerous editions have been published on the continent, but none with any additions or corrections from the author himself, though he has left behind him copious manuscript notes on the subject. By the curious frontispiece of this book, one would suppose that he laughed in his sleeve at the state of medical practice in the world, though the body of the work proves he laboured very seriously to improve it. This year he travelled through Scania, &c. and, two years afterward, published an account of this tour, as he had done of the former. It is much to be regretted that these travels of Linnæus are not given to the world in a language more generally understood. There are German translations of them, but we know of no others. He was this year rector of the university, and it was memorable to him also for an attack of the gout, so violent as to endanger his life. He always attributed his restoration from this fit, and other subsequent ones, to his eating wood strawberries, the only sort, then at least, known in Sweden. Of this fruit his servants were ordered to purchase, throughout the season, all that were brought to his door, and it made a principal part of his diet.

To this attack of the gout, however distressing to the patient, the world is indebted for one of his most valuable and remarkable works, the *Philosophia Botanica*. The substance of this book must have been comprehended in the mind of its author when he wrote his *Fundamenta Botanica*; of which it is professedly a dilatation or exemplification, in the form of a commentary on each aphorism throughout. But, though he had long meditated on the subject of this publication, which embraces the whole range of botanic science, and indeed all the principles of natural knowledge; he had made but a few notes, not being able to digest or select his ideas, sufficiently to his own satisfaction, to communicate them to others. This illness however prompted him to rescue from the grave, to which he supposed himself hastening, whatever might be of service to those he left behind; and his pupil Lœfling was employed, sitting by his bed-side, to write down whatever the intervals of his sufferings would allow him to communicate. The manuscript afterwards received his own corrections, and the book came out in 1751.

About this period the queen of Sweden, Louisa Ulrica, sister to the great Frederick of Prussia, having a taste for natural history, which her royal consort king Adolphus Frederick also patronised, shewed much favour to Lin-

næus. He was employed in arranging her collection of insects and shells, in the country palace of Drotningholm, or Ulricksdahl, and was frequently honoured with the company and conversation of their majesties, during his attendance there. The queen interested herself in the education of his son, and promised to send him to travel through Europe at her own expence. She also listened very graciously to any recommendation or petition of Linnæus, in the service of science; redeeming the papers and collection of Hasselquist, and causing Kæhler to be sent to the Cape of Good Hope; whose mission however was rendered abortive by the jealousy of the Dutch, though he forwarded many curious insects and plants to his mailer from Italy. Linnæus devoted some of his leisure time in winter, to the arrangement of his friend count Tessin's collection of fossils, at Stockholm, of which an account in Latin and Swedish, making a small folio, with plates, came out in 1753. The result of his labours at Drotningholm was not given to the public till many years after, in 1764, when his *Museum Regium* appeared, in 8vo being a sort of *Prodromus* of an intended more splendid work, that was never executed. His most magnificent publication appeared in 1754, being a large folio, entitled *Museum Regis Adolphi Fredrici*, comprehending descriptions of the rarer quadrupeds, birds, serpents, fishes, &c. of the king's museum, in Latin and Swedish, with plates, and an excellent preface. This preface, one of the most entertaining and eloquent recommendations of the study of nature, that ever came from the pen of an enthusiastic naturalist, was translated into English by the writer of the present article, and first printed in 1786; appearing again, in a volume of *Traacts relating to Natural History*, in 1798. The queen of Sweden took so much pleasure in the conversation of her distinguished naturalist, that she allowed him his habitual indulgence of smoking, even in her apartments, that he might continue his labours with the more ease and satisfaction to himself. He was in every respect politely treated, as a visitor to his royal mistress, nor were his services accepted, without suitable returns of royal munificence. Whether, however, he felt not so entirely at ease as in his own study, or his attention was distracted by a variety of objects, the *Museum Regium* is certainly not one of his most correct works, as those who study its *Lepidoptera* and shells, with critical care, will not fail to discover.

In the mean while, this eminent man was preparing a lasting monument of his own talents and application, which even his rival Haller nobly denominates "*maximum opus et æternum*," the *Species Plantarum*, of which the first edition was printed in 1753, the second in 1760, each in two volumes 8vo. The work is too well known to need any description, but besides its importance as a complete arrangement and definition, with all necessary indication of synonyms, of every plant of which its author had any satisfactory knowledge, it is ever memorable for the adaptation of specific, or as they were at first called, trivial names. This contrivance, which Linnæus first used in his *Pan Suecicus*, a dissertation printed in 1749, extended to minerals in his *Museum Tessinianum*, and subsequently to all the departments of zoology, has perhaps rendered his works more popular than any one of their merits besides. His specific differences were intended to be used as names; but their unavoidable length rendering this impracticable, and the application of numeral figures to each species, in Haller's manner, being still more burthenome to the memory, all natural science would have been ruined for want of a common language, were it not for this simple and happy invention. By this means we speak of every natural produc-

tion in two words, its generic and its specific name. No ambiguous comparisons or references are wanted, no presupposition of any thing already known. The distinguishing character of each object is usefully stamped in its name; and if this perfection of the art cannot always be attained, the memory is assisted, often very ingeniously, with collateral information, indicating the colour, the habit, or the qualities of the object of our examination. The philosophical tribe of naturalists, for so they are called by themselves and their admirers, do not therefore depreciate Linnæus, when they call him a nomenclator. On the contrary, they celebrate him for a merit which no other person has attained, and without which their own discoveries and remarks, of whatever value, would not be understood. Neither can some of his fellow labourers, in the discriminative department of natural science, be justified, for either slighting this invention, or giving the credit of it to others. The method of Rivinus is not the same; as he designed his names for specific characters, to which purpose they are necessarily, from their brevity, inadequate. Whatever may have been thought of the Linnæan trivial names at their first appearance, they are now in universal use, and their principle has been, with the greatest advantage, extended to chemistry, of which the celebrated Bergman, the friend of Linnæus, originally set the example.

These herculean literary labours, combined with the practice of physic, were more than the bodily constitution of Linnæus could support. He was attacked with the stone, and had also, from time to time, returns of gout. He considered the wood strawberry as a specific for both disorders, and they never greatly interfered with his comfort or his duties. On the 27th of April 1753, he received, from the hand of his sovereign, the order of the Polar Star, an honour which had never before been conferred for literary merit. A still more remarkable, if not more grateful, compliment was paid him not long after by the king of Spain, who invited him to settle at Madrid, with the offer of nobility, the free exercise of his religion, and a splendid botanical appointment. This proposal was conveyed to him in a handsome letter by the duke of Grimaldi, then prime minister, and was as handsomely declined by Linnæus, who declared, that if he had any merits, they were due to his own country. This patriotic moderation received its just reward in November 1756, when he was raised to the rank of Swedish nobility, and took the name of Von Linné.

The *Systema Naturæ* had already gone through nine editions in different countries. Its author had, for several years, a more ample edition of the animal department in contemplation, on the plan of his *Species Plantarum*, and this constituted the first volume of the tenth edition, published in 1758. The second volume, which came out the following year, was an epitome of the vegetable kingdom. Here the genera appear with short essential characters, and the species are noted by little more than their specific differences, with few references and no indication of their native countries. This same great and important work appeared still more enlarged, in a twelfth edition, in the year 1766: to this the Mineral kingdom was added in a third volume on the same plan with the first. We can readily pardon the self-complacency of its author, when, in his diary written for the use of his friend Menander, he calls the *Systema Naturæ* "a work to which Natural History never had a fellow." We may venture to predict that as this was the first performance of the kind it will certainly be the last; the science of natural history is now become so vast, that no man can ever take the lead again as an universal naturalist.

The emoluments of Linnæus by his various publications were not great. He is reported to have sold the copyright of most of them for a ducat, (about nine and sixpence,) a printed sheet. His different appointments, however, for he soon laid aside the general practice of physic, had raised him to a considerable degree of opulence. He purchased the estates of Hammarley and Söfja in 1758, for 80,000 dollars, above 2330*l.* sterling. He chose the former for his country residence, and there, some years afterwards, he lodged his museum, in a building of stone, secured from all danger by fire. There he received the visits of distinguished foreigners and admitted his favourite pupils; to several of whom he gave private courses of Lectures, and completely laid aside the state of the nobleman and professor while he discoursed with them on his favourite topics. In 1760 he could not resist the temptation of writing in support of his doctrine of the sexes of plants, a handsome premium being offered that year by the Petersburg academy, as it was supposed with a view to awaken his attention to the subject. His Dissertation was printed, and was translated into English in 1786, with notes, by the present possessor of his library. His patent of nobility did not receive his Majesty's sign manual till 1761, though it was antedated 1757. It was confirmed by the Diet in 1762, and he then took a coat of arms expressive of the sciences he cultivated. That august body honoured him with a still more solid reward, upwards of 520*l.* sterling, for what seems to have been the least valuable of his discoveries, the art of producing pearls in the river muscle. This was accomplished by wounding the shells in their natural situation, as appears by some specimens illustrative of it in his museum, but the practice does not seem to have been prosecuted to any great extent.

He now became one of the eight foreign members of the French Academy of Sciences, an honour never before conferred on a Swede. Amid all his dignities however, his fondness for botany never declined; he records in his diary that having made many trials in vain to obtain the tea plant alive, he succeeded at length in 1763, adding "that God blessed him even in this point." His view indeed was patriotic as well as botanical, aiming at bringing this shrub into cultivation with us, so as, to use his own expression, "to shut the gate through which all the silver went out of Europe." It is much to be regretted that, from some peculiarity in the constitution of this precious vegetable, all attempts to reconcile it to the climate of any part of Europe have proved of no avail, at least as to any economical purpose.

In 1763 Linnæus was permitted to avail himself of the assistance of his son, now 21 years of age, in the labours of the Botanical Professorship, and the young man was thus trained up for his future successor. His eldest daughter was married to an officer in 1764. His worldly concerns appear to have been in a prosperous train, except that he suffered this year from a dangerous attack of pleurisy; but it is pleasing to read, in his private memorandums, the gratitude he expresses to his old rival Rosen, for his skill and attention during this illness, and the expressions of intimate regard by which they were now become attached to each other.

This year the sixth edition, by far the most complete, of the *Genera Plantarum* was published, nor did its author ever prepare another. It was intended as a companion to the *Species Plantarum*, but was greatly superseded by the more concise and commodious short characters of genera, given in the vegetable part of the *Systema Naturæ*. This last-mentioned part was subsequently prepared, under the inspection of Linnæus, for publication by his pupil Murray

of Göttingen, with the title of *Systema Vegetabilium*, edition 13th, and printed in 1774. A 14th edition, with additions from Jacquin and Thunberg, was published in 1784. Into these editions were interwoven the new species described by Linnæus in his first and second *Mantissæ*, two little volumes, containing additions and corrections, by way of supplement to the *Species Plantarum*. In them we cannot help perceiving a decline of the wonted precision and genius of their author, especially in the latter part of the second *Mantissa*, many remarks in which are misapplied, to plants different from what were intended, and the errors to which they give birth can be unravelled by the inspection of the Linnæan herbarium only.

Though Linnæus declares, in his diary, that he gave up the general practice of physic, on his establishment at Upsal, attending only his friends and the poor, he appears ever to have paid great attention to that noble and intricate science. His lectures on medicine, dietetics, and the animal economy, were in high repute, nor is he at all behind-hand in commending his own abilities in this line. Though undoubtedly a great and sagacious observer in every department of nature, he was in this somewhat too theoretical. If, however, he had peculiar ideas respecting the prevalence of the number five, his hypotheses in general rose much above the dull level of the humoral pathology in which he was educated; and when he applies his own didactic talents to illustrate medical theories, or any thing else, he is always ingenious, and as luminous as the subject will allow. His curious little *Clavis Medicinæ*, published in 1766, and his *Genera Morborum*, which appeared three years before, are not only striking, but instructive. His idea of a systematic arrangement of diseases by technical characters, was followed up and illustrated on a large scale, by his friend Sauvages of Montpellier; and the celebrated Dr Cullen of Edinburgh, justly attributed to the Swedish philosopher the foundation of his own performance in this line. Such schemes of arrangement indeed can be considered merely as helps to the memory, and in themselves altogether artificial. The abilities of Linnæus appear to the greatest advantage in his classification of natural objects. He excelled in a happy perception of such technical characters, as brought together things most naturally allied. Thus his sexual distribution of plants, though professedly artificial, is in many parts as natural as any that pretends to be so. Linnæus, moreover, was the first who perceived and declared the distinction between a natural and an artificial botanic system, and he has laboured at the one as much as at the other. His lectures on the natural orders of plants were published, long after his death in 1792, from the notes of his pupils Giseke and Fabricius, at Hamburg. They evince his deep consideration of a subject, then in the infancy of cultivation, the intricacy of which may well excuse the frequency of error in the detail. In the zoological department, it is but justice to observe, that his classifications of birds and insects are the most original as well as the best of the whole. In the former, as in the *Mammalia*, the organs of feeding lead the way to the most natural distinctions possible; but the author of this system, which no one has yet attempted to supersede, was well aware that the same principle would not hold good throughout, particularly with respect to insects, whose destination, in their perfect state, is not so much to take food, as to propagate their species. The mouth and its appendages are therefore, in this tribe, but of far subordinate consequence; and Linnæus had recourse to the more natural, as well as far more easy principles, deducible from the chief peculiarities of these animals, the differences in their wings, their legs, and their *antennæ*. His pupil Fabricius,

for this reason, however able and ingenious in entomology, cannot be considered as fortunate or philosophical, in applying his great preceptor's scheme of arrangement of quadrupeds and birds to insects. Indeed, those who have followed Fabricius in the detail of this study, declare, that he has rarely proceeded on his own plan, but, leaving the mouth in most cases unexamined, has trusted to habit and general configuration, which certainly produce natural assemblages enough, and true to the Linnæan rules, but different from his own. The arrangement of fishes, by the relative position of their ventral fins, was a no less happy and original idea of the Swedish naturalist; as pointing out their leading differences of form and habit, by a distinctive character, taken from a peculiar organ of their own. Shells he was long before he would study minutely at all, considering them merely as the houses of particular animals, the knowledge of whose structure and economy was, in a great measure, inaccessible. At length, however, the uniformity of his plan obliged him to class these popular objects of admiration, in some way or other, and he has succeeded at least as well as any of his fellow-labourers; though we are by no means inclined to justify some of his terms, which are borrowed from an anatomical analogy, not only false in itself, but totally exceptionable. This leads us to consider a charge, often brought against this great man, of pruriency of phraseology in many parts of his works. The most attentive contemplation of his writings has satisfied us that in such instances he meant purely to be anatomical and physiological, and if his fondness for philosophical analogies sometimes led him astray, it was not in pursuit of any thing to contaminate his own mind, much less that of others. "Some of the descriptions of Linnæus," says a noble botanical author, "would make the most abandoned person blush." His lordship ought to have added, "*none but* the most abandoned." That the mind of Linnæus was simple and chaste, as his morals were confessedly pure, is evinced by his Lapland Tour, written only for his own use, but which is now, as we have already mentioned, before the public. This is such a picture of his heart, as will ever render any justification of his moral character, and any elaborate display of his religious principles or feelings, alike superfluous.

His apparent vanity, as displayed in his diary, published in Dr. Maton's valuable edition of Dr. Pulteney's *View of his Writings*, is perhaps far less justifiable. All we can say for him is, that this paper was drawn up for the use of his intimate friend Menander, as materials from which his life was to be written. If it be unbecoming, and indeed highly ridiculous in many instances, for a man to speak as he does of himself, the justice and accuracy of his assertions, had they come from any other person, could in no case be disputed.

As the habits of Linnæus were temperate and regular, he retained his health and vigour in tolerable perfection, notwithstanding the immense labours of his mind till beyond his 60th year, when his memory began in some degree to fail him. In 1774, at the age of 67, an attack of apoplexy greatly impaired his constitution. Two years afterwards a second attack rendered him paralytic on the right side, and materially affected his faculties. The immediate cause of his death, which happened January 10th, 1778, in the 71st year of his age, was an ulceration of the bladder. His remains were deposited in a vault near the west end of the cathedral of Upsal, where a monument of Swedish porphyry was erected by his pupils. His obsequies were performed, in the most respectful manner, by the whole university, the pall being supported by sixteen doctors of physic,

all of whom had been his pupils. A general mourning took place on the occasion at Upsal. His sovereign, Gustavus III. commanded a medal to be struck, expressive of the public loss, and honoured the Academy of Sciences at Stockholm with his presence, when the eulogy of this celebrated man was pronounced there by his intimate friend Bäck. A still higher compliment was paid to his memory by the king in a speech from the throne, wherein his majesty publicly celebrated the talents of his deceased subject, and lamented the loss which his country had so recently sustained. Various testimonies of respect were given to the merits of Linnæus in the different parts of Europe, even where rival systems or interests had heretofore triumphed at his expence. The celebrated Condorcet delivered an oration in his praise to the Parisian Academy of Sciences, which is printed in its memoirs. We cannot wonder that his memory was cherished in England, where he had long had numerous correspondents, and where two of his most distinguished pupils, Solander and Dryander, have, in their own talents and character, conferred singular honour upon their preceptor. Ten years after his decease a new society of naturalists, distinguished by his name, was founded in London, and has since been incorporated by royal charter, whose publications, in ten quarto volumes of Transactions, sufficiently evince that its members are not idle venerationers of the name they bear. This name, in imitation of them, has been adopted by several similar institutions in other parts of the world.

The appellation of Linnæan Society was, with the more propriety, chosen by this British institution, on account of the museum of Linnæus having fallen into the hands of its original projector, and hitherto only president. This treasure, comprehending the library, herbarium, insects, shells, and all other natural curiosities, with all the manuscripts and whole correspondence of the illustrious Swede, were obtained, by private purchase from his widow, after the death of his son in 1783. The authority which such an acquisition gave to the labours of the infant society, as well as to all botanical and zoological publications, the authors of which have ever been allowed freely to consult it, will readily be perceived. Nothing perhaps could have more contributed to raise up, or to improve, a taste for natural science, in any country.

Linnæus had by his wife Sarah Elizabeth, who survived to extreme old age, two sons and four daughters. His eldest son Charles succeeded him in the botanical professorship; see the next article. The younger, John, died March 7, 1757, in the third year of his age. The marriage of his eldest daughter, Elizabeth Christina, we have already mentioned. This lady is recorded as having discovered a luminous property in the flowers of the *Nasturtium*, *Tropæolum majus*, which are sometimes seen to flash like sparks of fire in the evening of a warm summer's day. Of the other daughters we know nothing materially worthy of record. The late Danish Professor Vahl is reported, when a student, to have made an impression on the heart of the young girl, which her father did not think proper to countenance, and which is supposed to have prevented his shewing that favour and encouragement to the young Dane, which his acuteness and zeal in botanical studies certainly deserved. Linnæus's Diary, published by Dr. Maton, with another in MS. of the early part of his life. Stoecker's Life of Linnæus by Trapp. Aikin's General Biography. Various works of Linnæus. S.

LINNÆUS, OF VON LINNÉ, CHARLES, the eldest, and only surviving son of the preceding, was born January 20, 1741, at the house of his father at Fahl n. His father was anxiously desirous of his excelling in natural

history, more particularly botany, and after endeavouring, from his most tender years, to make him fond of flowers, committed him, when about the age of nine or ten, to the more particular care of some of his own most favourite pupils. By them he was taught the names of the plants in the Upsal garden, and such of the principles of natural science as were suited to his period of life, as well as to converse habitually in Latin. He proved a docile and ready scholar, and appears to have given satisfaction to his father, who procured for him, at the age of eighteen, the appointment of Demonstrator in the botanic garden, an office then first contrived on purpose for him. Having learned to draw from nature, he became an author at the age of twenty-one, publishing in 1762 his first *Decas Plantarum Rariorum Horti Upsaliensis*, the plates of which, in outline only, like those of Plummer, were drawn by his own hand. These are sufficiently faithful and useful, if not ornamental. The descriptions are full and scientific. In 1763 another *Decas*, or collection of ten species, came out on the same plan. Whether the Upsal bookfellers did not encourage him to proceed, or for what other reason we know not, he never printed any more numbers under this title. In 1767 however, he published at Leipzig ten more plates and descriptions, like the above, entitled *Plantarum Rariorum Horti Upsaliensis Fasciculus Primus*. To this he was perhaps infligated by his friend Schreber, who, the year before, had given to the world a similar work, describing ten rare oriental plants, drawn by himself. But neither of these publications was ever extended to a second *Fasciculus*. In 1763 he was nominated adjunct Professor of Botany, with a promise, hitherto unexampled, that after his father's death, he should succeed to all his academical functions. In 1765 he took his degree of Doctor of Physic, and began to give lectures.

His progress would probably have been happy, if not brilliant, but domestic chagrin sapped the foundation of all his felicity, and damped his ardour in every pursuit. This arose from the conduct of his unnatural mother, another example of that rare and detestable depravity exhibited by the mother of Savage the poet. Not content with dishonouring her husband's bed, and making his home as uncomfortable as she could, by the meanest parsimony and disgusting petty tyranny, the wife of the great Linnæus conceived a hatred for her only son, which she displayed by every affront and persecution that her situation gave her the means of inflicting on his susceptible and naturally amiable mind. According to Fabricius, she forced her husband, who by such a concession surely partook largely of her guilt and meanness, to procure the nomination of his pupil Solander to be his future successor, in preference to his own son, and it was a part of her plan that he should marry her eldest daughter. Solander, however, disdained both the usurpation and the bait, refusing to leave England; and the misguided father recovered his senses and authority, causing his son, as we have said above, to receive this truly honourable distinction. The mind and spirit of the young man nevertheless still drooped, and even when he had attained his thirtieth year, he would gladly have escaped from his miseries and his hopes together. The authority of the king was obliged to be exerted, at his father's solicitation, to prevent his going into the army. This measure of the parent was happily followed up by kindness and encouragement in his botanical pursuits, to which treatment the son was ever sensible, and he revived from his despondency before his father's death, which happened when he was thirty-seven years of age.

Though obliged by his mother to purchase, at her own

price, the library, manuscripts, herbarium, &c. which he ought by every title to have inherited, he rose above every impediment, and betook himself to the useful application of the means now in his hands, for his own reputation and advancement. His father had already prepared great part of a third botanical Appendix, or *Mantissa*; from the communications of Mutis, König, Sparmann, Forster, Pallas, and others. To this the younger Linnæus added those of Thunberg from the Cape, which his father, "with half-extinguished eyes," as Condorcet beautifully relates, had just been able to glance over, but not to describe. Hence originated the *Supplementum Plantarum*, printed at Brunswick, under the care of Ehrhart in 1781. The ingenious editor inserted his own new characters of some genera of Mosses; which Hedwig has since confirmed, except that some of the names have been justly rejected. This sheet was, in an evil hour, suppressed by the mandate of Linnæus from London, where, at that period, the subject of generic characters of mosses was neither studied nor understood, whatever superior knowledge was displayed concerning their species. The plants of the *Supplementum* are admitted into the fourteenth edition of the *Syllaba Vegetabilium* by Murray, and figures of some of the most curious have been published by the writer of this present article, in his *Plantarum Icones ex Herbario Linnæano*. Three botanical dissertations also appeared under the presidency of the younger Linnæus, on Grasses, on *Lavandula*, and the celebrated *Methodus Muscorum*, which last was the work, and the inaugural thesis, of the present Professor Swartz of Stockholm. These form a sequel to the 186 similar essays, which most of them compose the seven volumes of the *Amoenitates Academica*, the rest being published by Schreber in three additional ones.

The subject of our memoir had always felt a strong desire to visit the chief countries of learned and civilized Europe. For this purpose he was obliged to pawn his juvenile herbarium, made from the Upsal garden, to his friend Alströmer, for the loan of about fifty or sixty pounds. He arrived at London in May 1781, and was received with enthusiasm by the surviving friends and correspondents of his father, and was in a manner domesticated under the roof of sir Joseph Banks, whose friendship, kindness, and liberality could not be exceeded; neither could they have been by any one more gratefully received. Here the ardent Swedish visitor had every assistance for the preparation of several works on which he was intent, as a system of the *Mammalia*, a botanical treatise on the Lily and Palm tribes, and new editions of several of his father's standard books. None of these however have yet been printed. An attack of the jaundice rendered half his stay in England uncomfortable as well as useless to him. He proceeded to Paris in the latter end of August 1781, accompanied by the amiable and celebrated Broussonet, with whom he became acquainted at London. His reception in France was not less flattering than what he had experienced in England. He was enriched with duplicates of Commerçon's plants from the herbarium of the excellent Thouin, which amounted to about 1100 species, and had never been communicated to any other foreigner. In the following spring he visited Holland, tracing with filial piety every vestige of his father's steps at Hartecamp and elsewhere, and receiving, as he had done at Paris and London, ample contributions for his herbarium, library, and museum of shells and insects. The next place in which he made any stay was Hamburg, where several of his own friends were already settled, and from hence he returned by Copenhagen and Stockholm, visiting his friend Fabricius at Kiel, and his patron Baron

Ailstroemer at Gottenburgh, finally arriving at Upsal in February 1783. In his progress he had received several academical honours, as well as ample testimonies of scientific and personal respect, being a man of agreeable and unassuming manners, without vanity or ostentation, though somewhat, perhaps not unduly, tenacious, that his own discoveries and performances should not be confounded with any thing left behind by his father. But the career of this excellent man was cut short by a bilious fever, which concluded with a stroke of apoplexy, November 1, 1785, in the forty-second year of his age. His remains were interred with great solemnity on the 30th of the same month. His coffin was laid by the side of his father, and as the male line of the family concluded in him, their coat of arms was broken over the grave. After this ceremony the gardener of the university strewed flowers over the mingled ashes of the father and the son. A funeral oration in Swedish was pronounced by M. Von Schulzenheim, and was soon after published. This composition, partly translated, and much enlarged, in the English edition by Trapp of Stoevner's Life of Linnæus, has afforded much of the substance of this article, assisted by several private communications.

The younger Linnæus is said to have had naturally a strong and vigorous frame of body, and to have inherited his father's keen and penetrating eyes, as well as his temper and active disposition. He was greatly beloved by those who knew him, and died generally respected and lamented. His museum and library reverted to his mother and sisters, as he had never been married; and the former instantly fixed her eyes on Sir Joseph Banks, as the most likely person to purchase these relics at the high price, as she thought it, of a thousand guineas. On his refusal, and by his kind recommendation and advice, they came into the hands where they now are. The sale was precipitated before the return of the king of Sweden, then on his travels, lest he should oblige the heirs to dispose of the whole at a cheaper rate to the University of Upsal. This would actually have been the case, as appears from the exertions made by his Majesty on his return, who sent a courier to the Sound, and a vessel by sea, to intercept the ship that was bearing away the prize. S.

LINNET, LINARIA, in *Ornithology*, the denomination of a tribe of birds, which some authors have made a distinct genus, comprehending several species, which are usually classed under the genus *Fringilla*. Those who consider them as a distinct genus, state their characters to be these: the birds of it are somewhat smaller than the chaffinch; their general colour is a greyish-brown; their tail is a little forked, the outer feathers of it having white extremities; and they all sing very sweetly. We have in England four species of this bird.

1. The common brown linnet, the *Fringilla linota* of Gmelin, well known to every one. These birds are much esteemed for their song: they feed on seeds of different kinds, which they peel before they eat: the seed of the *linum*, or flax, is their favourite food, whence the name of the linnet tribe. See **FRINGILLA Linota**.

2. The *linaria rubra major*, or greater red-headed linnet, or greater redpole; the *Fringilla camialina* of Linnæus. This has a fine red head, a grey neck, a dusky reddish brown back, and its breast and belly are somewhat reddish. The female of this species, however, has no redness in its head or breast, but has somewhat of a greenish cast on the brown of its back, and is yellowish on the breast, with some brownish spots. It is a common fraud in the bird-shops in London, when a male bird is distinguished from a female by a red breast, as in the case of this bird, to stain or paint the

feathers, so that the deceit is not easily discovered, without close inspection. This species of linnet is frequent on our sea-coasts, and is often taken in flight time near London. It is a familiar bird, and becomes cheerful in five minutes after it is caught.

3. The *linaria rubra minor*, or lesser red-headed linnet, or lesser redpole; the *Fringilla linaria* of Linnæus. This is the least of all the linnets, and on the back is of the same colour with the common linnet; the back part of its head is red, and also its breast, but the lower part of its belly is whitish. In this species, the female, as well as the male, has a red head, that of the male being ornamented with a rich shining spot of a purplish-red, and that of the female of a saffron colour; and both have their beaks much sharper, and their feet and legs blacker than in the larger kind. This is a gorgeous bird, whereas the larger species commonly flies single. This seems to be the species known about London by the name of stone redpole.

4. The last species is the *linaria montana*, or *Fringilla montana*, or mountain linnet. This is the largest of all the linnets, according to Willughby's description, though Mr. Pennant says that it is in size rather inferior to the common linnet. Its beak is very small; its head and back are of the same colour with those of the common linnet, and the feathers of its breast and belly are black, edged with white; the rump of the male is of a fine and beautiful red, and thus distinguishes it from the female. This species is common in Derbyshire, but seems not so frequent in other places. However, it is taken in the flight season near London with the linnets, and called a *white*. It breeds, according to Mr. Pennant, only in the northern parts of our island. Ray and Pennant.

It is remarkable of the linnet, that when it builds in hedges, and when in furze-bushes on heaths, in both which places the nests are very common, they are made of different materials. When they build in hedges, they use the slender filaments of the roots of trees, and the down of feathers and thistles; but when they build in heaths, they use moss, principally, for the outer part, finishing it within with such things as the place will afford, chiefly with wool and hair. These birds will have young ones three or four times a year, especially if they are taken away before they are able to leave the nests. They lay five whitish eggs, spotted like those of the gold-finch.

When they are intended to be taught to whistle tunes, or to imitate the notes of any other bird, they are to be taken from the old ones when they are not more than four days old; for at this time they have no idea of the notes of the old ones, and will readily be taught to modulate their voice like any thing that is most familiar to their ears, and within the compass of their throats. The honourable Mr. Barrington observes, that in order to be certain that a nestling will not have the call of its species, it should be taken from the nest when only a day or two old; though a bird of this age requires great trouble in breeding, and the chance is greatly against its being reared. There requires more care in the feeding them when they are taken thus young, than when they are left in the nest till nearly fledged, but they will be reared very well upon a food half bread and half rape-seed, boiled and braised: this must be given them several times a day. It must be made fresh every day, and given them sufficiently moist, but not in the extreme. If it be in the least sour, it gripes and kills them; and it too stiff, it is as mischievous, by binding them up.

They must be hung up as soon as taken from the nest, under the bird whose note they are intended to learn; or if they are to be taught to whistle tunes, it must be done by

giving them lessons at the time of feeding; for they will profit more while young in a few days, than in a long time afterwards, and will take in the whole method of their notes before they are able to crack hard seeds. Some have attempted to teach them to speak, in the manner of the parrot, or other birds, and they will arrive at some sort of perfection in it with great pains.

Mr. Barrington mentions a linnet, which being taken from its nest when only two or three days old, almost articulated the words *pretty boy*, as well as some other short sentences. See *SONG of Birds*.

LINNICK, in *Geography*, a town of France, in the department of the Roer, and chief place of a canton, in the district of Aix-la-Chapelle, seated on the Ruhr; five miles N.N.W. of Juliers. The place contains 2086, and the canton 13,589 inhabitants. N. lat. $50^{\circ} 57'$. E. long. $6^{\circ} 13'$.

LINOCARPUM, in *Botany*, so called by Micheli, Nov. Gen. 22. t. 21, from the resemblance of its fruit to that of *Linum*, Flax. See *RADIOLA* and *LINUM*.

LINOCIERA, a name given by Dr. Swartz, in honour of Geoffrey Linocier, a French physician, who flourished at the close of the sixteenth and beginning of the seventeenth centuries. He published at Paris in 1584 an account of the officinal aromatics of the East and West Indies. This book is accompanied by wooden cuts. Linocier also wrote upon the natural history of beasts, birds, fishes, and serpents; but on these subjects he borrowed largely from Gesner and other authors. The present genus was adopted by Schreber, from Swartz, who first called it *Thouinia*, in his *Prodromus*. Dr. Smith however suggests that *Linociera* may probably not be a distinct genus from *Chionanthus*, merely because they differ in the number of cells of the fruit: the former having two cells, the latter only one. But in some genera of this natural order, the number of cells in the ripe fruit has been discovered constantly to be fewer than in the young germen. In *Olea*, in particular, this was found to be regularly the case by the late M. Broussonet, though we know not that it had been before suspected. —Swartz Ind. Oce. v. 1. 49. Schreb. 784. Willd. Sp. Pl. v. 1. 154. (*Thouinia*; Swartz Prod. 14.) — Clafs and order, *Diandria Monogynia*. Nat. Ord. *Scitagineae*, Linn. *Jasminaceae*, Juss.

Gen. Ch. Cal. Perianth inferior, very small, four-toothed, obtuse, permanent. Cor. Petals four, equal, linear, channelled, erect, spreading at the top, considerably longer than the calyx. Stam. Filaments two, very short and broadish; anthers linear, two furrowed, the length of the corolla, erect, each adhering slightly to one side of two of the petals. Pist. Germen superior, ovate, quadrangular; style short; stigma oblong, cloven. Peric. Berry, or rather Drupa, ovate, acuminate, of two cells. Seeds solitary, oblong.

Eff. Ch. Calyx four-toothed. Corolla of four petals, the two opposite ones connected at their base by the anthers. Fruit of two cells and two seeds.

L. ligustrina is the only species described by Swartz. It is a native of dry open places in the West Indies, especially Jamaica and St. Domingo, flowering in June and July.

LINONASME, the name of a melancholy and solemn air of the ancient Greeks, on the death of Linus.

LINOS is supposed to imply the same air. Rousseau, however, calls it a kind of rustic song among the ancient Greeks; they had likewise a funeral song of the same name, which answered to what the Romans called *Nenia*. Some

say that the Linos was invented in Egypt; while others ascribe its invention to Linus, the Euboran.

LINOSA, in *Geography*, a small island in the Mediterranean, not far from the coast of Tunis, near the island of Lampedusa.

LINOTA, in *Ornithology*. See LINNET, and FRINGILLA *Linota*.

LINOZOSTIS, in *Botany*, a name given by the ancient Greek writers to two plants very different from one another; the one is the *mercurialis*, or English mercury, a plant common in uncultivated places, and eaten by many boiled in manner of asparagus; the other the *epilinum*, or dodder, growing upon the plants of flax.

Theophrastus, Dioscorides, and the ancient Greeks, use the word in the first sense, and the modern Greeks in the latter.

The Latin authors call this *linozostis*, or *epilinum*, sometimes *anginalis*, and *podagra lini*, looking on it as a disease which chokes the plant it grows on, and causes gouty tumours on the stalks. See DODDER.

LINQUES, in *Geography*, a country of Celebes, lying between the two states of Binano and Bankale, not far from the bay of *Touratea*; which see.

LINSCHOTTEN, a town of Holland; eight miles W. of Utrecht.

LINSDDRF, a town of Bohemia, in the circle of Koeniginratz; 32 miles E.S.E. of Geverberg.

LINSE, a town of Prussia, in Oberland; 15 miles S.E. of Marienwerder.

LINSEED, or LINE-SEED, a sort of grain, being the seeds of the common flax, (which see,) which enters the composition of several medicines, and yields, by expression, an oil, that has most of the qualities of nut oil, and is according generally used, in lieu thereof, in painting, and for burning.

Those who manufacture it in large quantities have mills turned by horses or water, for the more expeditious dispatch of their work. See OIL.

LINSEED, in the *Materia Medica*. These seeds have an unctuous mucilaginous sweetish taste, without any remarkable smell. The oil which they yield in expression, when carefully drawn without the application of heat, has no particular taste or flavour; and in some properties differs considerably from most other oils of this kind; as congealing in water, not forming a solid soap with fixed alkaline salts, acting more powerfully as a menstruum on sulphurous bodies, than any other expressed oil that has been tried.

The seeds, boiled in water, yield a large proportion of a strong flavourless mucilage; but to rectified spirit they give out little or nothing. These seeds have been sometimes used, in a season of scarcity, instead of grain; but they appear to be an unwholesome as well as an unpalatable food. They afford little nourishment, impair the stomach, and produce great flatulence, as Galen long ago observed. Tragus relates, that those who fed upon them in Zealand, had the hypochondres in a short time distended, and the face and other parts swelled; and that not a few died of these complaints.

Infusions and decoctions of these seeds, like other vegetable mucilages, are used as emollients or demulcents in hoarsenesses, coughs, and pleuritic symptoms, which frequently prevail in catarrhal affections; they are also recommended in nephritic pains and stranguries; a spoonful of the seeds unbruited is said, for these purposes, to be sufficient for a quart of water. The seeds are also much used externally in emollient and maturating cataplasms. The seeds from which the oil has been expressed, boiled in milk, and applied warm, on a cloth, to hernia, are much recommended in

in the Satyr. Silefiac. Specim. 4. Obf. 4. The expressed oil is an officinal preparation, and is said to be of a more healing and balsamic nature than the other oils of this class; it has therefore been very generally employed in pulmonary complaints; also in colics, and constipations of the bowels. It is used in common with other oils as a vernifuge. Lewis Mat. Med. Woody. Med. Bot.

LINSEED Cakes, in *Agriculture*, the name of such cakes as remain after the expression of the oil from flax seed. They are at present much used in the fattening of cattle, sheep, and other sorts of live stock, and of course of great value and importance to the farmer. The price however has been of late so high as to greatly lessen the demand for this article. See OIL-CAKE.

LINSEED, *Infusion of*. See INFUSION.

LINSELLES, in *Geography*, a town of France, in the department of the North; five miles N. of Lille.

LINSENBAHRT, or as he is called in his works in Latin, **LENTILIUS, ROSINUS**, in *Biography*, a physician, was born at Waldenburg, in the province of Hohenlohe, in February 1657. He commenced his studies at Heidelberg at the age of fourteen, and thence removed to Jena in 1673. But his scanty means of subsistence compelled him the next year to engage as a teacher in the vicinity of Leipzig, where he continued till 1677. He then travelled, with a view to improve his situation, through several of the principal towns in the north of Germany, and settled at Mittau, in Courland, in the same capacity of teacher. To aid this feeble resource, Linsenbahr began likewise to practise medicine, in which his success was such, that the marquis of Anspach appointed him physician to the town of Creilheim, in Franconia; whither he repaired in 1680, after having been admitted a licentiate in medicine at Altdorf. He afterwards settled at Stutgard, and was patronised by the marquis of Dourlach; and, when that prince was driven by the war to take refuge at Basle, he was nominated honorary physician to the duke of Wirtemberg, and became his first physician in 1711. He accompanied the son of this prince in his travels, during three years; and after his return, in 1716, remained in the tranquil exercise of his profession until his death, in February 1733. Linsenbahr was ardent in his attention to the qualities and operations of drugs during his whole life, regarding that species of knowledge as the most important to the physician, and being somewhat too negligent of the study of anatomy, and of the writings of the ancients. He was the first who recommended the use of arsenic internally, for the cure of intermittent fevers, in which its efficacy has been established by recent observers, and especially by Dr. Fowler, of York. He was a decided enemy to blood-letting, which he strenuously endeavoured to discard from the practice of medicine; and particularly condemned the custom, then prevalent among the Germans, of letting blood at the equinoctial periods, against which he published a treatise in his mother-tongue, at Ulm, in 1692. He was likewise author of the following works. "Tabula Consultatoria Medica" Ulm, 1696. "Miscellanea Medico-Practica tripartita," ibidem, 1694. "De Hydropothæ causâ et cura, Dissertatio," ibid. 1770. "Eteodromus Medico-Practicus anni 1709," Stutgard, 1711. "Jatromemata Theoretico-Practica," ibid. 1712. Eloy Dict. Hist. de la Méd.

LINSPINS, or **LINCHPINS**, are small pins of iron, which keep the wheel of a cannon, or waggon, on the axle-tree; for when the end of the axle-tree is put through the nave, the linspin is put in to keep the wheel from falling off.

LINSTOCK, a short staff of wood, about three feet

long, having at one end a piece of iron divided into two branches, each of which has a notch to hold a piece of match, and a screw to fasten it there; the other end being also shod with iron, and pointed to flick into the ground, or in the deck when it is used at sea. It is used by the gunners in firing cannon. It is frequently used in small vessels, in an engagement, where there is commonly one fixed between every two guns, by which the match is always kept dry and ready for firing.

LINSTORP, in *Geography*, a town of Sweden, in the province of Medelpedia; 16 miles N. of Sundswal.

LINT, in *Surgery*, is the scraping of fine linen, used by surgeons in dressing wounds. It is made into various forms, which acquire different names, according to the difference of their figures.

Lint made up in an oval, or orbicular form, is called a *pldgit*; if in a cylindrical form, or in the shape of a date olive-stone, it is called a *dyffil*.

These different forms of lint are required for many purposes; as, 1. To stop blood in fresh wounds, by filling them up with dry lint before the application of a bandage; though if scraped lint be not at hand, a piece of fine linen may be torn into small rags, and applied in the same manner. In very large hemorrhages the lint, or rags, should be first dipt in some styptic liquor, alcohol, or oil of turpentine, or sprinkled with a styptic powder. 2. To agglutinate and heal wounds; to which end lint is very serviceable, if spread with some digestive ointment, or balsam, or dipt in some vulnerary liquor. 3. In drying up wounds and ulcers, and forwarding the formation of a cicatrix. 4. In keeping the lips of wounds at a proper distance, that they may not hastily unite, before the bottom is well digested and healed. 5. They are highly necessary to preserve wounds from the injuries of the air. Small portions of lint tied round with thread are chiefly used in dressing wounds and ulcers of the deeper kind. They are always applied to the bottom of such wounds, the remaining cavity being filled up with other portions of lint. By this means, the immediate removal of the dressings is not only provided for, but the possibility of leaving any part of them in the bottom of the wound is prevented.

In very large wounds, and especially in amputations of the limbs, which operations are frequently required in the army and navy, at times when lint is very scarce, it will be very sufficient to dress the bare bone and face of the wound with scraped lint, filling up the cavity with tow, and covering all with a large compress.

Surgeons of former ages formed compresses of sponge, feathers, wool, or cotton, linen being scarce; but lint is far preferable to all these, and is at present universally used.

LINTCIN, in *Geography*, a city of China, of the second rank, in Chan-tong, on the grand canal, much frequented by vessels as a magazine for all sorts of merchandise. N. lat. 36 56'. E. long. 115 31'.

LINFEL, in *Architecture*, the piece of timber which lies horizontally over door-posts and window-jambes; as well to bear the thickness of the wall over it, as to bind the sides of the walls together.

LINTELN, in *Geography*, a town of Germany, in the county of Verden; four miles N.E. of Verden.

LINTERNUM, or **LITERNUM**, in *Antient Geography*. See LITERNUM.

LINTHAL, in *Geography*, a town of Switzerland, in the canton of Glaris; 12 miles S.W. of Glaris.

LINTIN, a town of China, of the second rank, on a small island in the province of Quang-tong; 15 miles N.E. of Macao.

LINTNER,

LINTNER, in *Biography*, an excellent performer on the German flute at Berlin, in 1772, a disciple of the late Frederic II. king of Prussia's flute-master, Quantz.

LINTON, in *Geography*, a small market town in the hundred of Chilford. Cambridgeshire, England, is situated ten miles from Cambridge, and forty-six from London. The town consists of several irregular streets, the chief of which is about half a mile in length; the houses are principally low and covered with thatch; some however are of brick, and neatly built. The church is a spacious structure, and built with flints, intermixed with stone and plaster. It consists of two aisles, a nave, a chancel, and a large tower. It contains several monuments and sepulchral memorials, among which is a handsome mural monument by Wilton, to the memory of Mrs. Elizabeth Bacon, and her brother Peter Sandley, esq. A Sunday school was recently established in this town by the exertions of the Rev. Mr. Fisher, the vicar; it now affords tuition to upwards of an hundred children. A market, principally for corn, is held on Thursdays; it was originally on Tuesdays, and was granted in the year 1245, with an annual fair for three days. The fair has been discontinued, but two others have been established; one for sheep, and one principally for hiring harvest men. In the reign of Edward III. there was an alien priory at Linton, subordinate to the abbey of St. Jacutus de Insula in Britany; being seized for the king in the reign of Henry V., it was given by his successor to the master and fellows of Pembroke hall, Cambridge. At Barham also, in this parish, was a priory of Crutched Friars, so early as the year 1292; the site was granted by Henry VIII. to Philip Parth, esq. and afterwards to John Millicent, esq. who was before possessed of the manor. In the Millicents the priory and manor continued till the year 1740, when John Millicent, esq. the last of the family, died; his widow, afterwards married to the Rev. C. Lonsdale, left her estates to the master and fellows of Pembroke hall. Barham hall, Mrs. Lonsdale's seat, appears to have been formed out of the conventual buildings: the hall, chapel, and cloisters, still remain: it was appropriated, by Mrs. Lonsdale's will, as a country seat for the master of Pembroke hall for the time being. In the population return to parliament in the year 1801, the parish of Linton was stated to contain 183 houses, and 1157 inhabitants. Lysons' *Magna Britannia*, vol. ii. *Beauties of England and Wales*, vol. ii.

LINTZ, a town and citadel of Germany, surrounded with an old wall, and situated on the E. side of the Rhine, containing about 600 houses; 10 miles S.E. of Bonn. N. lat. 50° 34'. E. long. 7° 14'.—Also, a well-built and populous town of Austria, seated on the Danube; consisting of a single street, with some annexed suburbs, in which is the sovereign's citadel, situated on an eminence, commanding a fine prospect. The trade of the town is considerable, and it has fairs that possess privileges under proper regulations, at Easter and St. Bartholomew's; 30 miles S.E. of Passau. N. lat. 48° 18'. E. long. 14° 15'.

LINTZENEGG, a town of Austria; 10 miles S. of Zwettl.

LINUFAR, in *Botany*, a name used by some of the writers of the middle ages, to express the water-lily. The Arabians gave this genus of plants the name of *nilufar*, and this word *linufar* is only formed of that, by transposing some of the letters.

LINUM, in *Botany*, the *lino* of Dioscorides, Theophrastus, and other ancient Greek authors, appears to be derived from *lino*, to hold, the fibres of this plant being so remarkable for their tenacity, that its herbage has always been in the greatest estimation for the manufacture of linen

cloth, whilst its seeds by pressure afford a valuable oil. (See FLAX.)—Linn. Gen. 113. Schreb. 206. Willd. Sp. Pl. v. 1. 1533. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 342. Prod. Fl. Græc. v. 1. 214. Ant. Hort. Kew. ed. 2. v. 2. 184. Tournet. t. 176. Juss. 303. Lamarek Illustr. t. 210. Gærtn. t. 112.—Class and order, *Pentandria Pentagynia*. Nat. Ord. *Gruinales*, Linn. *Caryophyllaceæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of five leaves, lanceolate, erect, small, permanent. *Cor.* funnel-shaped; petals five, oblong, gradually broader towards the upper part, obtuse, much spreading, large. *Stam.* Filaments five, awl-shaped, erect, the length of the calyx; (also five rudiments alternating with them) anthers simple, arrow-shaped. *Pist.* Germen superior, ovate; styles five, thread-shaped, erect, as long as the stamens; stigmas simple, reflexed. *Peric.* Capsule globose, bluntly five-sided, of ten cells and ten valves. *Seeds* solitary, ovate or flattish, acuminate, smooth.

Ess. Ch. Calyx five-leaved. Petals five. Capsule superior, with ten valves and ten cells. Seeds solitary.

In the 14th edition of Linnæus's *Système Vegetabilium* we meet with twenty-two species of *Linum*. Willdenow has twenty-nine, besides which, four, not mentioned by him, occur in the *Horius Kewensis*, and one in the *Prodromus Floræ Græcæ*. But from the list is to be deducted *L. Radiola* which is the *Radiola millegrana* of Dr. Smith's *Flora Britannica*, 202.—The genus is divided into two sections, the first having alternate, the second opposite, leaves.—Examples of the first section are

L. usitatissimum Common Flax. Linn. Sp. Pl. 397. Engl. Bot. t. 1357. Curt. Lond. fasc. 5. t. 22.—Calyx-leaves ovate, acute, three-nerved. Petals crenate. Leaves lanceolate, alternate. Stem mostly solitary.—Not infrequent in fields throughout the more temperate parts of Europe, in consequence probably of its being a plant of such general cultivation, flowering in July. Root annual, fibrous, small. Stem erect, round, smooth, leafy. Leaves entire, three-nerved, smooth. Flowers on stalks, erect, of a sky-blue colour. Seeds elliptical, very shining. For the uses and management of this valuable plant, we need not repeat what is already given under the article FLAX.

L. trigynum Three-styled golden Flax. Sm. Exot. Bot. t. 17. Ant. Hort. Kew. ed. 2. n. 3. Curt. Mag. t. 1100.—Leaves alternate, elliptical, ferrated, acute. Styles three. Capsule of six cells.—A native of the East Indies, where it was gathered by colonel Hardwicke on the sides of mountains flowering in December. The natives call it *Gul Astarfe*, from its fine golden hue, *Gul* signifying a flower, and *Astarfe* a coin of the same metal current in India, of the value of 2l. sterling.—Stem shrubby. Branches round and leafy. Leaves smooth, dark green, pointed, on a short footstalk. Flowers large and handsome, nearly odororous.

L. hispidum Hairy Flax. Linn. Sp. Pl. 398. Willd. n. 4. Jacq. Austr. t. 31.—Calyx hirtute, acuminate. Flowers sessile, alternate. Leaves on the branches opposite.—A native of Austria and Hungary, flowering in June and July. Root perennial, woody. Stems from a foot and a half to two feet in height, branching towards the top. Leaves lanceolate or ovate, hairy at their edges and on their backs, sometimes nearly smooth. Flowers blue; the petals so closely united at the base as to resemble a monodeltous, funnel-shaped flower. Linnæus remarks that this is very closely allied to *L. neoliflorum*.

L. byrriciflorum Mallow-flowered Flax. Curt. Mag. t. 1048,

1748, approaches very nearly to *L. hirsutum*. Its flowers however are larger, and of a red lili or purplish tinge.

L. arboreum. Tree Flax. Linn. Sp. Pl. 400. Curt. Mag. t. 234.—Leaves wedge-shaped. Stems arboreous t.—A native of the Levant, from whence it was sent to England by Dr. Sibthorp in the year 1788. It flowers from May to August. This beautiful species is an arboreous shrub, rising to the height of several feet. Stems rather slender, leafy. Leaves on short footstalks, the upper ones slightly embracing the stem, of a glaucous colour.

The two following species come under the other section of this genus, from having opposite leaves.

L. catharticum. Purging Flax. Mill-mountain. Linn. Sp. Pl. 401. Engl. Bot. t. 382. Curt. Lond. fasc. 3. t. 19. Fl. Dan. t. 851.—Leaves opposite, obovato-lanceolate. Stem forked. Petals pointed.—Not uncommon in elevated, dry pastures in all parts of Great Britain, bearing flowers from June to August.—Root annual, small. Stems leafy, erect, many-flowered. Leaves obtuse, entire. Flowers small, white, pendulous before they expand.—Dr. Smith observes, in the *Flora Britannica*, that *L. catharticum* is very nearly allied to *Geranium*, for that its stamens are sometimes monadelphous. The whole herb is smooth, bitter, and has long been celebrated for its purgative qualities.

L. quadrifolium. Four-leaved Flax. Linn. Sp. Pl. 402. Curt. Mag. t. 431.—Leaves four in a whorl.—A native of the Cape of Good Hope, flowering in May and June. Root thick and woody. Stems numerous, about six inches in height, forked, slender, upright. Leaves four in a whorl. Flowers yellow.

This is the original *quadrifolium* of Linnæus, that of Ray having blue flowers.

LINUM, in Gardening, comprehends plants of the herbaceous, annual, and perennial shrubby kinds, of which the species are the common flax (*L. usitatissimum*); the perennial flax (*L. perenne*); the shrubby flax (*L. suffruticosum*); the tree flax (*L. arboreum*); and the African flax (*L. Africanum*.)

In the second sort there is a variety which is procumbent, with smaller flowers.

Method of Culture.—All these plants may be increased by seeds, layers, and cuttings.

But the two first sorts are best raised by sowing the seeds in the early spring months, as March, or the following month, the former in fields or plantation-grounds, where the soil is fresh, good, and well reduced into order, by frequent digging over, or ploughing and harrowing, in narrow drills, or broadcast, and raked or harrowed in with a light harrow; the plants being afterwards kept perfectly clean from weeds by repeated hoeings.

About the end of August, when the plants have attained their full growth, and begin to turn yellow at bottom, and brown at top, and their seeds to ripen, it is proper time to pull them; though, if it were not for the sake of the seed, they might be pulled a little before the seeds ripen, by which the flax is generally better coloured and finer; but if suffered to stand till the seeds are fully ripe, it is commonly stronger, somewhat coarser, and more in quantity. It should be pulled up by handfuls, roots and all, shaking off all the mould; then either spreading them on the ground by handfuls, or binding them in small bunches, and setting them upright against one another, for ten days or a fortnight, till they are perfectly dry, and the seed fully hardened, then housed, and the seed thrashed out, cleaned, and placed in a dry airy situation, being afterwards put up for use. The flax, after being rippled and sorted, should be carried to a pond of nearly stagnant water, being placed in it with the

bundles crossing each other in different directions, so as to keep the whole in a close compact state, being kept just below the surface of the water, by proper weights applied upon it. It should remain in this sleep till the stems become brittle and the bark readily separates, when it must be taken out and spread thinly on a flint pasture, being occasionally turned until it becomes perfectly bleached and dry, when it is in a proper state for the purpose of being converted into flax by the huckler.

With regard to the latter, or perennial sort, it should be sown in a bed or border of good earth, in shallow drills at the distance of six inches; and when the plants are two or three inches in height, they should be thinned to the same distances, and in autumn be planted out in the places where they are to grow. But it is probably a better practice to sow them at once in the places where they are to grow, thinning them out properly afterwards.

The three other sorts may be best increased by planting cuttings of the branches in pots of light fresh earth, plunging them in the tan hot-bed, or by layers laid down in the latter summer months. When the plants in either mode have stricken good root, they may be removed into separate pots, and be managed as other tender exotic plants, that require the protection of the green-house. And they may likewise be raised from seeds when they can be procured, which should be sown in pots, and placed in a hot-bed in the spring season.

The first sort may be said to be one of the most valuable plants in the whole vegetable kingdom; as from the bark of its stalks is manufactured flax or lint, for making all sorts of linen cloth; from the cloth, when worn to rags, is made paper; and from the seeds of the plant linseed oil is expressed, which is much used by painters, and in other arts; and the refuse, after expression, forms the oil-cakes so valuable in the fattening of cattle, sheep, and other sorts of live stock.

A few plants of this, and the second sort, may be introduced in the clumps and borders of the pleasure-ground; and the three other sorts afford variety in green-house collections among other potted plants.

LINUM *Carpasium*, *Carpasian flax*, or *linen*, a term often occurring in the old writers, and used by different authors in very different senses.

The first use we find made of the word, is for the expressing a kind of flax which was finer and smaller, as well as brighter and more glossy, than any other. Pliny uses the word in this sense, and tells us, that such flax was principally brought from Spain; and that both it, and the linen made of it, were, in his time, called by the name *carpasian*: from this it became a custom to call all very fine flax, or fine linen, *carpasian linen*, and the word signified no more than delicate, or fine.

The modern Greeks use the word in this sense, and Suidas expresses the finest linen veils by the term *carpasian*. The author of the *Periplus Maris Erythræi*, who was contemporary with Pliny, calls the flax, of which the Indian linens were made, *carpasia*; but none of the older Greeks have the word. This author is not, however, to be appealed to for ascertaining the purity of the language of the ancients; for it is plain that he has taken in many words which are not good Greek, nor ever were used by any author of credit, but are the mere technical terms of the tradesmen and merchants of that time.

Pausanias uses the word *carpasium linum* in a very different sense from all these; for with him it is made to express the flax made of the stone asbellos, and the linen made of this, which was thrown into the fire to be cleaned. Solinus uses

the word also in the same sense: he says, that in Carystos there was found that kind of flax which remained unhurt in the fire; and Hieronymus Mercurialis thinks that the *carbysis* of the ancient Romans was a word properly used only to signify the carpathian flax of Pausanias, which was not to be destroyed by the fire, and was the true *linum incombustibile*, or threads of the asbestos stone, or linen made of that material. This, however, is not the sense of the word in later times, for we find it evidently used for all linen manufactures of whatever kind.

LINUM, Carystium, in *Natural History*, a name given by Pausanias to the asbestos. It was found plentifully in this author's time, near Carystos, a town in the Negropont, and thence obtained its name.

LINUM Catharticum, Purging flax, in *Medicine*, makes a common purge among the country people. It is almost as rough as that of *gratiola*.

It is a species of wild flax, distinguished by the name of meadow flax, with small flowers which appear in July, and commonly called mountain-flax, growing without culture on chalky hills and dry pasture grounds in many parts of England, and is taken in infusion in ale.

This herb is said to be an effectual and safe cathartic; an infusion of a handful of the fresh leaves in whey or white wine, or a drachm of the leaves in substance with a little cream of tartar and aniseeds, is directed for a dose. Linnæus recommends an infusion of two drachms of the dry leaves as a mild laxative.

It is greatly recommended by some in dropsies, and to prevent its griping they mix anise or some other of the carminative seeds with it. It is given in most chronic cases, where people's constitutions are strong enough to bear it, and often with great success.

LINUM Vivum, or incombustibile, cloth made of a sessile, stony substance, of a whitish colour, and woolly texture, separable into threads, or filaments, which will endure the fire without consuming. See *AMIANTHUS* and *ASBESTUS*.

As to the art of managing this mineral, and of spinning and weaving it, &c. the accounts we have are various.

Marco Polo, the Venetian, gives us the manufacture of the linum, found in the province of Chinchintheles, in Tartary, from one Curfica, a Turk, superintendent of the mines of that country, as follows. The lanuginous mineral, being first dried in the sun, is then pounded in a brass mortar, and the earthy part separated from the woolly, which is afterwards well separated from filth; being thus purged, it is spun into thread, like other wool, and afterwards woven into cloth, which, if foul or spotted, they cleanse, he says, by throwing it into the fire for an hour's time, whence it comes out unhurt, as white as snow: which very method, according to the account given us by Strabo, seems to have been used, in ordering the Cretan amianthus; with this addition, that after it was pounded, and the earthy part separated from the woolly, he says it was combed; and so does Agricola.

Signior Ciampani, after describing four sorts of the linum, whereof he had specimens in his museum; the first sent him from Corfu, the second from Sestri di Ponente, the third coarser and darker than the rest, and the fourth from the Pyreneans; and after observing, that though he kept it three weeks in a glass-house fire, yet he found it unaltered, though it could not preserve a stick wrapped in it, from the fire; he proceeds to shew the manner of spinning, and making it into cloth, which he effected thus:—He first laid the stone in water, if warm the better, for some time to soak; then opened and divided it with his hands, that the earthy parts might fall out of it, which are whitish

like chalk, and serve to bind the thready parts together. This makes the water thick and milky. That operation he repeated six or seven times, with fresh water, opening and squeezing it again and again, till all the heterogeneous parts were washed out, and then the flax-like parts were collected, and laid in a sieve to dry. As to the spinning, he first shews a method discovered to him, which is thus:—Lay the linum, cleansed as before, between two cards, such as they card wool with, where let it be gently carded, and then clapped in between the cards, so that some of it may hang out of the sides; then lay the cards flat on a table, or bench; take a small reel, made with a little hook at the end, and a part to turn it by, so that it may be easily turned round; this reel must be wound over with white thread; then, having a small vessel of oil ready, with which the fore finger and thumb are constantly to be kept wet, both to preserve the skin from the corrosive quality of the stone, and to render the filaments thereof more soft and pliant, by continuing to twist about the thread on the reel in the asbestos hanging out of the cards, some of the latter will be worked up together in it; and, by little and little, the thread may, with care, be woven into a coarse sort of cloth; and, by putting it into the fire, the thread and oil will be burnt away, and the incombustible cloth remain.

But finding this way, of uniting the stone with the thread, very tedious; instead of the thread, he put some flax on a distaff, and, by taking three or four filaments of the asbestos, and mixing them with the flax, he found they might be easily twitted together, and the thread thus made much more durable and strong; so that there is no need of carding, which rather breaks the filaments, than does any good: only open and separate the filaments, after washing, on a table, and take them up with the flax, which is sufficient.

As to the making of paper, he says, in the washing of the stone there will remain several short pieces in the bottom of the water, of which paper may be made in the common method. He concludes with the best way of preserving the cloth, or any thing made of the linen, which, by reason of its excessive dryness, is very apt to break, and twist; and it consists in keeping it always well oiled, which is the only preservative. When the cloth is put in the fire, the oil burns off, and the cloth comes out white and purified.

LINUM, in *Ancient Geography*, a country of Asia Minor, in the province of Hellepont, between Parium and Priæ. —Also, a promontory of Illyria, in Chaonia.

LINUS, in *Biography*, supposed to be the first bishop of Rome, was born at Volterra, in Tuscany. According to Irenæus he received his bishopric from the hands of the apostles Peter and Paul, which he is supposed to have retained twelve years. He is mentioned by St. Paul in the second epistle to Timothy, and is said, by some writers, to have been the son of Claudia, who is mentioned at the same time. Nothing more is known of him which can be relied on, though it has been said that he testified to the truth of his principles by suffering martyrdom; and two letters in the second volume of the Biblioth. Patr. have been ascribed to him, but there is no good authority for these facts. See Lardner, vol. ii. edit. 1788.

LINUS. This personage and Orpheus seem to have been the most ancient poets and musicians of Greece; but to determine whether Linus was the master of Orpheus, or Orpheus of Linus, would be as vain to attempt, as difficult to accomplish. All that can be done at this distance of time, is to compare the opinions of ancient writers upon the subject, and to incline to the most numerous and re-

spectable evidence: and in pursuing this method, it appears that the majority are in favour of the superior antiquity of Linus. No testimony places him in a more remote period, or does more honour to his memory, than that of Herodotus; who tells us (Euterp.) "that among other memorable customs, the Egyptians sing the song of Linus, like that which is sung by the Phœnicians, Cyprians, and other nations, who vary the name according to the different languages they speak. But the person they honour in this song, is evidently the same that the Grecians celebrate: and as I confess my surprize at many things I found among the Egyptians, so I more particularly wonder whence they had this knowledge of Linus, because they seem to have celebrated him from time immemorial. The Egyptians call him by the name of *Mineros*, and say he was the only son of the first of their kings, but dying an untimely death, in the flower of his age, he is lamented by the Egyptians in this mourning song, which is the only composition of the kind used in Egypt."

According to archbishop Usher, Linus flourished about 1280 years before Christ, and he is mentioned by Eusebius (Præp. Evang.) among the poets who wrote before the time of Moses. Diodorus Siculus, who is very diffuse in his account of Linus (lib. iii. cap. 85.) tells us from Dionysius of Mitylene the historian, who was contemporary with Cicero, that Linus was the first among the Greeks who invented verse and music, as Cadmus first taught them the use of letters. The same writer likewise attributes to him an account of the exploits of the first Bacchus, and a treatise upon Greek mythology, written in Pelasgian characters, which were also those used by Orpheus, and by Pronapides, the preceptor of Homer. Diodorus says, likewise, that he added the string *lichanos* to the Mercurian lyre, and gives to him the invention of rhythm and melody, which Snidas, who regards him as the most ancient of lyric poets, confirms. He is said by many ancient writers to have had several disciples of great renown, among whom were Hercules, Thamyris, and, according to some, Orpheus.

Hercules, says Diodorus, in learning of Linus to play upon the lyre, being extremely dull and obstinate, provoked his master to strike him, which so enraged the young hero, that instantly seizing the lyre of the musician, he beat out his brains with his own instrument. Heroes are generally impatient of controul, and not often gifted with a taste for refined pleasures; hence, relying merely on corporal force, their mental faculties, feeble perhaps by nature, are seldom fortified by education.

With respect to the dirges, which Plutarch, from Heracles of Pontus, mentions as written by Linus, we find no account of them in any other ancient author. It appears, however, that his death has given birth to many songs of that kind, which have been composed in honour of his memory. A festival was likewise instituted by the name of *Linia*, for the celebration of his virtues; and so numerous were his inventions, and various the periods and places in which different authors fix them, that some have tried to reconcile these jarring accounts, by supposing that there were three several illustrious personages of that name; a supposition which we shall not pretend either to affirm or deny.

"The Thebans, says Pausanias (in Bæotic.) assure us, that Linus was buried in their city; and that Philip, the son of Amyntas, after the battle of Cheronæa, which was fatal to the Greeks, excited by a dream, removed his bones into Macedon, whence, by counsel received in another dream, he sent them back to Thebes; but time has so defaced his tomb, that it is no longer discoverable."

Homer (lib. xviii. ver. 569.) has paid a tribute to the memory of Linus, in his description of the shield of Achilles.

"To these a youth awakes the warbling strings,
Whose tender lay the fate of Linus sings;
In measure'd dance behind him move the train,
Tune soft the voice, and answer to the strain."

Pope, in his note on this passage, says, from Pausanias, that "before the yearly sacrifice to the muses on mount Helicon, the obsequies of Linus were performed, who had a statue and altar erected to him in that place. Homer alludes to that custom in this passage, and was doubtless fond of paying this respect to the old father of poetry."

LIO, in *Geography*, a lake of Thibet, about 30 miles in circumference. N. lat. 31° 22'. E. long. 86° 34'.

LIOI-KIA-LANC-TSA, a town of Thibet, 100 miles S.S.E. of Lassa. N. lat. 28° 8'. E. long. 92° 44'.

LIOIPOU, a lake of Thibet, about 30 miles in circumference. N. lat. 34° 27'. E. long. 90° 34'.

LION, LEO, in the Linnæan system of *Zoology*, is a species of quadrupeds belonging to the *felis* or cat kind, with a long tail and pale-red or tawny body. See *FELIS*.

The lion is an inhabitant of all parts of Africa, and the hot parts of Asia, such as India and Persia, and some few are found in the deserts between Bagdat and Bassorah, on the banks of the Euphrates; but they most abound in the torrid zone, where the size is the largest, and their rage most tremendous, being inflamed by the influence of a burning sun and a very dry soil. It is observed, that, though they reign absolute masters over every beast, their rage diminishes and their timidity increases as they approach the habitation of the human race. They have been also known to spare the weaker animals, and many instances are related by A. Gellius, Ælian, and Pliny, &c. of their gratitude. Lions are capable of being tamed; and the monarch of Persia is said, on days of audience, to have two large lions chained on each side of the passage to the room of state, led there by keepers in chains of gold. The lion preys on all kinds of animals; having roused them into view by his roar, he starts on his prey, striking it with his talons, and tearing it to pieces. He also invades the folds, leaping over the fences with his prey, and his strength is so great, that he can carry off a middling ox with the utmost ease. He sometimes seizes his prey by surprize, and mankind falls a victim to his hunger, more through necessity, as it is said, than choice. The Arabs have a notion of his sparing the tender sex, but Dr. Shaw informs us in his *Travels*, p. 244, that the lion observes no distinction in these days. The flesh is often eaten in Barbary, and is said to resemble veal in taste. Pennant's *Brit. Zool.* p. 165, &c.

LION-Monkey. See *SIMIA Oedipus*.

LION, Seal. See *PHOCA Leonina*.

LION-PUCERON, in *Natural History*, the name given by Mr. Reaumur to a genus of worms which destroy the pucerons in the same manner that the formica leo does the *ants*.

These little insects are a prey also to a sort of worm hatched from the egg of a two-winged fly. This has no legs, and is of several colours. See *VER-PUCERON*.

Though these lion-pucerons be all hexapodes, yet they are of different origin; some being produced from the eggs of a four-winged fly, others from those of a beetle. As the formica leo has two horns, the extremities of which serve him by way of mouths, our lion-puceron has the same kind also; but as the former of these insects can only move backwards, and is forced to make snares for his prey, not being able to hunt it, this creature runs very nimbly in the com-

iron way, and seizes its prey, without having recourse to such stratagems.

The body of the lion-puceron is longer than that of the formica leo, and is flat; the breast is the thickest and broadest part of it, and from this it gradually tapers off to a point at the tail; it has two legs fixed to the breast, the other four to the anterior rings of the body; and when it moves, the posterior end of the body serves it in the place of a seventh leg, for it always bends it downward, and draws it along the surface it walks upon. The back of this creature is not smooth or glossy, but is every where rough, and full of wrinkles, and seems as if every ring of it was composed of several other smaller rings.

This is the general description of the creature, treating of it in the general way, these characters suiting all the kinds of it. There are others, however, by which the whole class may be divided into three principal kinds.

These are much more voracious devourers of the pucerons, than the worms which feed on them. A small puceron, seized by one of them, is eaten in an instant, and the very largest is not the work of half a minute for them.

These creatures are very small when first produced from the egg, and yet they immediately begin to feed. They are so ravenous of food also, that whenever they can they catch and eat one another. But as the pucerons, among which they live, are easier to be caught, they usually escape one another's fury pretty well; unless where there is a scarcity of the pucerons, or when they offend one another.

It is easy to conceive that a creature, which feeds so very fast, must soon arrive at its full growth; and this is the case with these animals, for within five or six days of their being hatched from the egg, they are ready for their final transformation, or the putting on the form of the animals to whose eggs they owed their origin. In order to this, the creature leaves the place where he has hitherto fed, and seeks the folds of a leaf, or some other such convenient receptacle, where it spins a web of very fine silk, every way surrounding its body with it, and under this cover passes the state of a nymph or chrysalis. The silk of this web is not only very strong, but the threads are very closely laid together, so that it is much firmer than the webs of any of the caterpillar kind. It is of a roundish figure, and is somewhat smaller than a pea.

This round figure is owing to the form into which they roll up their body, which serves as a mould for it; and the orifice, out of which the silky matter is produced, is at the extremity of the posterior part of the body. The creature continues in this state about three weeks, if it be in the beginning of summer that it goes into it; but if toward autumn, it remains in it all the following winter; and is afterwards, in spring, seen to come out in the form of a very beautiful fly, of a remarkable large size, in proportion to the creature it is produced from, and the web out of which it comes. It is a very long-bodied one, and much resembles the libella or dragon-fly, only that its wings are larger in proportion to its body: these wings are of a most delicately fine structure, the finest gawse being coarse and thick in comparison to them. These, when the creature is at rest, are placed in an angle over the body, and form a sort of canopy or tent for it; but they are so perfectly transparent, that the body is easily seen through them. The body and breast are all green, and that of a very beautiful tinge; but the most remarkable beauty of this creature is its eyes: these are large and prominent, and are of a fine gold colour, and of greater lustre than the most highly polished metal.

The eggs of this fly are a very singular object, and cannot have escaped the eye of any person who is conversant among

the insects which live on trees; though of the many who have seen them, perhaps few or none ever found what they really were. It is common to see on the leaves and pedicels of the leaves of the plum-tree, and several other trees, as also on their young branches, a number of long and slender filaments, running out to about an inch in length, and being of the thickness of a hair: ten or twelve of these are usually seen placed near one another, and a vast number of these clusters are often found on the same tree. The end of each of these filaments is terminated by a sort of swelling or tubercle of the shape of an egg. People who have observed these, have generally supposed them to be of vegetable origin, and that they were a sort of parasitical plants, growing out of others, as the mistletoe, mosses, &c. from the oak and other trees. They very much resemble in figure those species of mouldiness, which Malpighi and others have figured under the shape of little mushrooms, only they are much larger than those little plants, and bear the heat of the sun and other accidents uninjured, which would destroy the tender plants of that kind. There is a time, when these egg-like balls, which terminate every one of these filaments, are found open at their ends, and in this state they very much resemble flowers, and they are in this state figured by some authors under the name of flowers of a singular kind, found on the leaves of the willow. All this, however, is wholly erroneous, and the pursuing the history of our lion-pucerons shews their true origin to be from the fly of that creature. What these authors took for flowers of the willow were only the eggs of this fly, out of which the young animals had been hatched, and had made their escape. The leaves and branches, on which these eggs are found, are usually seen covered over with the pucerons; and the creature providing a place where her young shall find nourishment as soon as hatched, places her eggs in the midst of these harmless and defenceless animals, fixing each on a slender pedicle, yet sufficiently strong to bear its weight. If these eggs be nicely examined, a worm may be discovered in them while yet whole; but the most certain way of judging of them is, to put several of them into a box, in which case every one of them is found at a proper time to hatch, and to give an insect; which, when viewed by the microscope, appears plainly to be a lion-puceron in all its parts, and requiring only increase in size, without any change of shape, to be one of those we have already described, as feeding so voraciously on the pucerons. Reaumur's Hist. Inf. vol. vi. p. 142.

LION, *Ant.* in Zoology. See FORMICA LEO.

LION'S FOOT, *Candia*, in Botany. See CATANANCHE.

LION'S LEAF. See LEONTICE.

LION'S TAIL. See LEONURUS.

LION'S COVE, in Geography, a small bay in the straits of Magellan, surrounded by rocks. The water is deep, the ground is good, and water may be obtained, but no wood. The only refreshments which this bay affords are limpets, muscles, rock fish, and celery. S. lat. 53° 26'. W. long. 74° 25'.

LION MOUNTAIN, a mountain of Africa, near the Cape of Good Hope, deriving its name from a supposed resemblance to the lion. It consists of the Lion's head, which is a bare rock 2160 feet high; and the Lion's tail or rump, which is also rocky, but covered with a slight stratum of earth, 1143 feet high. This earth yields an inferior kind of grass, to which every one's cattle has access. Upon both these summits are erected ensign staves, upon which signal flags are hoisted as soon as any ships are perceived at sea. These signals, whilst the Cape remained in possession of the Dutch, were changed every month; and advices were sent two years before

before to Holland and the India settlements; and sealed letters, containing the detail of them, are given to the commanders of vessels, who are to touch at the Cape; which letters are opened when they arrive within sight of the mountains, that they may ascertain whether or not the place be in the hands of their countrymen, and accordingly avoid it or proceed to an anchorage in the bay. A cannon is also fired on Lion's head, so often as to correspond to the number of ships that appear, in order to give notice to Cape Town; and this notice is facilitated by the reverberation which the sound makes against the steep sides of the Table mountain.

LION D'Angers, Le, a town of France, in the department of the Maine and Loire, and chief place of a canton, in the district of Segré; 10 miles N.N.W. of Angers. The place contains 1728, and the canton 9578 inhabitants, on a territory of 247½ kilometres, in 12 communes.

LIONARDO DA VINCI, in *Biography*. See *Da Vinci*.

LIONCELES, in *Heraldry*, a term for lions when there are more than two of them borne in any coat of arms, and no ordinary between them.

LIONINE, or **LIONADE**, in the history of the *Coins* current in Ireland, a name given to certain coins, imported privately from France and other places. There were, beside these, many others of the same sort, impressed with eagles, roses, and the like, and called by names signifying those impressions. They were a very base and poor sort of money; the penny *lionade*, or *lionine*, not coming up to the value of the halfpenny of the coin of the kingdom. They were discontinued in the year 1300; and good money being struck there, it was made death, and confiscation of goods, to import any of them, and the run of them was thus stopped.

LIONS, in *Geography*, a town of France, in the department of the Eure, and chief place of a canton, in the district of Les Andelys; nine miles N. of Grand Andelys. The place contains 1828, and the canton 9905 inhabitants, on a territory of 125 kilometres, in 13 communes.

LIOSK, a town of Lithuania, in the palatinate of Troki; 20 miles W. of Grodno.

LIOTARD, JOHN STEPHEN, in *Biography*, a painter in enamel, crayons, and miniature, who was born at Geneva in 1702. He went to Paris to study in 1725, and thence accompanied the marquis de Pusieux to Rome, where the earls of Sandwich and Bathorough engaged him to accompany them to Constantinople. There he became acquainted with sir Everard Fawkener, our ambassador, who persuaded him to come to England.

He attempted to make himself conspicuous by adopting the habits and manners of the Levant, and acquired by that and his talents, which were far from contemptible, (particularly in enamel,) a considerable degree of encouragement among the nobility and gentry of this country. But his pictures want grace and taste; he was too close a copyist of what he saw, and did not make his pictures pleasing enough to hold his practice when Rosalba became his competitor in crayons.

LIP, or LIPS, in *Anatomy*. See **DEGLUTITION**.

LIP, Cancer of, in *Surgery*. Such cases as usually go under the denomination of cancers of the lip, are attended with considerable variety, both in regard to the manner in which they begin, and the appearances which they put on in their progress. It is often exceedingly difficult to pronounce, with certainty, whether particular ulcers of the lips ought to be called cancers or not. For, if we can trust to the reports of surgical authors, very inveterate sores upon

the lips are frequently excited and kept up by a disordered state of the abdominal viscera, and many instances at first taken for cancers, have in the end yielded to different remedies. Thus, a painful induration in the lip, which was supposed to be an occult cancer, is recorded to have been cured by the employment of enetic and purgative medicines, especially the *helleborus niger*. (Jourdain, *Maladies de la Bouche*, tom. ii. p. 172.) Richter and other continental surgeons consider it as ascertained, beyond doubt, that many bad ulcers of the lips are connected with gastric diseases, by which we are to understand disorders of the viscera subservient to digestion, as the stomach, liver, bowels, &c. We are informed of a malignant-looking sore of the lower lip, which proceeded from the projection of an unnaturally long incisive tooth of the upper jaw, and which healed of itself as soon as the irritating tooth was extracted. (Jourdain, l. c. p. 196.) Scorbatic sores upon the lips have sometimes been mistaken for cancers, and at length yielded to anti-scorbutic medicines. (Metzger *Adversaria*, vol. ii.) Even sores which have been occasioned on the lips by chilblains, have sometimes been erroneously regarded as cancers. Many ulcers on the lips which at first are quite of an harmless nature, are rendered malignant by the stimulating and caustic applications made use of, almost every unhealthy sore in this situation attracting a suspicion of carcinoma, and leading the hasty practitioner to dress it with irritating and escharotic substances. But the cases which, of all others, are the most liable to be mistaken for cancers of the lip, are venereal ulcers. These are said to have been sometimes cut out by indiscriminating surgeons, who, instead of seeing the wound heal favourably, have had the double mortification of witnessing the return of more extensive syphilitic ulceration in the part, and on the administration of mercury, having their blundering conduct detected by the offended patient, and exposed to the obloquy of the world.

Whoever meditates on the foregoing facts, must be convinced of the impropriety of making hasty and positive decisions, concerning the nature of ulcers on the lips. Bad ill-looking sores are, indeed, formed with particular frequency on these parts of the face; but most of them are not of so malignant and incurable a character, as to merit the appellation of cancer. Many of them, as we have already stated, are exasperated by wrong modes of treatment, and the lips, in consequence of their incessant motion, are unquestionably a disadvantageous place for cicatrization in general.

The diseases to which custom has assigned the name of cancer of the lip, may begin in different ways, and assume various appearances. They often commence in the form of a warty excrescence, which, after attaining a certain size, breaks out into ulceration. They frequently come on in the shape of a phagedenic ulcer; while, in other instances, they begin as a hard lump, which at last falls into the ulcerated state. In some cases much pain is experienced; in others, the degree of suffering is inconsiderable. The occasional causes are subject to equal variety. Sometimes the disease appears to come on of itself. In other examples, its origin is referred to a small pimple, chaf, or excoriation of the lip. We are told of a case, where a cancerous ulcer of the tongue and one side of the mouth occurred, in consequence of inadvertently drinking some liquor, with which an ulcerated cancer of the breast had been washed. (Gooch, *Chirurgical Works*, vol. ii. p. 127.)

The lower lip is that which is commonly affected, the upper one being attacked only in a small proportion of the cases which present themselves in practice. It is also alleged, that the disease is much more frequent in the male than

than the female sex. (Richerand, *Néographie Chirurgicale*, tom. iii. p. 253, edit. 2.) One important fact, in which all the best informed surgeons agree, is, that cancers of the lips and face in general are far less malignant than carcinoma of the breast, or at least, admit of being effectually extirpated with the knife or caustic with more extensive success. The prudent surgeon, before removing a cancerous breast, feels himself obliged to explain the possibility of a return of the distemper; but when the lip is the part affected, and care is taken to remove every particle of the disease, he may be much bolder in his promises.

The medicines usually tried in other cases of carcinoma, may be exhibited in those of cancerous lips. (See CANCER.) The internal employment of arsenic has in particular been much praised. On the whole, however, we have little confidence in any thing but extirpation, and it is only in doubtful cases, that delaying the operation to try the effect of medicines or applications can be very justifiable. Wasting time till the disease affects the lymphatic glands under the jaw, or spreads so extensively, that the wound after the operation cannot be united, is serious misconduct in the surgeon, for the ill consequences to the patient are irremediable. In the first case, the distemper under the jaw mostly cannot be taken away; in the second, if the lower lip be affected, as is commonly the case, great deformity, imperfect speech, and (what is more terrible) a continual slaverling must for ever remain; or at most, admit of only slight palliation by artificial contrivances.

There are now only two modes of extirpating cancers of the lip; one with caustic, the other with a knife.

In these cases, caustic has been very extensively employed, and success may be expected from the method, when the whole of the disease admits of being at once destroyed by a single application. But when the caustic must be repeatedly used, it not only proves in many instances ineffectual, but often aggravates the disease. Nearly all the varieties of caustic have been employed by different practitioners. The great thing is to have one that is exceedingly active, and the Kali purum with quick-lime is as good as any. We have read of a case which was cured by means of a burning glass, though we do not perceive any advantage that this plan can have over the employment of caustic. Comte, *Histoire de l'Acad. Royale de Médecine*, ann. 1776.

Let it not be inferred from the foregoing observations, that we are advocates for the use of caustic, as we frankly own, that although it was our duty to mention the practice, we should be ashamed of adopting it. In every case where caustic can be employed, the knife can always be used with advantage. It does its office more quickly, and with less pain, at the same time that it accomplishes the removal of the disease, and surrounding substance with greater certainty and exactness. But the grand recommendation is, that the wound made with a cutting instrument is such as can be evenly united by the first intention.

Notwithstanding the testimony of the best surgical writers, in support of the very frequent success attending the extirpation of cancers of the lip, one modern author is adverse to making such attempt at all, either with caustic or with the knife. (Jourdain, *Mal. de la Bouche*.) This doctrine, we confess, surprises us a good deal, as being so repugnant to the sentiments which we have derived, not merely from the most accurate books, but from the observation of numerous cures. If M. Jourdain has, in his own individual practice, met with many instances of a return of the disease after the operation, we cannot help suspecting, that his mode of extirpation must have been faulty and incomplete.

Although it is an important maxim in the operation, to

make the wound of such a shape as will admit of an even union, it is a still more important point to remove every particle of the disease. The majority of relapses are unquestionably imputable to the neglect of this material object, and not to the incurableness of the complaint. It is always better to remove too much rather than too little, for the lips are so very yielding, that, in numerous cases, nearly the whole lip has been cut away, and yet the wound has been united without deformity. At the time that we are writing this article (namely August 1811,) there is in St. Bartholomew's Hospital a case, where the greater part of the lower lip was removed by Mr. Vincent on account of a cancer; but, notwithstanding this great loss of substance, the edges of the wound were easily brought into contact.

The operator ought not only to take away all that is manifestly swollen, ulcerated, or indurated; he should be careful likewise not to leave any parts which are at all discoloured. In short, it is safest to make the incisions at some little distance from the perceptible boundaries of the distemper. The extent of the disease upon the inside of the lip will always demand careful examination.

When the whole lip is thoroughly cancerous, the practitioner is under the necessity of cutting every particle of it away, in which circumstance the wound will not admit of union, but must heal by granulations. On the contrary, when the extent of the disease is more moderate, the operator should always make the wound in the manner of that practised for the cure of the hare-lip, so that it may be united by means of the twisted future. (See HARE-LIP.) As the lips are very tensile, this method is generally practicable; and it is well known, that the twisted future may be successfully employed, though two-thirds of the lip have been cut away.

The sooner the operation is undertaken, the greater is the chance of success. Cases only become irremediable through delay, or an ineffectual use of caustic or the knife. The more extensive the malady is, the more difficult it is to cure. The case indeed is past relief, when the distemper has spread to the bones, the gums, the glands beneath the jaw, or any other parts which cannot be removed. The surgeon, however, must relinquish no case where there is a possibility of making an effectual removal of the morbid parts.

The mere magnitude of a cancerous tumour is not prohibitory of the operation. In one case, excision was performed most successfully, notwithstanding the excrescence was so large as to hang down on the breast. (Le Drac, *Observ.* tom. i. p. 78.) In another example, the operation had the happiest consequences, although the inside of the lip and cheek felt as rough as if it had been smeared all over with sand. (Richter's *Anfangsgr. &c.* Band 2, p. 326.) Richerand upbraids with timidity, surgeons who are stopped by the extent of the malady, and he contends, that extirpation should be undertaken, even though it be necessary to separate the soft parts from the lower jaw bone, provided the glands under the chin are free from disease. He informs us, that Chopart, after removing in one case the whole of the lip, and a portion of the cheek, was obliged to cover the denuded jaw with the integuments of the neck. Notwithstanding such loss of substance, the wound healed; the opening of the mouth remained for a time contracted; but it serves (says this author) for the admission of aliment, and gradually becomes larger, the power of better pronunciation also returning. *Néographie Chirurgicale*, tom. ii. p. 252. edit. 2.

Whenever the case is such, that an attempt to unite the wound can be practised, the surgeon must take away a triangular portion of the diseased lip, so that the incision may

referable

refenable the letter V, and its edges be easily brought together with the twisted future, as in the operation for the hare-lip.

The union of wounds of the lower lip is an exceedingly important object, since, besides the deformity, a more serious grievance arises from the separation, namely, the continual involuntary discharge of the saliva, which is naturally confined within the mouth by the lower lip. Nothing can be more annoying than such an infirmity, and by impairing digestion, it also proves extremely hurtful to the health. A patient whose lower lip is so extensively diseased, that extirpation cannot be effected, without inducing this affliction, is in a truly pitiable state.

That the health suffers greatly from the incessant loss of the saliva, is a fact confirmed by numerous cases. A woman had a cut through her lower lip, and the wound, being neglected, suppurated, and its margins healed. The consequence was that the saliva constantly escaped from her mouth, and from being a healthy-looking woman before the accident, she became rapidly emaciated, afflicted with stomach complaints and difficulty of digestion. Tronchin, being consulted, saw that her indisposition proceeded from the loss of a nutritious fluid. He advised uniting the division by the operation for the hare-lip. This was actually done by Ferrand. The loss of the saliva was prevented, and the patient soon regained her health and good looks again.

It would seem that children can bear the loss of a large quantity of the saliva better than adults. A little girl, six years old, was brought into the hospital of St. Louis, afflicted with a gangrenous carbuncle, that had not only spread to the whole lower lip, and soft parts about the chin, but also to the body of the jaw. The sloughing having stopped, the dead parts were detached, the body of the lower jaw-bone separated from the rami at the places of anatomical division. In this case, the circumstance particularly worthy of notice is, that although the saliva was incessantly running out of the mouth, so as to wet all the girl's clothes, she enjoyed, during the six months she was in the hospital, a good appetite, and had every appearance of being well nourished. See Richerand's *Nosographie Chirurg.* tom. iii. p. 255, edit. 2.

LIP, *Hare,*

LIP, *Preternatural Fissure of,* } See HARE-LIP.

LIP, *Wounds of.* In these cases the chief indication is to place the edges of the division in exact and even contact, in order that they may unite by the first intention. The twisted future will generally be found the most advantageous for this purpose. It is to be applied in the manner explained in the article HARE-LIP, in conjunction with narrow strips of adhesive plaster, and a bandage that will press forward the integuments of the face. Whether one or two pins ought to be used must depend upon the length of the division. When the wound is lacerated, or contused, it often cannot be hindered from suppurating, and union by the first intention is prevented. However, in such instances, a pin may frequently be employed with benefit, as a partial adhesion may take place, though the agglutination is not general. And even when these wounds suppurate, maintaining the edges near each other with strips of adhesive plaster will materially lessen the breadth of the scar, and expedite the cure. Sometimes it may be proper to poultice a contused or lacerated injury of the lip, where there is no immediate prospect of adhesion, and the part has a sloughy aspect; but this plan should only be continued till the wound puts on a cleaner appearance and begins to granu-

late; the proper method being now to apply adhesive plasters, and a pledget of any common unirritating ointment.

LIP of a Horse, in the *Manege*, is the skin that covers the sides of the mouth, and furrounds his jaws. A horse is said to arm or guard himself with his lips, when his lips are so thick that they cover their bars, and keep off the pressure of the curb.

LIPA, of λιπος, *fat*, a word used frequently by Hippocrates to express any thing fat or oily. He calls certain stools, which have a fatty appearance, by this name. These are esteemed a sign of great colliquation. He also applies it to a sort of fatty substance, often seen swimming on the surface of the urine like a spider's web: this the same great author gives as a sign of a consumption.

LIPA, in *Geography*, a town of Lithuania, in the palatinate of Novogrodek; 32 miles W. N. W. of Sluck.—Also, a town of Croatia, on the river Dobra; 10 miles S. W. of Carlstadt.

LIPARÆUS LAPIS, in the *Natural History of the Ancients*, the name of a stone usually found in Lipari, one of the Æolian islands, and brought thence in the time of the Greeks among the pumices, of which that place always afforded them a large quantity.

It was a small stone, about the bigness of a filbert, of an irregular and uncertain shape, and porous and friable constitution, like that of the pumices, but more easily falling to pieces on rubbing between the fingers than even the softest of them; the colour was a dusky grey, and the whole external surface plainly shewed that it had suffered changes by the means of fire. The stone at present, however, is so little regarded, that the writers on such subjects have even forgot to name it. They are sometimes brought to us, to this day, among the pumices from the burning mountains, but are not regarded.

LIPARI, in *Geography*, a volcanic island, or rather a group of such islands, in the Mediterranean, about twenty-four miles from the N. coast of Sicily. They were formerly called *Æolian Islands*, which see; and now *Isole di Lipari*, from the name of the chief of them. These islands were anciently known to be volcanic, and called *Volcanian*, but it is in modern times that their volcanization has been considered as an object of interesting research to philosophers, among whom M. de Luc, sir W. Hamilton, Dolomieu, and Spallanzani have distinguished themselves. These islands are commonly reckoned ten in number, though some by omitting and others by comprehending some barren rocks, have diminished or increased their number. The largest is Lipari, being 19½ Italian miles in circuit. Accordingly this island, from its extent, the city which renders it illustrious, the number of its inhabitants, its agriculture and commerce, claims pre-eminence above all the others by which it is surrounded. Nor is it less important in the estimation of the naturalist from the quantity, variety, and unusual beauty of the volcanic products which it contains. It is well known, by the testimony of Diodorus (l. 5.), that all the Æolian isles were subject to great eruptions of fire, and that their craters and mouths were visible in his time. As to Lipari, however, very few memorials have been preserved of its ancient conflagrations. Of the antiquity of the island, and of its existence before the Trojan war we are certain, since we learn from Homer, that, after the taking of Troy, Ulysses landed there, and was treated with the utmost urbanity and courtesy by king Æolus, during the whole month of his continuance there (*Odys. l. 10.*); and though we allow to the poet the usual licence of poetry, it is still most certain that he could not have named this island, and the city it contained, unless they existed at the time when he wrote his poem, above

3000 years ago. But if we consult other ancient and credible writers, we shall find that before *Æolus*, *Liparus* reigned in this island, and that from him it took its name, being before called "*Melogonis*," or, according to others, "*Meligunis*." The antiquity of this island may also be inferred from the manner of its production by subterranean eruptions, in which the decomposition of volcanized matters is necessary, which requires a considerable interval of time. If, therefore, *Lipari* had inhabitants and cities, and was a cultivated country before the destruction of *Troy*, it is evident that it must have existed many ages prior to that event. But from the time when mention is made in history of this island to the present day, it is pretty certain that no true eruption or current of lava has taken place in it; for if this had been the case, some memorial would have been preserved of it as well as of those of *Stromboli* and *Vulcano*. The stoves and the warm baths of *Lipari* are the only places in the whole island where any signs remain of unextinguished volcanos. *Spallanzani* made a circuit of this island for the purpose of first examining its shores, and he then ascended its mountains in its interior parts. In examining its shores, he began with the city of *Lipari*, which extends along the shores in the form of an amphitheatre; and in his researches in the harbour itself, under the castle of the city, he found that it is erected on an immense rock of lava, that rises perpendicularly from the water, and is entirely destitute of all vegetation, except a few stalks of the Indian fig (*Cactus opuntia*, Linn.) which grew in its fissures. This lava has for its base feldspar, is of a fine compact grain, of a scaly fracture, dry to the touch, and gives sparks, like flint, with steel. The colour is cinereous, approaching in many places to that of lead. This lava is joined to large masses of glass, which form a whole with it, without any separations or divisions in the middle. It is therefore the same lava, either retaining its own nature or transmuted into glass. This glass, like the lava, gives sparks with steel; but the lava is opaque, whereas the glass, in the angles and thinner edges, has a considerable degree of transparency. The ancient existence of fire in this place is evinced by another circumstance, *viz.* that the vitreous substances already noticed are frequently accompanied by pumice, which are, in fact, only an imperfect glass. In viewing the steep masses of glass and lava, which rise perpendicularly from the sea, like a wall, they are seen to be interspersed with different strata of pumice, which is of two kinds; the one heavy and compact, the other light and porous, and both of a cinereous colour. The first sort is of the same nature with the lava of the rock; but the other kind is rather scaly than filamentous, and its scales have a degree more of vitrification than the other. This pumice is usually a continuation of the other, and, according to our author, derives its origin from the greater degree of heat which it has sustained. Upon attentively examining this mixture of lava, glass, and pumice which forms the body of the rock, it appeared evident that there must have been several currents that had flowed down the sides, and, perhaps, from the summit, of the contiguous mountain *Della Guardia*, into the sea; since the direction of their descent is found on that side, and even the filaments of the pumices point towards that mountain. The lava, glass, and pumice exhibited neither feldspars, shorls, nor any other extraneous body, either, as our author conceives, because they have melted by the fire, or, perhaps, because they never existed in them. The lava and glass of the rock, when exposed to the furnace in separate crucibles, fused into a light-grey glass; the globules which before appeared in them melting at the same time; during liquefaction these substances, which filled only one quarter part of the crucible,

swelled so much, that they rose several times above the edges of the crucible, and flowed over its sides. The two kinds of pumice, though both derive their origin from the same feldspar, which is the base both of the lava and the glass, afford different results in the same fire; since their volume, instead of being augmented, is diminished, only retaining its former colour.

The haven of *Lipari* forms a curve in the shore, which to the south begins at the foot of the *Monte Capifullo*, and ends to the north-east at the bottom of the *Monte della Rosa*. After having examined that part of the shore which is contiguous to the harbour, lying under the castle, and on the right side of *Monte Capifullo*, our author made the circuit of the remainder of that curve to the base of *Monte della Rosa*. The objects that here attracted his notice were first a tufa, which the industry of the inhabitants had converted into a soil suitable to small vineyards, and next a mass of crags and precipices, partly fallen into the sea, and partly threatening to fall; among which, besides scoræ of an iron colour, he met with beautiful volcanic breccias of lava of a petrosiliceous base, containing small particles of glass and pumice. At the foot of the *Monte della Rosa*, where the harbour of *Lipari* ends, our author perceived on the shore a stone, which, from its singularity, drew his attention. It formed a rock rising in part above the sea, and in part concealed by the water. It was at first taken for a jasper: its ground was of a red-blood colour; it gave sparks strongly with steel, was of a rather fine grain, and had almost the hardness of quartz. On a more attentive examination this stone was perceived not to be simple like the jasper, but of a compound formation, containing in it reddish scales of feldspar and shorls, which gave it the character of that kind of porphyry which has for its base a hard horn-stone. This substance our author, after careful investigation, cannot exclude from the number of true and real lavas, though he cannot affirm that its redness is an effect of calcination, as is the case in other lavas, since of this it does not exhibit the slightest indication. The reasons of fact on which *Spallanzani* grounds his opinion, that this porphyritic rock has passed into the state of lava, are two; the great number of minute cells it contains in many parts of it, and the direction of those cells. Hence he concludes, that this stone is not only a true porphyritic lava, but that it once flowed from the mountain to the sea, and in its motion the naturally circular figure of its pores or cells was changed into an oval. The same appearance has always been observed, on a smaller scale, in re-melted lavas, and glasses. All the species of this kind of lava are not, however, of a blood-red colour; some of them are of a duller red, though the component principles of both are essentially the same. This lava, when fused in the furnace, doubled its volume, and its upper part assumed a vitreous convexity, which was smooth, shining, semi-transparent, and of a greenish tincture; but internally it was a very black vitreous scoræ, extremely porous, and sufficiently hard to give sparks with steel.

In pursuing his tour our author found that *Lipari*, like the other *Æolian* isles, is at its base more or less corroded by the sea, which is frequently in a state of violent agitation: the lower excavations cause the parts above them to give way, and, in a series of years, great masses fall into the sea. To this the nature of the lava, which is full of cracks and fissures, considerably contributes; not to mention the influence of the humidity of the atmosphere, and other destructive elements. Large heaps of these fragments accumulate on the shore, and make room for others, and thus a gradual diminution of the island takes place. Beyond the harbour

harbour and the porphyritic rock, our author found the sea forming a kind of bay within the land, round which a few cottages are built, affording shelter to a small number of inhabitants, who subsist by the profits of a vineyard that ill repays their labour. The name of this place is Canneto; and above it is a current of lava, of an argillaceous base, similar to that of the Arlio in Sicily. At the distance of three miles from the haven of Lipari is Campo Bianco (the White field), so called, because it is a lofty and extensive mountain, composed entirely of white pumices. For the nature, production, and properties of *Pumice*, we refer to that article. The mountain, which is a prodigious mass of pumice, rises almost perpendicularly from the sea, and, seen at a distance, appears to be about a quarter of a mile in height, and above half a mile in breadth. No plants grow upon it, except a few without fruits, like those on the tops of the Alps. Its sides are streaked with numerous furrows, widening and deepening as they approach the bottom, and formed by the rains, which easily corrode and excavate a substance so soft and yielding as pumice. The sea at the bottom has likewise occasioned great devastations, by means of which is laid open to view a large vein of horizontal lava, on which the last wave dies away when the sea becomes calm. The formation of this lava was, therefore, prior to the vast accumulation of pumices which rest upon it. This mass of pumice is an aggregation of numerous beds, or strata, of pumices, successively placed on each other, distinguishable by their colour and by their projection from the mountain. Some of these pumices are so compact that the smallest pore cannot be discerned, nor do they exhibit the least trace of a filamentous nature. With a lens they appear to be an irregular accumulation of small flakes of ice. Others are full of pores and vacuities of a larger size, usually round; and their texture is formed by filaments, and streaks, generally parallel to each other, and of a shining silvery whiteness. Of these pumices there are three kinds, which the people of Lipari dig for sale. One kind is employed in polishing different substances, and the other two kinds are used in the construction of arched vaults, and the corners of buildings. There are other kinds which merit the attention of the natural historian. In examining these pumices our author obtained the following results:

	1st Species of Campo Bianco.	2d Species.	3d Species.	4th Species.	Pumice of the rock of the castle of Lipari.
Silex	60.3	80	80	61	63
Alumine	23	6	4	22.7	24
Magnesia	6	3	2	6	5.6
Lime	6	4.7	4	5.8	3
Iron	3	4.8	5.3	3	2

Beyond Campo Bianco and its adjacent hills, rises a mountain of another kind, called the Monte della Castagna, which, in the part of it descending to the sea, is about one mile in extent, and above four miles in circumference. This mountain, according to Dolomieu and our author, is entirely composed of enamels and glasses. For the description of these in their number and variety, we must refer the reader to the work before us. Campo Bianco and the Monte della Castagna, though apparently isolated, are in reality a connected group, taken in its whole extent, having a circuit of eight miles; nor is the extent of its vitrifications less, if in these we include likewise the pumices, which are in fact only a less perfect glass. The sterility of these mountains is a consequence of their vitreous nature, which, in the course of so many ages, has not been decomposed into a vegetable earth: if we except a few lichens attached

to the fissures of the glasses, there is no vestige of a single living vegetable over the whole Monte della Castagna; and on Campo Bianco they are extremely rare. Beyond the pumices, the lavas again appear, beginning from the "Punta del Segno Nero," and extending in a chain of several miles, which on the side of the sea descends in precipices and craggy declivities: and proceeding further, the sea makes an incurvature and forms a small bay, called the Valle di Muria, on the sides of which rise high and steep rocks of lava, half demolished, and among the lava enamels and pumices. In examining the interior of the island, Monte San Angelo, situated to the north of the city of Lipari, is the highest mountain, on the summit of which is a circular plain, surrounded by eminences shelving towards the inside, which M. Dolomieu imagined to be the remains of an ancient crater, and which he supposes to have been the first that was formed in the island, about a mile above the sea, through which the volcano burst forth, and which served as a base and support for the other mountains that were thrown up afterwards. Soon afterwards rose its companion, the Monte della Guardia, which looks towards the south, and little inferior to the other in height. These two mountains formed two islands in the sea, which, enlarging each its respective base, united into one. To these two mountains subsequent eruptions made new additions, until at length the whole island of Lipari was produced, which, from the erosions of the rain and sea, is now certainly less than it once was.

Lipari, if we except some few flat places and practicable declivities, which the inhabitants have rendered cultivable by great labour, is a ruinous pile of horrid precipices, rugged cliffs, and enormous masses; and there is no summit, nor projecting part of a mountain, which does not exhibit manifest indications of its future fall and destruction. The materials of which these ruins are formed are pumices, enamels, and glasses, similar to those which we have already mentioned.

The celebrated flices of Lipari have exercised the curiosity of travellers. These lie four miles W. of the city, and somewhat beyond the summit of a mountain, which, next to those of San Angelo and della Guardia, is one of the highest in the island. The road from the city to the flices is formed by a deep excavation, chiefly the work of rain-waters, in an immense mass of tufa. Our author conceives that the volcanic tufas have been formed by slimy eruptions; without denying, however, that ashes, sand, and other subtile matters ejected by volcanoes, and penetrated either by the rain-waters, or those of the sea, where they covered the bases of the burning mountains, have been consolidated into some tufas. The tufa of Lipari, to which we now refer, has every appearance of having been an earthy current in our author's opinion. It begins at about 100 paces from the city, and continues, without interruption, to beyond the summit of the Monte della Stufa, or Mountain of the Stoves. (See Tufa.) The flices, terminating a descent of about 200 feet in length, form a group of four or five caves, more like to the dens of bears than the habitations of men, and exhibiting much less art than the edifices formed by the beaver. Every cave has an opening at the bottom, through which the warm and humid vapours enter, and another in the top, through which they pass out. On one of these flices the thermometer stood at only 48°; but the vapour possesses somewhat of a suffocating nature. The flices now retain little more than their name, and whatever may have been their supposed virtue in the cure of disorders, they are now nearly deserted. Under the flices, and the adjacent

ground, there is reason to believe, that some remains of sulphureous conflagrations still continue.

Lipari, we have already observed, is the largest, and it is also the most populous of those called the Æolian isles; the number of its inhabitants amounting to between nine and ten thousand, most of whom reside in the city of the same name. If the island be divided into four parts, about $2\frac{1}{2}$ will be found to be cultivated, and the remainder overgrown with wood, and barren. These barren tracts, however, are gradually converted into fruitful fields, from a kind of necessity arising from the continually increasing population of the island. Lipari produces cotton, pulse, and olives, in small quantities. The corn is scarcely sufficient for the supply of the city. The principal of the useful productions of this island are the grapes, of which there are several kinds. The first furnishes the common wine that is drank in the island, and of which they export annually two or three thousand barrels. The passole and passolina, as they are called in the island, are two other kinds of grapes that are dried. The last is that sort which is usually called the Corinthian grape. Of this they commonly sell 10,000 barrels annually; and of the other about 12,000. From a fourth kind of grape is made the famous Malvasy of Lipari; which is a wine of a clear amber colour, generous and sweet. The grape producing this wine is scarce, and does not furnish more than 2000 barrels annually, which are sold for foreign markets, as well as the passole and passolina. The vintage is in the month of September, which is a season of relaxation and festivity to the Liparese. Another plant of domestic use to the Liparese, if it does not form a branch of foreign commerce, is the Indian fig (*Cactus opuntia*, Linn.) Nothing can be more wretched than the fishery of Lipari. In June and July they fish for coral; but owing to a want of skill, this fishery is very unproductive. At Lipari large and small cattle are very scarce; and the few oxen and cows which are slaughtered there are brought from Sicily, and are very lean. Of wild quadrupeds, the country only produces rabbits, which make their burrows in the mountainous parts, where the volcanic matters, principally of the tufaceous kind, permit them to dig with their feet. The birds stationary here are but few, viz. the partridge, green-finch, sparrow, gold-finch, horn-owl, and raven. Of migrating water-fowls, here are different kinds of sea-gulls and the cormorant. The birds of passage are the turtle-dove and the quail, which come for a few days in April and September. Several kinds of swallows are common.

Foreign commerce has begun to be introduced into the island by the mariners; they every year buy, at the fair of Sinigaglio, linen, muslins, veils, and other commodities of that kind; and sell them at Messina, Catania, Palermo, and other parts of Sicily. The trade is very advantageous to the country, and many have acquired considerable wealth; though it injures the fishery and raises the price of fish. Strabo, Diodorus, and Dioscorides say, that the sulphate of alumine (alum) was procured in great abundance at Lipari; but none of this salt is now extracted in the island.

The political administration of Lipari is composed of a criminal judge, a fiscal, a governor, who has the chief authority both in military and civil affairs, and who is commonly an old invalid; and a civil judge. The bishop, seventeen canons of the first order, and fourteen of the second, and from 120 to 130 priests, form the ecclesiastical establishment. The Liparese are, in general, of a prompt and lively wit, ready to learn, of acute penetration, and very desirous of obtaining knowledge. A beggar is scarcely ever found in this island; for the poorest persons have some

small piece of ground which they cultivate, and by the produce of which they live. The natives are rather of a large size, robust, and comely. The heat of the sun, however, injures their fine complexions, producing tanned skins and swarthy countenances. The Liparese, in general, value themselves upon being good mariners, both in theory and practice. Spallanzani's Travels in the Two Sicilies. &c.

LIPARI, an ancient city of the above island, forming an amphitheatre along the shore, with a chain of mountains behind it, not of an extensive circuit, and consisting rather of narrow alleys than streets. The castle is surrounded with a wall, on which are erected a few cannon, and is defended by a small garrison. The houses are indifferent buildings; but three edifices are distinguishable from the rest; viz. the palace of the bishop, the house of the governor, and the cathedral church. The latter contains very costly sacred utensils, a great quantity of plate, and a number of silver images, among which is the statue of St. Bartholomew, their patron saint. The value of this treasure is said to amount to 90,000 Neapolitan scudi; the scudi being worth about 4s. 3d. N. lat. 38° 35'. E. long. 15° 12'.

LIPARIA, in Botany, so named by Linnæus, in his second *Mantissa*, in allusion either to the smooth or sleek habit of *L. sphaerica*, from which his idea and character of the genus was taken, or to its rich and splendid appearance, for the Greek word *λεπτός* will justify either explanation. Professor Martyn gives the former; we prefer the latter.—Linn. Mant. 156. Schreb. 499. Willd. Sp. Pl. v. 3. 1114. Mart. Mill. Dict. v. 3. Thunb. Prodr. 123. Ait. Hort. Kew. ed. 1. v. 3. 48. Juss. 353.—Class and order, *Diadelphia Decandria*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminosæ*, Juss.

Gen. Ch. Cal. Perianth of one leaf, inferior, very obtuse at the base, divided half way down into five acute segments, the lowermost of which is very long, elliptical, and resembling a petal. Cor. papilionaceous, without any spurs or elongations to the keel or wings. Standard oblong, folded, straight, reflexed at the sides. Wings oblong, straight, narrower at the base, two-lobed at their inferior margin. Keel lanceolate, slightly ascending, divided deeply at the base. Stam. Filaments in two distinct sets; one simple; the other in nine divisions, which are thread-shaped, three of them shorter than the rest; anthers ovate. Pist. Germen sessile, very short; style thread-shaped, of a moderate length; stigma simple. Peric. Legume ovate. Seeds few.

Eff. Ch. Calyx in five segments, the lower one elongated. Wings of the corolla two-lobed at the lower side. Three of the united stamens shorter than the rest. Legume ovate.

This splendid genus of shrubs, from the Cape of Good Hope, is in every respect closely allied to *Borbonia*, next to which it ought to stand in the Linnean system, though Murray, who has been heedlessly followed by others, widely separated them. *Liparia* differs from *Borbonia* in being truly diadelphous. How far the other characters indicated in their descriptions hold good, we have not sufficient acquaintance with all the species of either genus to determine, but there is no difference with regard to habit or appearance. Two species are described by Linnæus, Mant. 268, 269, and four more indicated with doubt, amongst which is *Spartium capense*, (*Crotalaria eppysia*, Linn. Suppl. 322.) The rest stand as *Liparis* in Syst. Veg. ed. 14. 665, making five in all, to which eight are added by Thunberg, and the whole thirteen are admitted by Willdenow. The habit of the genus is rigid, with numerous, scattered, sharp, usually elliptical, rarely linear leaves, which are either smooth, hairy, or silky. Flowers, as far as we know, of a

fine rich yellow, in terminal heads or umbels. Examples are

L. sphaerica. Linn. Mant. 268. Andr. Repof. t. 568. Curt. Mag. t. 1241.—Flowers numerous, in bracteated drooping heads. Leaves elliptic-lanceolate, ribbed, smooth.—According to Andrews this was raised by Mr. Milne, gardener at Fonthill, Wilts. We received it from Mr. Anderson, curator of the splendid collection of James Vere, esq. at Kensington Gore. The *shrub* is five or six feet high, clothed with numerous, spreading or recurved, glaucous leaves, above an inch long, entire, and strongly ribbed. The large drooping round heads of golden flowers, are singularly magnificent, accompanied by numerous reddish bractes, differing from the leaves chiefly in colour and situation. The whole plant unavoidably turns as black as ink in drying. It blossoms in May.

L. graminifolia. Linn. Mant. 268.—Flowers capitate. Calyx hairy. Leaves linear-lanceolate, smooth.—Grows in a sandy soil at the Cape. We have seen it in a dry state only, nor is any figure extant. The very narrow leaves, an inch or inch and a half long, and about a line wide, are peculiar, as well as the hairy heads of flowers, much smaller than those of the foregoing. The branches are angular and smooth.

LIPARIS, a name given by some authors to the pin-guicula, butter-wort, or Yorkshire fanicle.

LIPARIS, in *Ichthyology*, a species of *Cyclopterus*; which see.

LIPARIS *Noftras*, the name of a small fish, common on the coasts of Yorkshire, and some other parts of England, and called in English the snail, and limax marinus by some authors. It is about five fingers long; on its back and sides it is of a bright brown, and on the belly of a fine white: these are its colours, when fresh taken, for when it has been kept ten or twelve hours, the whole surface of the body, except the fins, becomes of a paler and bright brown. The head is thick, and not flat, but rounded; it has no teeth, but its jaws are both rough like files.

The whole fish, head as well as body, is very soft and unctuous, and easily melts into a sort of oily liquor. It is caught principally at the mouths of great rivers where they open into the sea.

LIPAROCLE, from *λίπος*, fat, and *κλῆρ*, a tumour, in *Surgery*, any kind of tumour composed of fat.

LIPAVINA, in *Geography*, a town of Croatia; 12 miles E.N.E. of Creutz.

LIPCZANI, a town of Poland, in the palatinate of Braclaw; 60 miles W.S.W. of Braclaw.—Also, a town of Moravia, on the Pruth; 24 miles S.S.E. of Choezim.

LIPENIUS, MARTIN, in *Biography*, a German Lutheran divine, known only by his works, which are “On the Navigation of Solomon’s Ships to Ophir,” 1661; “A Treatise on Christmas-Boxes or New-Year’s Gifts;” but his most important work is entitled “*Bibliotheca Realis*,” in 6 vols. folio; consisting of a view of all the subjects into which the different sciences are branched, with a catalogue of the names and works of the various authors who have treated concerning them. Moreri.

LIPES, in *Geography*, a town of Peru, and capital of a jurisdiction, under the viceroy of Buenos Ayres; 150 miles S.S.W. of Potosi. S. lat. 21° 40'. W. long. 68° 16'.

LIPETSK, a town of Russia, in the government of Tambov, on the Voronez; 40 miles W.N.W. of Tambov. N. lat. 53°. E. long. 40° 24'.

LIPETZ, a town of Bohemia, in the circle of Konigin-gratz; 9 miles S. of Neu Biezow.

LIPINSKOI, a town of Russia, in the government of Novgorod; 16 miles S.E. of Novgorod.

LIPNISKI, a town of Lithuania, in the palatinate of Wilna; 20 miles E.N.E. of Lida.

LIPNITZ, a town of Bohemia, in the circle of Czaflau; 6 miles W. of Teutfeh-Brod.

LIPNO, a town of the duchy of Warsaw; 12 miles N. of Dobrzyn.

LIPODERMUS, or LEIPODERMOS, (from *λεῖπω*, to leave, and *δέρμα*, the skin,) in *Surgery*, wanting the prepuce.

LIPORANO, in *Geography*, a town of Naples, in the province of Otranto; 3 miles S. of Tarento.

LIPOTHYMYA, or LIPOPSYCHIA, in *Medicine*, from *λεῖπω*, deficio, and *δύμος*, animus, or *δύχη*, anima, signifies a sudden faintness, or temporary deficiency of the nervous power, and of all the functions depending upon it. It is called also *deliquium animi*, swooning, syncope, &c. See SYNCOPE.

LIPOWE, in *Geography*, a town of Lithuania; 25 miles N.N.E. of Braclaw.

LIPOWIEC, a town of Austrian Poland, on the Vistula, to which belongs a castle on a rock, used as a prison for ecclesiastical offenders; 20 miles W. of Cracow.

LIPPA, a town of Hungary, on the Maros; 22 miles N. of Temeswar.

LIPPE-SHAUMBERG, WILLIAM, Count, in *Biography*, son of Albert Wolfgang, count Lippe and Schaumberg, by a daughter of count Oynhausen, was born in 1724 at London, but was sent, in 1735, to Geneva, to complete his education. Here he devoted much of his time to the study of mathematics, as connected with the military art. In 1740 he returned with his brother, and in the following year they were both sent to the university of Leyden, from which they removed in a short time to Montpellier, in France. At the age of eighteen he repaired to England, and obtained an ensign’s commission in the first regiment of guards. On the death of his eldest brother he returned to Buckebourg, the family residence, in Germany, and soon after accompanied his father, a lieutenant-general in the Dutch service, during the campaign in the Netherlands, and was present as a volunteer at the battle of Dettingen, where he was distinguished as well for his good conduct as for his bravery. In the year 1745 he joined the Austrian army in Italy, and was promoted, in consequence of his services, to be a colonel in the Austrian army, but he declined acting under the commission. In 1746 he travelled over a considerable part of the continent, and from thence he came to England, where he remained till he succeeded to his paternal estates in 1748, when he repaired to Berlin, to surrender into the hands of his Prussian majesty the order of the Black Eagle, which had been conferred on his father. Here he formed an acquaintance with many persons of distinguished literary merit, and he was elected a member of the Academy of Sciences. After this he was distinguished as a military man in the Prussian army, raised a regiment of grenadiers from among his own subjects, and was honoured by Frederic with the order of the Black Eagle. In 1754 he established a foundery at Buckebourg, where he had all the cannon cast which he afterwards employed in the seven years’ war against the French. In 1756 he entered into a treaty with Great Britain, by which he engaged to assist his Britannic majesty in the defence of his German dominions against the arms of the French, and to furnish for that purpose a regiment of infantry of a thousand men, a corps of artillery, and another of carbineers and chassurs. He was present at the battle of Minden, and in many other posts of much danger. In 1758 he was ordered to withdraw his forces from the allied army,

army, and join the Austrians against the king of Prussia: he refused, though at the risk of being put under the ban of the empire, and continued faithful to the engagements which he had entered into with England. In 1759 the count obtained the command of the whole artillery of the allied army; took a considerable share in the battle of Todenhausen, and the success of the day was in a great measure owing to the artillery of which he had the command. He was in the same year successfully engaged in the sieges of Marburg and Munster. On his return home, in 1760, he formed an artificial island in the Steinheeder lake, which is a mile in length, and half a mile broad, and being surrounded by morasses, is without the reach of cannon. Here he constructed a fortress, which was considered as impregnable, and it contains, besides the usual apartments, a chapel, and a library furnished with the best books on engineering, a collection of models, another of natural curiosities, and lodgings for the officers, with a school for engineers, and an observatory. In 1761, when the war broke out between Spain and Portugal, count Lippe was appointed by his Britannic majesty as commander-in-chief of the British troops sent to the assistance of the latter. He was afterwards entrusted with the command of both armies, and in 1762 proceeded, by way of England, to Portugal. Soon after his arrival, the king ordered the sum of forty thousand crusadoes to be paid him for his establishment, but he immediately distributed one-half of the money among the soldiers, and sent back the remainder, except what was sufficient to pay for his uniform of field-marshal, to the king. His majesty even offered him a pension of 3000*l.* but this the count declined, and nothing could induce him to accept of that remuneration of his services to which he was unquestionably entitled. By his exertions principally, Portugal was protected from the danger threatened to it by her powerful and ambitious neighbour. The king of Portugal, Joseph I. who knew how to appreciate count Lippe's talents, employed him in a civil as well as military capacity, and, in consequence of his advice, introduced many improvements into the political administration of the kingdom, and particularly into the financial department. His principal object was to establish the army on a respectable footing, and to inspire the soldiery with a more delicate sense of honour. The war which he carried on with Spain was merely a defensive one, but he effected more by it than he could by one of a contrary description, as he was enabled to throw so many obstacles in the way of the enemy, that their plans were rendered entirely fruitless. In 1763, before he left Portugal, he established a school of artillery, and constructed on the Spanish frontier a very strong fortress, which, in commemoration of his name, was called Fort Lippe. At the general peace the count returned to Germany, carrying with him abundance of presents from the kings of Portugal and England, in testimony of their esteem and approbation. He now employed much of his time in the study of the military art, and in bringing his theories to the test of practice. As the result of his experience and observations, he wrote a treatise on the art of defensive war, in six small volumes, which is said to possess much merit, but of which he had only ten copies printed. In 1767 he revisited Portugal by the king's invitation, and completed the reform which he had begun in the Portuguese army. In the following spring he returned to Germany, and soon after was honoured with a visit from Frederic II. of Prussia. The remainder of his life he employed in promoting the prosperity of his states, and the happiness of his subjects. He died in 1777, in the fifty-fourth year of his age. Sublime thoughts and heroic sentiments had been as familiar and natural to his mind as they

were to the noblest characters of Greece and Rome. The animation of his features announced the elevation, sagacity, penetration, kindness, virtue, and serenity of his soul. In his retirement he amused himself with the arts and sciences, but his favourite studies were philosophy and ancient history. He possessed an extensive knowledge in every department of literature, and by his travels in foreign countries he had become familiarly acquainted with the French, English, Italian and Portuguese languages: he was an excellent draftsman, a great connoisseur in paintings; and excelled so much in music, that he was able to direct the concerts which were given in the evening at his residence. Gen. Biog.

LIPPE, in *Geography*, a county of Germany, W. of the bishopric of Paderborn, divided into several branches, which derive their names from the different towns and parts of the principality belonging to each. The country, generally mountainous, contains some good arable land. Its chief towns are Detmold and Lemgow, and the principal rivers are the Emmer and the Werra. It now forms a part of the kingdom of Westphalia.—Also, a town of Westphalia, called *Lippstadt*, on a river of the same name; 14 miles W. of Paderborn. N. 51° 39'. E. long 8° 24'.

LIPPEHNE, a town of the New Mark of Brandenburg; 26 miles N. of Custrin. N. lat. 53° 4'. E. long. 15° 3'.

LIPPI FRA. FILIPPO, in *Biography*. Concerning the exact date when the birth of this very excellent historical painter took place, authors differ extremely. The most probable account fixes it about the beginning of the fifteenth century, as he was a scholar of, and of course nearly contemporary with, Massaccio. At the age of sixteen, being entered a novice in the convent of Carmelites at Florence, where he was born, he had there an opportunity of seeing that extraordinary artist at work upon the astonishing frescoes with which he adorned the chapel of Brancacci, in the church there; and became eager to embrace the art he saw capable of so much effect in affording gratification, instruction, and interest to the mind.

Such was his success, and so did he enter into the principles and manner of his great master, that after the death of the latter, it was said, by common consent, that the soul of Massaccio still abode with Fra. Filippo.

He forsook the habit of his convent, and devoted himself entirely to painting; but his studies were for a time disturbed by his being unfortunately taken, while out on a party of pleasure, by some Moors, and carried prisoner to Barbary; where he remained in slavery 18 months. He obtained his liberty by his talents. He drew the portrait of his master upon a wall with so much spirit and accuracy in resemblance, that he, being struck with the ingenuity of his slave, and generously feeling compunction in confining a man of such useful talents, gave him his freedom as a reward.

On his return home he painted some works for Alfonso, king of Calabria. He employed himself also in Padua; but it was in his native city of Florence, that his principal works were performed. He was employed by Cosmo di Medici; who presented his pictures to his friends; and one to pope Eugenius IV. He was also employed to adorn the palaces of the republic, the churches, and many of the houses of the principal citizens; among whom his talents were held in high estimation.

The holy mode of life into which he was conducted in early years, and the fine endowments of mind which he enjoyed by nature, did not teach him the folly of vice; and he met in this world with a severe punishment, justly due to a guilty amour he indulged in at Spoleto; where he was employed at the cathedral to paint the chapel of the Blessed

Virginia. There, in his sixty-seventh year, he was poisoned by the relations of the lady whose favours he was supposed to enjoy. Lorenzo di Medici erected a marble tomb in the cathedral to his memory, which Angelo Politiano adorned with a Latin epitaph.

LIPPI FILIPPO, son of the former, was renowned for excellent imitations of architectural ornaments. He died in 1505, at the age of 45.

LIPPI LORENZO, also a Florentine painter, born in 1606. He was likewise a great musician and a poet. In the latter character he published "Il Malmantile racquillato." He died in 1664.

LIPPIA, in Botany, was so named by Houttoun, in honour of Anguine Lippi, a French botanist, as we learn from Linnaeus's *Critica Botanica*, p. 93. He is also mentioned by Boehmer, in his dissertation *de plantis in cultorum memoriam nominatis*, as having travelled into Egypt, and as having died in Abyssinia—Reliq. Houtt. 6. Linn. Gen. 322. Schreb. 396. Willd. Sp. Pl. v. 3. 356. Mart. Mill. Dict. v. 3. Michaux Boreal. Amer. v. 2. 15. Jacq. Amer. 176. Jul. 109. Lamarck Houtt. t. 539. Gærtn. t. 56.—Class and order, *Didymia Gymnospermia*. Nat. Ord. *Stelatae*, Linn. *Viticeae*, Jul.

Gen. Ch. Cal. Perianth inferior, of two distant, acuminate, keel-shaped, erect, permanent leaves. Cor. of one petal, unequal; limb divided into four segments, the upper and lower ones larger, the upper one erect. Stam. Filaments four, shorter than the corolla, two of them shorter than the rest; anthers simple. Pist. Germen superior, ovate, compressed or flattish; style thread-shaped, standing between the stamens, and of equal length; stigma oblique. Peric. none, except the permanent calyx in which the seeds are enveloped. Seeds two, adhering together, ovate, somewhat bony, convex on one side, rather smooth, flat on the other side, or somewhat concave, whitish.

Eff. Ch. Calyx four-toothed, two-valved when mature. Corolla funnel-shaped, four-cleft. Seeds enveloped in the calyx.

1. *L. americana*. Linn. Sp. Pl. 883. Reliq. Houtt. t. 12.—Heads of flowers forming a pyramid. Leaves ovate, serrated.—Found by Dr. Houttoun at Vera Cruz, and cultivated by Mr. Miller before 1733.—This is a shrub which rises to a considerable height. Stems round, compressed at their joints. Leaves lanceolate, ovate, rugged. Flowers forming little oblong heads, about the size of a large pea.

2. *L. hemisphaerica*. Linn. Sp. Pl. 883. Jacq. Amer. t. 179. f. 100.—Heads of flowers hemispherical. Leaves oblong, entire.—A native of South America.—Stems eight or ten feet high. Branches woody, bending down unless supported. Leaves opposite, two or three inches long, smooth. Flowers small and white. The whole shrub is odorous and aromatic.

3. *L. hirsuta*. Linn. Suppl. 238. Willd. n. 2. (*L. umbellata*; Willd. n. 4. Cavan. Ic. 75. t. 174.)—Heads of flowers ovate. Leaves oblong, broad, serrated, downy beneath.—A native of Mexico and other parts of America.—Stem four-sided, rough with white hairs. Leaves opposite, long, hairy above, downy and hoary beneath. Flowers small.

From examining the Linnaean specimen of *L. hirsuta*, sent originally by Escallon, a pupil of Mutis, we are enabled to state that *L. umbellata* of Willdenow and Cavanilles is not a distinct species. The flowers of that are said to be of a deep yellow, and we find those of *hirsuta* tinged with the same colour, in a dried state. As the younger Linnaeus saw

it in no other condition, he appears to have guessed them to be white, but erroneously.

4. *L. cymosa*. Willd. n. 5. Swartz. Prod. 93. Ind. Occ. v. 2. 1066. (*Spiræa* congener, spinosa, &c. Sloan. Jam. v. 2. 30. t. 174. f. 3 and 4.)—Flowers in cymes. Leaves ovate, acute, nearly entire.—A native of woody savannahs, in the southern parts of Jamaica, flowering in May.—Stems several from three to six feet high, about the size of a goose-quill. Leaves almost round, yellowish-green, smooth, scented like those of Penny-Royal. Flowers many together, of the colour and somewhat resembling those of *Spiræa Theophrasti*.

L. ovata. Linn. Syst. Veg. ed. 14. 574. Mant. 89, is properly referred by l'Heritier and Willdenow to *Sclægo*.—Michaux places *Verbena Nodiflora* of Linnaeus in *Lippia*, though with doubt, and adds another species, *L. lanceolata*, which we presume is nearly allied to *nodiflora*.

LIPPIE, a corn measure in Scotland; four lippies being equal to one peck.

LIPPITUDO, (from *lippus*, bleary-eyed.) The signification of this term, in Surgery, is rather indeterminate. Cellus attaches the same meaning to it as ophthalmia. Lippitude, or blearedness, according to Wiseman, is a state of the eyes, in which they are dimmed with rheum. We believe that, at present, surgeons generally understand by lippitudo a chronic inflammation of the ciliary glands, and of the edges and inside of the eye-lids, attended with a secretion of viscid matter, by which the eye-lids are glued together during sleep, and cannot be opened in the morning without trouble, pain, and a copious emission of tears. The case is frequently accompanied by more or less inflammation of the conjunctiva, and always by a weak impaired sight. In bad cases, the margins of the eye-lids are itudded with little ulcerations; the eye-lashes fall off; and either an entropium or an ectropium taking place, the disease is rendered more complicated.

One of the best remedies for lippitudo is the unguentum hydrargyri nitrati, a small quantity of which is to be applied once or twice every day to the edges and inner surfaces of the eye-lids. Care is to be taken that these parts are well smeared with the ointment, which should be melted in a spoon, and applied by means of a camel-hair pencil. Several other ointments will answer the purpose, particularly such as contain hydrargyrum nitratus ruber, tutty, Armenian bole, &c.; but that above recommended will always answer when others will, and very often succeeds when they will not. The effect of the ointment may frequently be advantageously promoted, by washing the eye several times a day with a collyrium, composed of rose-water ʒviij and zincum vitriolatum, from gr. x to gr. xx, according to the sensibility of the organ.

Writers on surgery mention cases of disease of the ciliary glands, which are said to depend upon scorfula, a scorbutic habit, and the venereal disease. We cannot vouch for the accuracy of this statement, but we think it certain that numerous instances are kept up by constitutional causes, which prevent the efficacy of local applications and simple methods, and often create a necessity for resorting to internal as well as external treatment. In the examples alluded to, it was justly remarked by Mr. Warner, that the ordinary means will fail unless assisted by proper regimen in diet, and alteratives of different kinds, such as calomel, Plummer's pills, extractum cicuta, alkaline absorbents, decoctions of the woods prepared in lime-water, or common water, bark, vinum antimoniale, &c. Colliveneſs is at all times to be prevented. Warner also approves of applying, in certain cases, blisters to the head, neck, or betwixt the shoulders. He thought that they acted not only as stimulants and evac-

uants,

erants, but as alteratives, by the cantharides being freely absorbed into the circulation. He was likewise an advocate for issues. See *Descript. of the Human Eye, and its principal Diseases*, by J. Warner, F.R.S. p. 13.

LIPPOMAN, LEWIS, in *Biography*, a learned Italian prelate, descended from a noble Venetian family, flourished in the sixteenth century, but the time of his birth is not known. Being intended for the church, he pursued his studies with so much diligence and success, that he was considered one of the ablest divines of his time: he was likewise distinguished for his capacity for business. He acquired considerable reputation by his attendance at the council of Trent, and was fixed on by pope Julius III. as one of the three presidents of that council. He went as nuncio into Germany, and was afterwards sent in the same high capacity into Poland, by pope Paul IV. who made him his secretary. In Poland he was the unrelenting persecutor of the Jews and Protestants; and by his zeal in defence of his own religion, he obtained, successively, the bishoprics of Verona, Modena, and Bergamo. As a writer he published "Catenas" of the Greek and Latin fathers, upon "Genesis," "Exodus," and the "First Ten Psalms." He made also a new collection of "The Lives of the Saints," in eight vols. folio. He died in 1559, and is mentioned by De Thou as one equally illustrious for the purity of his principles, and the innocence of his life. Moreri.

LIPPSPRING, in *Geography*, a town of Westphalia, in the bishopric of Paderborn, at the source of the Lippe; rendered famous by Charlemagne's obliging the Saxons to embrace Christianity in this place, and holding in it three councils; four miles N. of Paderborn.

LIPRAZZO, a town of Naples, in Capitanata; 17 miles W.S.W. of Manfredonia.

LIPS, LABIA, in *Anatomy*, the edge, or exterior part, of the mouth; or that muculous extremity which shuts and covers the mouth, both above and below. See *DEGLUTITION* and *LIP*.

LIPS are also used to signify the two edges of a wound.

LIPS, in *Geography*, a town and castle of Hungary; four miles N. of Neufol.

LIPSE, or LIPSIUS, JUSTUS, in *Biography*, a very eminent philologist and critic, was born at a village, near Brussels, in the year 1547. He shewed an early disposition for the pursuits of literature, which was cultivated at the Jesuits' school in Cologne, whither he was sent when he was about 12 years of age. From thence he went to Louvain, and engaged in the study of the civil law, still retaining a strong predilection for the belles lettres. His first work was entitled "Variarum Lectionum Libri Tres," which he dedicated to the cardinal Granvelle, who patronized him, and received him into his house at Rome, where he arrived when he was twenty years of age. He spent two years with the cardinal in the quality of Latin secretary, and employed every leisure hour in collating MSS. in the Vatican and other libraries, and cultivating an acquaintance with the eminent scholars then residing in the metropolis. On his return to Louvain he passed some time in youthful gaieties, but becoming sensible of the danger of dissipated habits, he resolved to quit the scene, and visit Vienna. In 1572 he accepted the professorship of history at Jena, though a Lutheran university: he quitted Jena in two years and went to Cologne, where he wrote his "Antiquæ Lectiones," consisting chiefly of emendations of Plautus; and at the same period began his notes upon Tacitus. After this he went to Louvain, and was created a doctor of laws: from thence he proceeded to Leyden, accepted the professorship of history, and exchanged the Roman Catholic religion for

that of Calvinism. Here he spent thirteen of the most valuable years of his life, and obtained much reputation by the works which he published. These were upon various topics, critical, historical, and philosophical: but his commentaries upon Tacitus were particularly esteemed by the learned. In two of his works, viz. "Politicorum Libri VI." and "De una Religione," he openly maintained the maxims that no state ought to permit a plurality of religions, but ought to exercise the utmost severity against all those who dissent from the church. Such sentiments, carried to the extent in which he carried them, gave great offence to the government of this country, and he was glad to withdraw into Flanders for safety. There he abjured the Protestants, and joined the Catholics, with whom he lived the remainder of his life. He settled again at Louvain, and taught the belles lettres with great success: he received liberal proposals from various sovereigns and other persons of distinction to reside under their protection, but preferred to continue at Louvain, where he published several works, some of which were not only of inferior merit, but displayed the weakness of a very superstitious mind; he did not scruple to give an account of the wonders and miracles performed at the shrine of two images of the Virgin Mary: in this he adopted every puerile and absurd tale that he found current among the vulgar. Lipsius died at Louvain in 1606, in his fifty-ninth year. His works have been collected in six volumes folio, divided, according to their subjects, into sacred history, Roman and foreign history, political and moral discussions, &c. He was a very able Latin scholar, and wrote commentaries upon Plautus, Tacitus, Valerius Maximus, Valerius Paterculus, and Seneca. Moreri. Bayle.

LIPSK, in *Geography*, a town of Lithuania, in the palatinate of Novogrodek; 28 miles W.S.W. of Stuck.—Also, a town of Poland, in the palatinate of Sandomirz; 30 miles N. of Sandomirz.

LIPSO, an island in the Grecian Archipelago, about eight miles in circumference; six miles S.S.E. of Patmos. N. lat. 37° 24'. E. long. 26° 23'.

LIPTOTES, in *Rhetoric*, a figure, wherein, by denying the contrary of what we intend, more is signified than we would seem to express. Thus in the following verse of Virgil.

"Quid prodest, quod me ipse animo non spernis, Amynta."

See Vossius, *Rhet. lib. iv. p. 183.*

LIPYRIA, in *Ancient Medicine*, λυπυρία, a term applied to those varieties of continued fever, in which a burning heat was felt in the viscera, while the extremities and external parts were cold. It was ascribed by Galen and Aëtius to an erysipelatous inflammation of some of the abdominal or thoracic viscera. See Galen, *Comment. 2. in Prog. & Com. ad Aph. 48. lib. iv.*—Aët. *Tetrab. 2. lib. ii. cap. 89.*—Also Föëst *Æconom. Hippocrates.*

LIQUAMEN PYRITICUM, in *Natural History*, a name given by some authors to the liquid matter remaining in the pans in which the common vitriol is made; after which no more of that salt will shoot. It is otherwise called liquamen of vitriol.

LIQUAMUMIA, a term invented by some of the diffusatory writers, to signify human fat.

LIQUEFACTION, an operation, by which a solid body is reduced into a liquid; or the action of fire or heat on fat, and other fusible bodies, which puts their parts into a mutual intestine motion.

The liquefaction of wax, &c. is performed by a moderate heat, that of sal tartari, by the mere moisture of the air.

All salts liquefy; sand, mixed with alkalis, becomes liquefied.

quiesced by a reverberatory fire, in the making of glass. In speaking of metals, instead of liquefaction, we ordinarily use the word *fusion*.

LIQUET. See **NON LIQUET.**

LIQUID, a body which has the property of fluidity; and, besides that, a peculiar quality of wetting other bodies immersed in it, arising from some configuration of its particles, which disposes them to adhere to the surfaces of bodies contiguous to them. See **FLUID** and **LIQUIDITY**.

LIQUIDS, *Density of.* See **DENSITY**.

LIQUID alum, *amber, confects, laudanum, measures, storax, sulphur.* See the respective substantives.

LIQUID, among *Grammarians*, is a name applied to certain consonants opposed to mutes.

L, m, n, and **r**, are liquids. See **L, M, N, &c.**

LIQUIDAMBAR, in *Botany*, from *liquidum*, fluid, and *ambar*, a fragrant substance, generally taken for amber-grife; alluding to the aromatic liquid gum which distills from this tree. Linn. Gen. 499. Schreb. 649. Willd. Sp. Pl. v. 4. 475. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 1. v. 3. 365. Juss. 410. Lamarck Illustr. t. 783. Gærtn. t. 90. Michaux Boreal-Amer. v. 2. 202.—Class and order, *Menocia Polyandria*. Nat. Ord. *Amentacea*, Linn. Juss.

Gen. Ch. Male flowers numerous, in a long, conical, loose catkin. *Cal.* a common involucre of four ovate, concave, deciduous leaves, the alternate ones smaller. *Cor.* none. *Stam.* Filaments numerous, very short, in a mass which is convex on one side, flat on the other; anthers erect, of two lobes and two cells, with four furrows.

Female flowers collected into a globe, at the base of the male catkin. *Cal.* an involucre, as in the male, but double, the proper perianths being several within it, connected together, bell-shaped, angular, warty. *Cor.* none. *Pist.* Germens two, superior, united to the perianth and to each other; style to each solitary, long, awl-shaped; stigma recurved, downy. *Peric.* Capsules two, coriaceous, beaked, of one cell, opening at the inner edge. *Seeds* several, oblong, compressed, shining, with a membranous point.

Eff. Ch. Male, Catkin with a four-leaved involucre. Corolla none. Stamens numerous.

Female, Catkin globose, with a four-leaved involucre. Perianth of one leaf, pitcher-shaped, two-flowered. Corolla none. Styles two. Capsules two, surrounded by the perianth at their base, each of one cell, with many seeds.

1. *L. styraciflua*. Maple-leaved Liquid-amber, or Sweet Gum. Linn. Sp. Pl. 1418. Duhamel Arb. v. 1. 366. n. 1. t. 139. Sm. Inf. of Georgia, t. 48. Ehrh. Pl. Off. 129.—Leaves palmate, serrated, acute; veins hairy at the base of their ramifications.—Native of swampy ground in most parts of North America, near rivulets. It is a tall, straight, and handsome tree, with a round head of alternate, stalked, elegant and shining leaves, palmate like some kinds of maple, smaller than those of the Plane. *Flowers* terminal; the male a stalked, hairy, branched, conical catkin, or rather perhaps a cluster of globose flowers, nearly a finger's length; female a globular head, on a long simple bracteated stalk, springing from the base of the former. *Fruit* smaller than that of the Plane, beset in every direction with the long prominent points of the capsules. This tree is hardy in our gardens, and very ornamental, changing in autumn to various rich hues of red and orange, but does not blossom in Europe, at least not till it is very old. The gum, which exudes from any wounds in the trunk, in the warmer parts of its native climate, is seldom produced here. We have once collected it from a tree in Kew garden. Its scent is very fragrant and agreeable, like Benzoin or Storax.

2. *L. imberbis*. Oriental Liquid-amber. (*L. orientalis*; Mill. Dict. ed. 8. n. 2. *Platanus orientalis*; Pocock's Travels, v. 2. t. 89. Willd.)—Leaves palmate, bluntly crenate, or wavy, obtuse; veins naked.—Native of the Levant. Seeds were sent to France by Peyssonel, and some were forwarded to Miller, who raised plants from them at Chelsea. Whether any of these trees exist in England at present we know not. Some were to be seen at Paris 25 years ago, and probably still remain. This species differs from the former in having smaller leaves, whose lobes, as well as their notches, are all blunt, their margins wavy, not serrated, and their veins nearly or quite destitute of all pubescence at their origin.

For *L. asplenifolium* of Linnæus, a name which he afterwards changed, much for the worse, to *peregrinum*, see **COMPTONIA**.

LIQUIDAMBAR, in *Gardening*, comprises plants of the hardy deciduous tree kind, of which the species cultivated are the maple-leaved liquidambar, or sweet gum (*L. styraciflua*;) and the oriental liquidambar (*L. imberbis*.)

Method of Culture.—These two plants are increased by seeds and layers. In the former mode the seed should be sown as soon as it is procured from abroad, in spring, in a bed of light earth, half an inch deep, when the plants will rise some the same year and others not until the spring following, moderate waterings being occasionally given, keeping them clean from weeds all summer, and protecting them from severe frost the first two winters. When the plants are two years old, plant them out in spring, in nursery rows, two feet asunder, to remain three or four years, or till wanted for planting in the shrubbery, and other places. But some sow the seeds in pots, or boxes, in order to move them to different situations as the season requires; and when the plants do not come up the same year, the pots may be plunged in a hot-bed in the following spring, to forward their rising.

In the latter, or layer method, the layers should be made from the young shoots of the preceding summer, by slit-laying, when most of them will be rooted in the following autumn, though, in a dry poor soil, they are sometimes two years before they are sufficiently rooted for being removed to plant out.

These trees have great merit for ornamenting shrubbery plantations, in assemblage with others of similar growths, being handsome, straight-growing trees, with fine heads, as well as adapted for planting detached as single objects, in spacious short grass openings, in which they appear very ornamental, perfuming the air all round in the summer months. They succeed in any common soil and situation, and endure the severest cold without injury. They are usually kept in the nurseries for sale.

LIQUIDATE an *Action*. See **ACTION**.

LIQUIDATION, the act of reducing and ascertaining either some dubious disputable sum, or the respective pretensions which two persons may have to the same sum.

LIQUIDATION, the termination or winding up of accounts, such as paying or receiving debts, &c.

LIQUIDITY, in *Chemistry*, one of the three states of bodies between the solid and the aeriform state. The liquid and elastic states of bodies have the common denomination of fluids, hence the word fluid cannot be used to express either of these states particularly. Before the improvements in modern chemistry, the same explanation was applied to account for the properties of a liquid and an elastic fluid, under the general appellation of fluid; although bodies in each of these forms are differently constituted.

LIQUIDITY.

Sir Isaac Newton and the philosophers of his time supposed, that fluidity was occasioned by the spherical form of the particles of the bodies by which they were supposed to move with facility in all directions. Since, however, the constitution of bodies in different states is better understood, such an hypothesis is not necessary. Håüy has rendered it very probable, that the particles of bodies are of the form of their primitive crystals, which are flat-sided solids of the same regular form.

When we recollect that the particles of bodies, in the most solid state in which we find them, are far from touching each other, their spherical figure would not avail in giving them fluid properties, when they are changed into that form by the agency of heat.

Since bodies are found to expand by heat, and contract when the heat is withdrawn, it seems obvious, that the particles of bodies are acted upon by two forces; the one attraction, residing in the particles of the bodies; and the other, the repulsion of the particles of caloric for each; and which being combined with the attractive particles, give them the tendency to recede from each other, at the same time that the attraction is not altered.

The equilibrium, between the two forces, is kept up by the different distances of the particles, on which the relative volumes belonging to different temperatures depend. If we gradually raise a rod of tin, or any other metal, from the common temperature to its fusing point, we first observe its progressive expansion, by which we are to infer, that the cohesive force is diminishing in some ratio of the expansion. When it has arrived at a certain temperature, the pillar of metal will lose its form, and if it were not confined by the sides, it would become extended into a sheet of a thickness proportionate to its degree of fluidity. In other words, when the cohesion of the particles is so diminished, as to be exceeded by the action of gravity upon the particles individually, the solid will assume the liquid form.

This hypothesis perfectly explains all the phenomena attendant on the liquefaction of those bodies which are not susceptible of crystallization, such as wax, resin, tallow, and several other substances. Such bodies, we observe, first begin to soften by the partial loss of cohesion, and gradually become more and more liquid, till the degree of the heat shall occasion their decomposition, or give them the elastic form.

These bodies, as we should expect, increase in volume to the point of extreme liquidity, and the solid mass is of much greater specific gravity than the liquid.

The class of bodies that are susceptible of the crystalline form, which takes place at the point of liquidity, appears to depend upon some other cause than the mere presence of caloric, and on that account will present many anomalies to the above theory. These anomalies, however, are alone obvious at the point when crystallization is taking place. In some of these bodies, such as water, we do not observe any medium between perfect solidity and almost perfect liquidity.

The solids are in general of less specific gravity than the liquids, and consequently float upon them. And it is observed, that the point of maximum density is at a higher temperature than the point of congelation. The greatest density of water is, according to the enquiries of Dalton, at 36°, the point of congelation being at 32°. If, however, a mass of water be cooled, while the vessel holding it be kept at rest, it may be reduced as low as 18°, and even 16°, without congelation, contracting in volume all the time. When, however, the vessel is agitated by giving a tremulous motion to the table, the whole becomes instantly solid, with

a certain degree of expansion, and the temperature rises to 32° at the same moment of time. It would therefore seem, that the contraction and expansion by the presence or absence of caloric would be perfectly consonant with the change of temperature, were it not for the interference of this mysterious law of crystallization.

The circumstances under which the congelation of crystalline bodies takes place, clearly shews that something more is wanting than the mere abstraction of caloric. Salts are found to crystallize by standing for a certain time, although the temperature and quantity of water remain the same. It would therefore appear, that the integrant particles require time to arrange themselves; and that the salted form, as well as their regular form, is dependent on their arrangement: or that attraction of aggregation is the greatest when the integrant particles are placed in one particular direction. And it appears, since the strongest aggregation exists when the crystals are best formed, that the attraction causing solidity is the greatest when the homologous sides of the particles are parallel to one another, taking it for granted, that the particles are of the form of the primitive crystal.

The idea of a polarity in the particles of bodies is not new; and, from many recent facts, does not appear very gratuitous. Bodies which are magnetic or electrical, appear to be capable of arranging themselves in such order, that their poles shall be reversed to each other, from the attractions of opposite poles. We have already a striking instance of this electrical polarity in crystals of the *tourmalin*. And from some late experiments by Malus, it appears that even the particles of light are possessed of polarity, confirming what Newton had before conjectured.

When we apply heat to a solid crystalline body, such as a piece of ice, caloric does not effect its liquefaction by removing its particles to a greater distance, because the ice is not so dense as the water; consequently, the particles are nearer in the liquid than in the solid form. It would appear, in this instance, that the caloric had the power of lessening, and perhaps destroying altogether, the polarity of the particles, an effect which is not more unlikely than that of a certain temperature destroying the polarity of a magnet.

When, however, the caloric is removed, the polarity may return, but this alone is not sufficient to render the water solid. A certain time, with a certain degree of agitation, is necessary to allow the particles to assume their most favourable position for constituting the greatest aggregation, and their greatest regularity. We also should infer, that during this change, in which much force is exerted, the particles occupy more space, by which the expansion is occasioned. Similar effects take place in the congelation of most of the metals; and it will, doubtless, be found, that the solids of all bodies will be of less specific gravity than their respective liquids, in proportion to the susceptibility of crystallization, or, if we may be allowed the expression, as the polar force of their particles.

The particles of those bodies which are not susceptible of crystallization may have little or no polarity, and hence may owe their solidification to the mere absence of caloric. Their transition from the solid to the liquid form will be gradual and slow, and their hardness will be inversely as the caloric they contain. This is not the case with crystalline bodies; their transition from the liquid to the solid form is governed by several circumstances, and their hardness is not immediately in the inverse ratio of their caloric, but more dependent upon their polar arrangement. In all probability, if it were not for this latter cause, the point of congelation would be much lower in the thermometrical scale. What we termed confused crystallization, may be

a state of solidity in which the poles of the particles are deranged.

The want of fluidity in liquids may depend upon two causes. In the liquids which are homogeneous, the fluidity will be more or less perfect, according to the temperature by which the attraction of cohesion becomes greater or less. In fluids which are liable to change in their properties by exposure to the air, the want of fluidity arises from a substance being formed which is less fluid. This is the case with oils, both the fixed and volatile: such fluids are said to be tenacious. That the particles of liquids have still considerable attraction for each other, is apparent from a fluid assuming the form of drops. The drops will be more or less spherical according to the fluidity, and the size of the globules will be inversely as the density of the fluid. Hence we see the drops of sulphuric acid smaller than those of water, and the drops of mercury still smaller.

That the attraction of the particles of liquids becomes less according to temperature, is obvious from the law of their expansion. It is found that the increments of expansion are greater than the increments of heat. Mr. Dalton is of opinion, that the expansion of liquids is as the square of the temperature, and has proposed a new division of the thermometrical scale agreeably to this law. The same law that obtains in liquids which are susceptible of crystallization, will not probably hold good in other fluids, in which there does not appear to be any quick transition from solidity to liquidity. In order that the expansion may be in the duplicate ratio of the temperature, it would be necessary that the attraction should diminish in an equal degree with the increase of caloric. If the caloric, at the different points of time, be 1, 2, 3, &c. the attractions at the corresponding points should be $1, \frac{1}{2}, \frac{1}{3},$ &c. so that being inverted and multiplied into the increments of heat, they will make the increments of expansion a series of squares. The same law, according to Dalton, does not obtain in the expansions of solids and elastic fluids. A series of experiments, which would settle finally the relations between the increments of expansion and temperature, in different bodies, would be of great importance.

LIQUOR. See **DRINK, FLUID, &c.**

LIQUOR Amnii, in *Midwifery*, a clear pellucid fluid, or lymph, contained in the amnios, or inner membrane of the bag investing the fetus while in the uterus. The quantity varies very much in different women, or in the same woman in different pregnancies. In some women, when at their full term of gestation, there is not more of this fluid than three or four ounces, more commonly there are eight, ten, or twelve ounces; and in some rare cases, in women of a leucophlegmatic disposition, manifested by œdematous swellings of the legs, thighs, and labia pudendæ, two or three pints have been found. Its use appears to be to prevent the friction of the child against the amnios, or of the limbs of the child against each other, or against its body, which might occasion an abrasion of the cuticle, and an unnatural coalescence of the parts. Its purposes, therefore, are the same as those of the fluid found in the pericardium, and in all the cavities of the body in which any of the viscera are contained. It was thought to serve the further purpose of affording aliment to the fetus; but as children born without heads are found to be in other respects as perfect, as lively, strong, and plump as those with heads, it is evidently not necessary, at least for that purpose. See **CONCEPTION**, and **EMBRYO**.

LIQUORS, Fermented. See **FERMENTED Liquors.**

LIQUOR, Trifl, among dealers in brandy. See **SPIRIT**, and **TEST-liquors.**

LIQUOR Aluminis Compositus, in the *Materia Medica*. See **AQUA Aluminis Composita**.

LIQUOR Ammonia, or *Aqua Ammonia Pura*, P. L. 1787. See **AMMONIACAL Preparations**.

LIQUOR Ammonia Acetatis, *Aqua Ammonia Acetata*, P. L. 1787, is prepared by adding four pints of the acetic acid to two ounces of carbonate of ammonia, until bubbles of gas no longer arise, and then mixing. If the acid predominate, the solution is more grateful to the taste, and if the acid be correctly prepared, the proportions above stated will be sufficient; but where the strength of the acid cannot be depended upon, it will be right to regulate them by the cessation of effervescence rather than by quantity.

LIQUOR Ammonia Carbonatis, *Aqua Ammonia*, P. L. 1787. *Spiritus Salis Ammoniaci*, P. L. 1745, is formed by dissolving eight ounces of carbonate of ammonia in a pint of distilled water, and filtering the solution through paper. See **AMMONIACAL Preparations**.

LIQUOR Arjenicalis, or *Arjenical Solution of Fowler, &c.* See **ARSENIC**.

LIQUOR Calcis. See **LIME-water**.

LIQUOR Cupri Ammoniaci, *Aqua Sapphirina*, P. L. 1745. See **COPPER**.

LIQUOR Ferri Alkalini. See **IRON**, in the *Materia Medica*.

LIQUOR of Flints. See **FLINTS**.

LIQUOR Hydrargyri Oxymercurialis is prepared by dissolving eight grains of the oxymercurate of mercury in fifteen fluid-ounces of distilled water, and then adding a fluid-ounce of rectified spirit. This solution is directed for the purpose of facilitating the administration of divisions of the grain of this active medicine. Each fluidrachm contains $\frac{1}{15}$ th of a grain of the salt. The spirit, though it assails, is not absolutely necessary to the solution of this quantity, but it preserves it afterwards, and prevents the vegetation of mucus, to which all saline solutions are liable.

LIQUOR Mineralis Anodynus, the same given by Hoffman to a liquor of his own invention, famous at this time in Germany, and supposed by Burgrave to be made in this manner: take oil of vitriol and Indian nitre, of each four ounces; distil the spirit gradually from this by a retort; pour two ounces of this spirit cautiously and successively into fifteen ounces of spirit of wine highly rectified; distil this, and there comes over a very fragrant spirit. This is to be again distilled, to render it perfectly pure, adding first to it a small quantity of oil of cloves, and a quantity of water, equal to that of the spirit; after this, as soon as the watery vapours begin to arise, the whole process is to be stopped, and the spirit kept alone in a bottle well stopped. This has great virtues as an anodyne, diaphoretic, antiseptic, and carminative. It is not certain that it is exactly the same with Hoffman's, that author having never published his manner of making it; but it appears the same to the smell and taste, and has the same virtues.

M. Macquer says, that it is a mixture of very rectified spirit of wine, of ether, and of a little of the sweet oil of vitriol; and that it is made by mixing an ounce of the spirit of wine, which rises first in the distillation of ether, with as much of the liquor which rises next, and which contains the ether, and afterwards by dissolving in this mixture twelve drops of the oil which rises after the ether has passed. This liquor has precisely the same virtues with the ether which physicians now substitute for it. See **ETHER**.

LIQUOR, Boyle's fuming. See **SULPHURET of Ammonia**, and **AMMONIA**.

LIQUOR Plumbi Acetatis, and **LIQUOR Plumbi Acetatis Dilutus.** See **LEAD, Extract of**.

LIQUOR

LIQUOR Potasse. See **LIXIVUM Saponarium.**

LIQUOR Potasse Subcarbonatis. See **LIXIVUM Tartari.**

LIQUOR, or Smoking Spirit of Libavius, or Smoking Muriat of Tin, is a marine acid, or super-oxylated muriat of tin, very concentrated, smoking, and impregnated with much tin. (See **TIN**.) It is made by well mixing an amalgam of four parts of tin, and five parts of mercury with an equal weight of corrosive sublimate, by triturating the whole together in a glass mortar, or it may be prepared by melting, in an iron ladle, 5 oz. of pure tin, adding to it five drachms of mercury, stirring them together, and pouring out the amalgam into a marble mortar; and then putting 20 oz. of corrosive mercurial muriat in fine powder, and mixing the whole thoroughly. This mixture is to be put into a glass retort, which is to be placed in a reverberatory furnace. To the retort is to be luted, with fat lute, a receiver, with a small hole in it, in the same manner as is done for the distillation of concentrated mineral acids; the distillation is begun with a graduated and well managed fire; with an Argand lamp, or a sand-bath. A very smoking liquor passes into the receiver, and towards the end of the distillation a very thick and even concrete matter. When the operation is finished, the liquor in the receiver is to be poured quickly into a crystal glass bottle, with a glass stopper. When this bottle is opened, a white, copious, thick, and poignant fume issues, which remains long in the air without disappearing. (Macquer's Chem. Dict.) Proust gives, as the best proportions, 8 oz. of powder of tin (probably such as is made by melting the metal and shaking it in a box), and 24 oz. of corrosive sublimate, which afford 9 oz. of the smoking liquor. See **ETHER**.

LIQUORS, Stygian. See **STYGIAN Liquors.**

LIQUORS, Clearing of. See **CLARIFICATION.**

LIQUORICE, in Botany, Gardening, and the Materia Medica. See **GLYCYRRHIZA.**

LIQUORICE, in Agriculture, a plant of the long tap-rooted kind, often cultivated for medicinal and other uses in the field. It grows to about four or five feet in height; its stalks are hard and woody; its leaves small and roundish, standing together on the two sides of a rib, and making what botanists call a winged leaf. There are two species of this plant in cultivation, the *smooth podded* and the *prickly podded*; but they differ little, except in the seed-pods of the latter being armed with prickles. It is remarked that both these species are very hardy perennials, but that the first is the sort commonly cultivated for use, its roots being fuller of juice, and sweeter than the other.

It is chiefly grown for the root, which is perennial; but the stalks rise in spring, and decay in autumn.

It is a plant which delights in a deep light soil, in which its roots may run down three or four feet deep, and attain a large size, especially when permitted to stand three or four years. From the main root smaller ones generally run off horizontally; and from these horizontal roots, that run near the surface, cuttings for sets or young plants are taken for propagation, which are generally procured at the time when the liquorice is taken up for use, which is in about three years after planting; but cuttings for planting may occasionally be taken off before that period, if wanted. At the time of planting, the cuttings should be divided into lengths of six or eight inches, each having one or more good buds or eyes, being put into the ground at any time, in open weather, from October till March; but from the middle of February till the middle of March is the best season for this work: and an open situation is always the most proper for a plantation of this kind.

It has been long since observed, that this plant thrives

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best on a deep, loose, rich mould; and if it is fresh land that has not for many years borne corn, the profit will be the greater, as the crop will be larger, and the roots of a finer quality. A rich sandy soil, provided it is deep, will do well for this plant; and it must always be remembered, that too much moisture is its greatest enemy: let no one, therefore, attempt to plant it on a damp clay, lest the whole crop be cankered.

Soils intended for liquorice should be trenched two or three spades deep, if the depth of them will admit: then having the sets ready, proceed to plant them by line and dibble, planting the sets a foot distant in each row; putting them perpendicular into the ground, with the tops about an inch under the surface, and let the rows be a foot and a half asunder; though some scarcely allow more than twelve inches between row and row. A crop of onions is also sometimes sown on the same ground the first year; which, as the roots of the onions are slender, and the stems spread but little at top, may be done without any detriment to the liquorice or the onions, as the former seldom rises above ten or twelve inches high the first summer. The ground must be kept clean from weeds, during the summer season, by hoeing; and if there is a crop of onions, the small hoe should be employed, cutting them out to four or five inches distance, and clearing away all such as grow immediately close to the liquorice plants; and when they are gathered, give the ground a thorough hoeing with a large hoe, to loosen the surface, and destroy all weeds effectually. In autumn, cut down the decayed stalks of the liquorice, and nothing more is necessary till spring. But in February or March, a slight digging should be given between the rows; and, during spring and summer, all weeds be kept down by broad-hoeing; and in autumn, when the stalks are in a decaying state, they must be again cut down to the surface of the earth, as has been just observed. The same management must be repeated every succeeding year; but after the first or second year, the stalks of the liquorice will shoot strongly, and soon cover the ground, so as to retard the growth of weeds in a great degree. Likewise every autumn, about October, when the stalks begin to decay, and they have been cut down to the ground, as has been advised before, they should be wholly cleared away. It is remarked, that land cannot be made too fine, or dug too deep for liquorice; that it should be at least moved with the spade to the depth of two feet and a half; and if a little deeper, so much the better. And that if the land on which the liquorice sets are to be planted is fresh, rich, and in good heart, it needs no manure for the first crop; but that if it has been for some years in tillage, the planter will do well to give it, in the summer time, a good dressing of very rotten dung, lime, and coal-ashes, or soot, mixed together, some months before, into a compost: the quantity must be regulated by the state of the land, always remembering that this plant requires a great deal of nourishment, and is a great impoverisher of the soil, though it extracts much of its nourishment or food from a considerable depth.

But in another mode, after the ground has been properly prepared, and reduced to a very fine tilth, and laid level, some sets are to be procured. These are directed to be planted in rows, with dibbles armed with iron points. Some prefer rows at two feet asunder, putting the sets fifteen inches from each other, and three rows are planted on a six-foot bed; they are allowed two feet more of interval betwixt bed and bed. And in putting in sets with a dibble, the upper end of each set is left just level with the surface of the ground: and when the whole spot of ground is planted, labourers dig up the intervals one spit deep, and spread the

earth on the beds; which raises them about two inches above the heads of the sets, which, by lowering the intervals, serves in wet seasons to drain the beds. It is generally contrived to get this work done by the last week in September; but in favourable years, the middle of October is not too late. If the weather proves mild, no further trouble is taken with them during the winter; but if it is likely to freeze hard, the beds are covered with peas-haulm, or long dung, or some such matters, to forward the growth of the roots in the spring, and protect them during the winter from the frosts. Early in the spring, on the first appearance of the weeds, the liquorice is allowed a thorough hoeing; and this is several times repeated in the dry weather of the summer. The winter following, they are again covered with long dung; and in the spring, before the roots begin to shoot, the spaces betwixt the rows on the beds are loosened with a spade, and the intervals dug: immediately after which, the land has a slight dressing of coal-foot given, which is sown by hand: this should be thick enough to make the land look black, which, by the first rains washing it in, greatly pushes and invigorates the plants. The second and third summers, it is only necessary to keep the crop clear of weeds.

About the third year after planting, the roots of the liquorice will be in a state to take up; and the proper season for this is any time from the beginning of November till February, as they should neither be taken up before the stalks are fully decayed, nor deferred till late in the spring; otherwise the roots will be apt to shrink and diminish in weight.

Manner of taking up.—The mode of taking up the liquorice roots is by trenching the ground, beginning at one end, and opening a trench close to the first row three spades deep, or to the depth of the roots; at which work, three or four spademen are generally employed at each trench: one goes on with the top spit, a second with the next spit, another with a third spit, and the fourth spademan commonly gets to the bottom of the roots, having a mattock to assist him occasionally in clearing them; and, as he takes them up, throws them on the top of the ground. In this way they proceed from row to row, till the whole plantation is taken up. The small side-roots are then trimmed off, and the best of them divided into lengths proper for fresh sets, and the main roots tied in bundles for the purpose of sale. It is of much consequence to sell them as soon as possible after they are taken up, as they are apt to lose much of their weight by keeping.

After a crop of this root has been taken up, if it was planted on fresh land, the same ground is generally prepared to yield another crop; and this takes up nearly a year. In doing which, it has given it, during the winter, a thorough good dressing of well-rotted dung, mixed with lime: of this large quantities are laid on, still having regard to the condition of the soil, and ploughing it well in the ensuing summer. In such loose soils as are proper for this plant, there is no occasion to dig the land for this crop a second time, the taking up the roots having stirred it to a sufficient depth: this, with three or four summer ploughings, is as much as is necessary. In other respects, it is managed the same as for the preceding crop.

But if the land which has borne a crop of liquorice root was not fresh when it was planted, but had been some time in tillage, it is scarcely ever chosen to plant again with the same crop, without allowing several years to elapse.

After-Culture.—In whatever way this crop is cultivated, it should be kept perfectly clean by effectual hoeing in May and June; and for this reason it is better not to sow onions,

or any other small plants, upon the land with this sort of plants. In the liquorice husbandry, the land should likewise be very highly manured, and be kept well water-furrowed for the spring months.

In order to discover how much liquorice-root is watted by being kept in dry places, a choice was made of a piece of single root thirteen inches long, and full three-fourths of an inch diameter throughout, which weighed five ounces; and nine small roots, thirteen inches long each, and from one-fourth to one-eighth of an inch in diameter, which weighed also five ounces. All these were put into a drawer in a dry room, the beginning of February, and were weighed the beginning of August following; when the largest single root weighed two ounces and three quarters, and the nine small roots also weighed full two ounces and three quarters: so that in six months these roots lost almost half their weight. They were green and juicy when put into the drawer, and were now pretty dry and hard; but not quite so dry and hard as some of the same liquorice that had lain all that time in the open room. But liquorice may be kept in moist sand, or laid in the earth as long, with very little waste or loss of weight.

As liquorice is an upright growing plant, and not apt to lodge, and its roots descending deep, it is very proper for the horse-hoeing culture; in which it will probably arrive to greater perfection than in the usual method of cultivating it, as described above.

However in Yorkshire, where liquorice is cultivated in rich sandy soils, its roots sometimes penetrate to the depth of three or four feet, sometimes more; but the digging of the ground all over to that depth, when it is taken up, is very expensive. As a saving in this respect, the planters, in digging up the ground, lay it in a proper form, and replant it, making one digging serve for both purposes, which is a good method; but they set the plants much too close: whereas, if they planted them in rows, at about four feet distance, and horse-hoed it, the weeds might be destroyed, and the land greatly improved, especially if trench-hoed; and the produce would probably be very great, after so full a preparation of the land. And in addition to this, it may be observed, that this method of cultivation is much cheaper than by hand-work, which is the usual method.

LIQUORICE *Vetch.* See *ASTRAGALUS*.

LIQUORICE *Vetch, Knobbed-rooted.* See *GLYCINE*.

LIQUORICE, *Wild.* See *ABRUS*.

LIRA, or LIRE, a money of account in Italy, and also a silver coin, particularly at Milan and Venice.

LIRELLA, the diminutive of *lira*, a ridge or furrow, is used by Acharius for the peculiar fructification, or receptacle, of the genus *Opegrapha*. (See *LICHENES*.) Its colour is generally very black, though sometimes hoary with a sort of efflorescence; its form oblong, sessile or immersed, simple, aggregate or branched. The disk is usually narrow and linear, occasionally somewhat dilated; the margins parallel, various in thickness and elevation. In English this receptacle is termed a *cleft*.

LIRIA, or LLIRIA, in *Ancient Geography*, a town of Spain, in the province of Valencia; 18 miles S. of Segorbe. This is a very ancient town, which is said to have existed before the arrival of the Phœnicians in Spain. Under the Carthaginians it bore the name of Edera, and under the Romans of Edeta and of Laurona, when it was the capital of the country of the Edetani. There are some Roman monuments remaining. The town was almost destroyed during the wars of Sertorius and Pompey; but being afterwards rebuilt, it was taken by the Goths from the Romans, from the Goths by the Moors, and from them, in 1252, by

James

James the Conqueror, king of Aragon, who somewhat changed its position.

It is situated between two little hills: it has a parish church, two chapels of ease, two convents of Trinitarian and Franciscan monks, and a population of about six or seven thousand persons. This town has the title of duchy. King Philip V. gave it to marshal Berwick, and his descendants still possess it.

LIRIODENDRUM, in *Botany*, from *λίριον*, or *λίριος*, a lily, and *δένδρον*, a tree; the Tulip-tree. Linn. Gen. 278. Schreb. 373. Willd. Sp. Pl. v. 2. 1254. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 3. 329. Juss. 281. Lamarck Illustr. 491. Michaux Boreal-Amer. v. 1. 326. Gærtn. t. 178.—Class and order, *Polyandria Polygynia*. Nat. Ord. *Coadunate*, Linn. *Magnolia*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of three oblong, obtuse, concave, spreading, equal, petal-like, deciduous leaves. *Cor.* bell-shaped, regular, of six oblong, obtuse, equal petals, concave at the base. *Stam.* Filaments numerous, inserted into a conical receptacle, shorter than the corolla, linear; anthers terminal, longer than the filaments, but still shorter than the corolla, linear, erect, of two cells, bursting longitudinally at the outer side. *Pist.* Germens numerous, disposed in the form of a cone; styles none; stigmas all crowded together, obtuse. *Peric.* Cases numerous, imbricated in the form of a cone, lanceolate, compressed, leaf-like, triangular and tumid at the base, each of one cell, not bursting. *Seeds* two, ovate.

Eff. Ch. Calyx of three leaves. Petals six. Anthers bursting outwardly. Seed-cases lanceolate, imbricated in the form of a cone.

1. *L. tulipifera*. American Tulip-tree. Linn. Sp. Pl. 755. Curt. Mag. t. 275. Sm. Inf. of Georgia, t. 102. (*L. foliis angulatis truncatis*; Trew Ehret, t. 10.)—Leaves lobed, abrupt.—Native of hills in moist parts of North America, where it is vulgarly called the Poplar. This fine tree was cultivated by bishop Compton, at Fulham, in 1688, and is now not unfrequent in England, though seldom flowering till an advanced age. We have however known it bloom when about 16 years old. The first which produced blossoms in this country, is said to have been at the earl of Peterborough's, at Parson's green, near Fulham. There were several, early celebrated for their size and beauty, at Waltham Abbey, one of which remained lately, and perhaps still flourishes.

Botanists indicate two varieties in North America, one of which is figured in Plukenet's *Phytographia*, t. 68. f. 3, and appears to differ from the common kind, represented in the plates we have quoted above, in having four slight lobes, instead of two great ones, at each side of the leaf. We have indeed observed the leaves to have occasionally divided side-lobes, in our gardens; but as there are said to be differences also in the colour and quality of the wood, it is much to be suspected that these make in fact two species. In some trees the wood is said to be yellow, soft and brittle; in others white, heavy, tough and hard; but no one has observed whether each particular variety has either form of leaf appropriated to it, which would settle the question. The remarkable shape of the leaves of the Tulip-tree, cannot fail to strike the most careless observer. They seem as if cut off with scissars at the end. The elliptical obtuse deciduous *stipulas*, which curiously unfold the young leaves, are also remarkable. The flowers, though not glaring nor scented, are singularly beautiful, resembling a small tulip, variegated with green, yellow, and orange. They appear in

June and July, standing solitary at the ends of the branches. The young bark of this tree is very aromatic.

2. *L. liliifera*. Indian Tulip-tree. Linn. Sp. Pl. 755. (*Sampacca montana*; Rumph. Amboin. v. 2. 204. t. 69.)—Leaves lanceolate.—Native of lofty mountains in Amboyna. Linnaeus adopted this species entirely from Rumphius, led, as it seems, by his delineation of the fruit, which indeed somewhat resembles that of a *Liriodendrum*. There is much in his description, as well as figure, that accords with *Magnolia pumila*, Andr. Repof. t. 226. Curt. Mag. t. 977, a plant cultivated in various parts of the East Indies, as well as in China, but whose native country, like the structure of its fruit, is really unknown. M. Correa de Serra, whose botanical acuteness is so well known, has pointed out to us what he conceives to be a certain criterion to distinguish a *Liriodendron* from a *Magnolia*, the cells of the anthers opening at the inner side in the latter, at the outer side in the former, which difference is confirmed by the total difference in their fruit. By this rule the *pumila* is a *Magnolia*; but respecting the supposed *Liriodendrum liliifera*, nothing can be guessed, except from its habit. We suspect moreover that the *pumila*, when its fruit is known, may exhibit characters in that part, sufficient to separate it from both these genera; as may also be the case with *M. fuscata*, Ait. Hort. Kew. v. 3. 331. Andr. Repof. t. 229. Curt. Mag. t. 1008, whose anthers likewise burst inwardly.

What the *L. liliifera* of Loureiro, Cocbinch. 346, may be, is very doubtful. He describes the anthers as opening by a terminal pore.—Here then may be another distinct genus. The flowers are said to be large, pale and scentless. Seeds imbricated in the form of a cone. He describes two more, which Willdenow has adopted from the German edition of his book, as we guess from the misquotation of pages. These are named 1, *L. Figo*, which has a singled-leaved spathaceous calyx, and a pale flower, dotted with red; and 2, *L. Coco*, which has a three-leaved calyx, and large, very white, sweet flower. Both are cultivated at Macao and Canton. The description of their fruits is like that of the genus before us, but we much doubt their belonging really to it. Nothing, in short, requires more investigation than the genera of this tribe, because scientific botanists had very little opportunity of seeing their whole fructification. We would recommend the consideration of their anthers and seed-vessels. The calyx is perhaps of less importance, except for specific distinctions.

LIRIODENDRUM, in *Gardening*, comprises a plant of the hardy deciduous ornamental kind, of which the species cultivated is the common tulip-tree, *L. tulipifera*.

Method of Culture.—Plants of this kind may be raised by sowing the seeds, imported annually from America by the seed-dealers, in spring, either in the full ground, in beds of rich light earth, in a warm situation, placing the seed lengthwise, and covering it nearly an inch deep; or in pots or boxes, plunging them in a gentle hot-bed. When the young plants appear they should be well screened from the sun, and have free air. They usually come up the same season; when in the former method water should be given them in dry weather; and if the bed be arched over with hoops, to have occasional shade from the mid-day sun in scorching weather, it will be beneficial to the germination of the seeds and growth of the young plants; continuing the waterings with care occasionally during the summer; and in winter, sheltering them with mats in frosty weather to preserve their tops, which are sometimes a little tender the first year, and apt to suffer in this way.

When the plants are two years old, they should be set out

in spring in nursery rows, two feet distant, and a foot asunder in the rows; to remain a few years, till from three to six or eight feet high, when they may be planted where they are to remain.

But they are raised best in the open ground, where the beds are prepared of good mellow rich earth, blended with old rotten cow-dung, lifting over the seeds fine turf-mould, mixed with fine sea or pit-land. And they succeed best afterwards in a light soil, not too dry. They should have their roots and branches as little pruned as possible.

This is a plant that grows so large as to become a tree of the first magnitude in its native situation, and it is generally known by the title of poplar: of late there have been great numbers raised from seeds in this country, so that they are become common in the nurseries, and there are many of the trees in different parts which annually produce flowers.

At Allerton-hall, the seat of William Roscoe, esq. there is a very large tree of this kind which flowers well.

These trees are highly ornamental in large plantations, among others of similar growth, and have a fine effect when planted out singly in large openings, kept in short grafts, in pleasure grounds, or other situations, when they flower in any full manner.

LIRIOPE, in *Botany*, a genus dedicated by Loureiro to the mother of Narcissus; a plant of the same natural family having been destined to commemorate her son. The blue colour of the present flower is thought also, by this author, to accord with the epithet *Carula Liriope*; see Ovid's *Metamorphosis*, lib. 3. 342.—Loureir. *Cochinch.* v. 1. 200.—Class and order, *Hexandria Monogynia*. Nat. Ord. *Spathaceae*, Linn.

Gen. Ch. *Cal.* Sheath ovate, incurved, single-flowered, small, permanent, of one leaf. *Cor.* inferior, bell-shaped, spreading, divided into six deep, oblong, reflexed, fleshy, equal segments. *Stam.* Filaments six, awl-shaped, erect, equal, shorter than the corolla, inserted into the receptacle; anthers oblong, erect. *Pist.* Germen superior, roundish; style thick, furrowed, reflexed, as long as the stamens; stigma simple. *Peric.* Berry ovate, smooth, fleshy, single-seeded. Seed ovate.

Eff. Ch. Corolla in six deep segments, inferior. Sheath ovate. Berry single-seeded.

1. *L. spicata*. Loureir. *Taé tien* of the Cochinchinese, *Mac lân* of the Chinese.—Found commonly both in rude and cultivated ground of those countries. *Roots* perennial, oblong, solid, brown *bulbs*, connected by creeping radicles. *Stem* none. *Leaves* numerous, crowded together, sword-shaped, stiff, smooth, nearly erect, a foot long. *Flower-stalk* naked, round, slender, straight, about as long as the leaves. *Flowers* spiked, rather small, of a pale blue colour, without smell.

The herb before us is said to have a cooling quality, and a decoction of its leaves is thought to strengthen the hair. We know not what to make of Loureiro's description as to referring it to any known plant.

LIRIS, in *Ancient Geography*, a river of Italy, which anciently bounded the territory of Latium towards the south. This river, called also *Clanis* and *Glanis*, and now *Garigliano*, descends from the country of the Marli towards the Apennines, or by the lake Fecinus, receives many streams in its slow progress southward, and at length loses itself in the bay of Cajeta or Gata. Towards its mouth, and at some distance from a grove consecrated to the nymph Marica, the river formed extensive marshes. Pliny observes that the waters were there hot, whence Silius Italicus gives to the

Liris the epithet sulphureous. It is related, that in the year of Rome 666, Marius, pursued by the faction of Sylla, concealed himself in these marshes, with his body under water and his head covered by reeds. The same place served also as an asylum to Varus, one of the persons proscribed by the triumvirate of Octavius, Antony, and Lepidus.

LIRIUM, in *Botany*, *λίριον* of the Greeks, is synonymous with *Lilium*, but Van Royen, in his *Flora Leydenfis Prodrromus*, retains it as the name of that genus, because he uses *Lilia* for the appellation of the natural order; and for this measure he is somewhere commended by Linnæus, under whose inspection the book was written. *Lirium* is however become entirely obsolete.

LIS, in *Geography*, a lake of Russia, in the government of Tobolsk, in the midst of an extensive morass. N. lat. 63° 5'. E. long. 99° 14'.—Also, a river of the same name, which runs into the Enisei. N. lat. 62° 20'. E. long. 90° 14'.

LIS, *Fleur de*. See *FLOWER-de-Luce*. This flower was not only borne in the ancient arms of France, but adopted by our kings till the late union with Ireland. The electoral cap, as emblematic of Hanover, and the shamrock for Ireland, have been substituted for it.

LIS, or *Li*, an itinerary measure of China, equal to 1897½ English feet: so that 192½ lis measure a mean degree of the meridian nearly; but European missionaries in China have divided the degree into 200 lis, each li making 1826 English feet.

LISARA, in *Geography*, a town of European Turkey, in the province of Albania; 52 miles S S E. of Albafano.

LISBON, **OLISIPONA** or *Olyfbona*, the metropolis of Portugal and royal residence, situated in the province of Estremadura, and forming a kind of crescent or amphitheatre, on the right bank of the Tago or Tagus, on several hills. The Portuguese compute the length of the city at two leagues; and the distance from Belem to the eastern extremity is stated by Link to be a full German mile, or about 4½ English miles. The breadth of the town is very various, often but small, and sometimes quite inconsiderable, not exceeding one street, but never much more than half a league. It formerly contained several magnificent churches, 50 colleges and convents, two elegant palaces, a castle commanding the town, and several handsome squares. It was surrounded by a single wall, on which were 77 antique towers of no great strength. On the river side it had 26 gates, and on the land side 17. The streets were narrow and dirty, and some of them very steep. The houses of the citizens were generally very mean, but those of the nobility and gentry were built with stone, and exhibited an elegant appearance. Such was the state of this city before it was almost totally destroyed by the earthquake, which happened Nov. 1, A. D. 1755. Since this catastrophe it has been built on a regular plan. The population is not easily ascertained. According to the decennial census in the year 1790, the 40 parishes of Lisbon contained 38,102 fire-places or hearths; these include the suburbs of Junqueira and Aleantara, but not the villages of Belem and Campo-Grande, though these, particularly the first, are connected with the town, being within the boundary of Lisbon. Including Belem, a market town which completely joins Junqueira, the population may be estimated, according to Link, at above 300,000, exclusive of the military. Lisbon is quite open on all sides, having neither walls nor gates, nor even any fortifications, except a small castle in the middle of the town, and a number of batteries or small forts on the river. The ground on which the city stands is very hilly, and, according to the Portuguese writers, is situated,

ated, like ancient Rome, on seven hills, but it may be more properly regarded as standing on three hills. The first begins at the bridge of Alcantara, forming the proper western limit of the town, and extending to St. Benedict's street. This hill is the highest, and much celebrated for the salubrity of its air. At the western extremity it is but little cultivated, but farther to the eastward up to its summit, forming in that direction a plain, on which stands the new monastery. In many parts it is so steep, that it is laborious to walk along the streets, and even the lower street, which runs along the river, has considerable declivities, and is much incommoded by torrents occasioned by heavy falls of rain. In this part many handsome houses are erected, intermixed with those of a meaner sort, in streets that are irregular, ill paved, and often narrow. Among these scattered houses are gardens and even corn-fields. On this hill the late queen built a church and convent, to which she was much attached. The church is handsome, but constructed in a bad taste, and overloaded with ornaments. Not far from this church is the Protestant burial ground, which is planted with cypresses and Judas trees (*cercis siliquastrum*). Beyond the houses is a pleasant plain, called Campo de Ourique, separated from the neighbouring hills by deep valleys, and used as a promenade by the lower and middling classes. The second hill is a continuation of the first, from which it is separated by a valley of no great depth; it extends from St. Benedict's street to the valley in which are three new streets built by Pombal. At the foot of the eastern side of this hill the earthquake did great damage, of which traces remain, and thus made way for the erection of several handsome houses. On this eastern declivity is the opera-house. Above the public promenade this hill rises to a considerable height, and is very steep towards the next valley. This eminence affords a very fine view; in the valley beneath appears the best part of the town; to the left are olive-gardens interpersed with many houses, monasteries, and churches; opposite is the high steep hill on which the castle stands; to the left the Tagus covered with ships. This hill is succeeded by an even valley of considerable length and breadth, which forms the broadest part of the town, which was entirely rebuilt after the earthquake of 1755. On the bank of the river is a handsome square, formerly the terrace or parade of the royal palace, 610 feet by 550. The quay, and the groups of people where the ships and boats are landing and taking in their cargoes, excite attention. The east side is formed by a large building with an arcade, terminating in a pavilion, which is used as an exchange. Opposite to it is a similar building without a pavilion. In the centre of this square, the avenues of which are unfinished, is an equestrian statue of Don Joseph in bronze, on a pedestal of stone adorned with various symbols. The three principal streets rebuilt since the earthquake, are formed by large buildings of considerable elevation and good appearance. The line that divides East and West Lisbon, which is an ecclesiastical distinction (the former belonging to the bishop of Lisbon and the latter to the patriarchate) passes through this part of the town. Near this spot is the great palace of the Inquisition. Another small square not far distant is used as a promenade, and forms a garden, with several avenues of various kinds of trees and hedges. Behind this garden are the play-house and the square used for bull-fights; and at a small distance are market places. The third hill begins with an eminence, on which is the castle of Lisbon, from which it continues, with some interruption of plains, to the eastern extremity of the town. The castle is a small fort. This part of the town consists of narrow, irregular, ill-paved streets, in which occur a few neat houses. The buildings are constructed on bad models; and even among the churches

there is not one particularly distinguished, and a constant noise of little bells and bad chimes renders them still more unpleasant. The patriarchal church is famous for the royal sepulchres which it contains. This was constructed in the year 1706 by pope Clement XI., who granted to it a chapter. The patriarch has been generally a cardinal, and its revenue is computed at 114,000*l*. Lisbon was erected into a bishopric in the 5th century, and when it was retaken from the Moors by Don Alphonso, the bishopric was re-established by pope Eugenius III.; and in the year 1370 it was erected into an archbishopric. The cathedral is a Gothic edifice, dedicated to St. Vincent, who is said to have suffered martyrdom on the cape which bears the name, and it is richly ornamented. The royal palace, which fronts the Tagus, is a large and magnificent edifice, and contains a library collected at a vast expence by John V. There are some other public buildings, which are constructed in a magnificent style. Along the river to the E. of Lisbon there is a succession of small houses and villages. To the W. Belem so nearly joins Lisbon, that their respective boundaries are not easily distinguished: and the suburb of Alcantara is only separated by a bridge over a small brook which here falls into the Tagus. This suburb is only separated by an artificial boundary from that of Junqueira, as the latter is from Belem, which is a considerable market-town, where many persons of property and tradespeople of the higher classes have houses. Formerly the royal family resided here, but the castle being burnt they removed to Quelus. (See BELEM.) Besides the church of the monastery of Hieronymites, which is in a Gothic but grand style, there are in Belem two new built and very handsome churches. Near to one of these are the botanic garden and museum, and a royal garden with a menagerie and several aviaries. Beyond Belem is a park of considerable size belonging to the prince, in which are olive-trees and broom; and the chase on the N. of the river is appropriated to the prince, but that on the S. is for the use of the public. To the N.W. appear the mountains of Cintra, which lie N.E. and S.W. The Tagus washes the foundations of the houses throughout Lisbon; being towards the eastern part about two or three leagues broad; to the W. it becomes narrower, and as far as its mouth it is only about a league broad. The river is often covered with ships, and large men of war may be opposite to the town. The scene is interesting; and the market-town called Almada, with its church on the summit of the hill, and the English hospital at the foot of it, enlivens the picture. The side of Lisbon towards the country consists entirely of hills, from which are seen only the highest edifices of the town, and the traveller arrives suddenly in the city before he is aware of it. The adjacent country, particularly on the N. and E. sides, to a considerable distance, is covered with large gardens surrounded with high walls. These gardens are called in Portuguese "*quintas*," and they generally contain plantations of orange and olive-trees, and sometimes corn-fields and even vineyards. Beyond the western part of Lisbon the country presents naked and rocky hills; but some of these are luxuriantly fertile. The hills, indeed, form the meadows of Lisbon. The soil round the city consists of lime-stone and basalt. Close to the N. side of the town is the famous aqueduct, constructed of a kind of white marble, and completed in 1738. It serves to convey water from several springs situated at a distance of three leagues, near the village of Bellas, being in some parts conducted under ground. Near the town it passes over a deep valley, and rests on several bold arches, the largest of which is 230 feet 10 inches French high, and 107 feet eight inches broad. Its pointed arches seem changed, when viewed

viewed from beneath it, into majestic vaults that re-echo every sound. The whole length of the aqueduct is 2400 feet. In the middle is a covered arch-way of seven or eight feet, where the water flows on each side through a tunnel of stone. Without this arched way and on each side is a path, where two persons can walk abreast, with a parapet. The water enters the town at a place called da Amoreira, when it divides into several other aqueducts, and supplies the fountains, which, though formed in a bad taste, are ornamental. Here the gallegos draw water in small barrels, and cry it about the streets. The water is very good, containing a portion of oxygenated calcareous earth; its sources being in lime-stone hills. The trees that grow on the N. side of Lisbon are chiefly olive and orange trees. The latter are propagated by seed and afterwards grafted. In December and January the oranges begin to turn red, and at the end of January and in February, before they are ripe and sweet, they are gathered for exportation. Toward the end of March and in April they are very good, but delicate persons will not eat them till the beginning of May; at which time they begin to be perfectly sweet and well-flavoured. One tree frequently bears 1500 oranges, and sometimes 2000, and rarely 2500. The climate of Lisbon is reckoned very salubrious. A heat equal to 96° Fahr. is not uncommon in Portugal. The medial heat is generally about 60°. From Midsummer-day to the middle of September rain is very uncommon; in November and December heavy rains with frequent storms occur. Days of perpetual silent rain are very rare; for in general it comes down in torrents. In January cold clear weather often prevails, but becomes milder in February, which is generally a very pleasant month. The days of fair weather amount to 200 in the year, and those of settled rain seldom exceed 80. In this city grates for fire are almost unknown. Ventilation and coolness are chiefly consulted; and in winter a warm cloak supplies the want of a fire. In the vicinity of Lisbon the harvest is in May, and the corn is thrashed as it is with us; but in some parts it is trodden out by horses or oxen, for which purpose a floor is made in the fields. The Portuguese live chiefly on meat and fish, but are not fond of vegetables. In Lisbon the bread is generally bad. It is usually made of wheat flour, sometimes of maize, and never of rye. Potatoes are not cultivated, but imported from England and Ireland. Both the rich and poor consume great quantities of bacalhao, of which the English export thither to the value of a million and a quarter of dollars. The Sardinha, or pilchard, is also the food and comfort of the poor. The fruits most common are oranges and grapes. In the vicinity of Lisbon is a small vineyard, that of Carcavella, or Carcavelos, yielding a peculiar grape, which gives name to the Lisbon wine or to Carcavella; a wine that is said to be generally fabricated in London. The badness of the police strikes every foreigner on entering Lisbon. The filth is suffered to lie in heaps in the streets, unless it should be washed away by the rains. The streets are rendered still more inconvenient by want of light; a host of dogs, without masters, and preying on the public, wander about like hungry wolves; and, still worse than these, an army of banditti. The society of Lisbon is dull and melancholy, especially when compared with that of large Spanish cities. The inhabitants neither walk nor ride for mere amusement; there is little luxury, nor are there any fine equipages. Many servants are kept by the higher families, but they are poorly clad and ill fed. One of the principal amusements of the rich is the Italian opera, which is supported by private individuals. The play-house is little visited by persons of condition; here no women perform; and the players are fre-

quently artisans. The place used for bull-fights is a large quadrangular edifice, surrounded with wooden balustrades and benches. In summer there are bull-fights almost every Sunday, and from twelve to fifteen beasts are killed in an afternoon: in winter this amusement entirely ceases. As to the religion of the city, Link says, that people go to masfs because they have no other walk, and that they love the ceremonies of religion as a pastime, and follow processions as they would go to an opera. Lisbon is by no means destitute of literary institutions. The first and most important is the Academy of Sciences. (See ACADEMY.) The Geographical Academy, principally pertaining to the geography of Portugal, was instituted in January, 1799. Lisbon has also public libraries; and it has also some museums, and public hospitals.

The harbour of Lisbon is spacious and deep, and by the Phœnicians, who first traded hither, was denominated "Olisippo," i. e. the Agreeable bay, whence, as some have said, was formed the appellation of Lisbon. Others have fabulously ascribed the foundation of this city to Ulysses, and hence derived its ancient name Ulyssippo. The entrance of this port is difficult and dangerous, and requires the assistance of a pilot. The trade of Lisbon is extensive; and many foreign merchants, Catholic and Protestant, reside here, as it is the grand mart of all commodities brought from Brazil and other colonies belonging to the Portuguese. N. lat. 38 42' 58". W. long. 9 4' 40".

Operas at the court of Lisbon, before the earthquake in 1755, used to be the most splendid and best performed in Europe. See PEREZ, GIZZIELLO, and GUADAGNI.

Lisbon and the whole of Portugal keep accounts in rees, or reas, 1000 of which make a milree. The crusado of exchange, or old crusado, is 400 rees, and the new crusado 480 rees; the telloon 100; the vintin, or vintim, 20 rees. Hence it appears that the milree is = $2\frac{1}{2}$ old crusados = $2\frac{1}{4}$ new ditto = 10 telloons = 50 vintins.

The coins of Portugal are gold pieces, coined before 1722, which are now 20 *per cent.* higher than their original value; so that the old dobras, coined at 20,000 rees, are worth 24,000; the Lisbonnines, or moidores, coined at 4000 rees, are worth 4800, and the halves and quarters are in proportion; but there are few of these coins in circulation. The gold coins, struck since 1722, are the dobra = 12,800 rees, the meia dobra or Joaneze = 6400 rees, the half Joaneze = 3200 rees, the dezefeis telloon = 1600, the quartinho = 1200, the oito telloon = 800, the old crusado = 400 (now scarce), and the new crusado = 480 rees. The silver coins are the new crusado = 480 rees, halves, quarters, and eighths, or pieces of 240, 120, and 60 rees, the telloons of 100, and halves of 50, and vintins of 20 rees. The copper pieces are of 10, 5, 3, and $1\frac{1}{2}$ rees.

The gold piece of 6400 rees is worth 35*s.* 11*d.* sterling. The old crusado is worth 2*s.* 3*d.*, and the milree, valued in gold, is worth 67*s.* 4*d.* sterling. The new silver crusado is worth about 2*s.* 9*d.* sterling, and the milree, valued in silver, is worth 68*s.* 3*d.* sterling. Gold is to silver as 16 to 1.

The commercial weights are the quintal = 4 arrobas, the arroba = 32lb., the pound or arrate = 2 marks, or 16 ounces, the ounce = 8 outavas; $13\frac{1}{2}$ quintals = a ton. The pound of Lisbon is = 952 Dutch ascs, or 7084*3*/₄ grains English troy weight; so that 83lb. of Lisbon = 84lb. avoirdupoise weight.

The measure for corn, salt, and other dry commodities, called moyo, is = 15 fanegas; the fanega = 4 alquieres = 8 meyoys = 16 quartos = 32 outavas = 64 mequias. The alquiere measures 675 French or 817 English cubic inches; so that 21 alquieres are nearly = 1 English quarter,

or 50 alquieres = 19 English bushels. For liquid measure, the tonelada of Lisbon is = 2 pipas, the pipa = 26 almudes = 312 canadas = 1248 quartillos. The baril is = 18 almudes. The standard gauge, at the custom-house of London, of a pipe of Lisbon is 140 gallons = 31 almudes, and the almude is $4\frac{1}{2}$ English gallons nearly. The long measures of Lisbon are the vara = 5 palmos, and the covado = 3; the palmo = 8 inches of Lisbon, or $8\frac{3}{5}$ English inches; the covado is = $26\frac{3}{5}$ English inches; the Lisbon foot is = half a covado, or $13\frac{3}{5}$ English inches; and 9 feet of Lisbon = 10 English feet. In the freight of ships, 4 chests of sugar, 4 pipes of oil, 4000lb. of tobacco, and 3000lb. of gumac, are reckoned for 1 last. Kelly's Un. Cambist. See EXCHANGE.

LISBON, a town of America, in New London county, Connecticut, lately a part of Norwich; containing two parish churches, and 1168 inhabitants.

LISBURN, a post and borough town of Ireland, in the county of Antrim, and province of Ulster, now the second in the county for size and population; but in the reign of Elizabeth only a small village, called Lisnagarvey. It lies about seven miles S. of Belfast, on the river Lagan, which separates it from the county of Down. In the reign of James I. sir Fulk Conway obtained a grant of it, and settled some English and Welsh families there. In 1641 a victory was obtained by sir George Rawdon over the rebels under sir Phelim O'Neil and others, little more than a month after the breaking out of the rebellion. In 1662 the church of Lisburn was erected into a cathedral for the united dioceses of Down and Connor, and the inhabitants had the privilege granted of sending two burgesses to parliament, although not a corporate body. These privileges were given on account of their loyalty to Charles I. and II. In 1699 a patent was granted to some French refugees for establishing a manufacture of linen in the town, to which circumstance it chiefly owes its prosperity. The virtuous conduct and civilized manners of these good people were of great advantage to it, and their skill and industry set an example to those who were concerned in the same business as they were, which soon had the effect of raising the quality of their manufacture to a degree of excellence unknown till then; and the linens and cambricks made in the neighbourhood and sold in Lisburn market, have until this day kept up their superior character. Though the vicinity of Lisburn to Belfast prevents it from being a place of much trade, there is a great deal of business done in it, in various ways. On market-days it is much frequented from the quantity of linen and other things brought to it, and it is well known as the first place to meet with oats of the best quality for feed. A few years ago a fine spire of cut stone was built to the church; and lately a steeple and cupola on the market-house. The houses of worship are, a spacious church, a Presbyterian meeting-house, a Quaker's meeting-house, a handsome Catholic chapel, and a Methodist chapel. There are also some good charitable institutions. The number of houses is 800, which at $6\frac{1}{2}$ gives a population of 5212. It is said by Carlisle to be noted for the neatness of its buildings and the urbanity of its inhabitants. It sends one member to parliament, and is 73 miles N. by E. from Dublin. Dubourdieu's Statistical Account of Antrim.

LISBURN, Cape, a cape on the W. coast of North America. N. lat. 69° 6'. W. long. 165°. — Also, a cape on the island of Spiritu Santo, one of the New Hebrides. S. lat. 15° 40' 45". E. long. 166° 57'.

LISCA-BIANCA, one of the smaller Lipari islands, near Basiluzzo. This island, as well as Bottero and Datolo, in its vicinity, is rather a rock, abounding in crusts of

fulphate of alumine, and for the most part formed of lava, whitened, and so decomposed that they are easily reducible to powder.

LISCHITZ, a town of Bohemia, in the circle of Czaflau; 8 miles N. of Czaflan.

LISCIANO, a town of Naples, in the province of Otranto; 8 miles S.E. of Tarento.

LISIANTHUS, in Botany, from *lis*, smooth, and *anthos*, a flower, in contradistinction, as one would suppose, to certain other flowers, nearly allied in many respects to this, but remarkable for some sort of fringe or hairiness, as *Menyanthes*. Yet Browne, who gave the name, does not advert to this idea; and by a slip of the pen he quotes Burmann as being the first author of it, in his *Thesaurus Zeylanicus*, 145. t. 67; whereas the plant there exhibited is called *Lysimachia*, and is *Chironia trinervia* of Linnaeus! — Browne Jam. 157. Linn. Mant. 6. Suppl. 135. Schreb. 111. Willd. Sp. Pl. v. 1. 826. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 1. 318. Juss. 142. Lamarek Illustr. t. 107. — Class and order, *Pentandria Monogynia*. Nat. Ord. *Rotacea*, Linn. *Gentiana*, Juss.

Gen. Ch. Cal. Perianth inferior, divided, more or less deeply, into five, lanceolate or roundish, erect, permanent segments, membranous at the edge. Cor. of one petal, funnel-shaped; tube longer than the calyx, swelling upwards, contracted just above the base within the calyx; limb in five deep, lanceolate or roundish, recurved segments, much shorter than the tube. Stam. Filaments five, thread-shaped, smooth, inserted into the tube, just above its contraction, generally shorter than the limb; anthers ovate, two-lobed, incumbent. Pist. Germen superior, ovate-oblong, pointed; style thread-shaped, the length of the stamens, permanent, finally twisted; stigma compressed, of two parallel plates. Peric. Capsule ovate-oblong, pointed, of two incomplete cells and two valves, the partitions formed of the inflexed margins of the valves. Seeds numerous, minute.

Eff. Ch. Corolla funnel-shaped, inflated; its segments recurved. Stigma of two plates. Capsule oblong, imperfectly two-celled; partitions from the inflexed margins of the valves. Seeds numerous.

Fifteen species of this elegant genus, little known in England, are collected by Willdenow, of which *glaber* and *frigidus* are one and the same. Whether the rest all truly constitute one genus, may perhaps be doubted. The carinated calyx, supposed an essential mark, in those of Browne, is not found in those of Aublet, the segments of whose calyx moreover are rounded, and their corolla somewhat irregular and curved. These more accord with *L. glaber* of Linnaeus, and very correctly with his *chelonoides* found in the same neighbourhood.

The following examples will enable the reader to judge of the habit and leading characters of these different sets of species.

L. longifolius. Linn. Mant. 43. Browne Jam. 157. t. 9. f. 1. — Calyx taper-pointed, keeled. Leaves lanceolate, acute. Branches round, somewhat downy. — Native of the mountains of Jamaica, in a dry sandy soil. It forms a humble shrub, with round, opposite, more or less downy, level-topped, leafy branches. Leaves opposite, on short footstalks connected by a very short, annular, intrafoliaceous stipula; their form is variable, ovate-oblong or lanceolate, acute, entire; the surface smooth, or finely downy. Flowers on short, terminal, downy stalks, solitary, or two or three together, about an inch and a half long, of a pale delicate yellow, very elegant. Their calyx and corolla are very sharply pointed; the former strongly keeled or winged, as in many plants of the Gentian family; the stigma short and almost capitate, yet of two parallel lobes.

This

This species is said to blossom in the stove at Kew in June and July. Little or no bitterness is perceptible in the dried specimen.

L. cordifolius. Linn. Mant. 43. Browne t. 9. f. 2, is probably but a mere variety, having shorter, and perfectly heart-shaped leaves, which, in our specimen from Browne, are rather more downy, as well as the branches.

L. latifolius. Swartz. Ind. Occ. v. 1. 348. never seen by us, is not by his account very clearly distinguished from these; for *longifolius* certainly has, by no means, "very long flower-stalks, widely spreading at their divisions," which he attributes to it, but rather stalks "simply three-forked, scarcely longer than the leaves," such as he describes in his *latifolius*.

L. glaucifolius. Jacq. Coll. v. 1. 64. Ic. Rar. t. 33.—Calyx taper-pointed, as long as the tube. Leaves elliptic-oblong, sessile, glaucous, smooth. Stem round.—This seems to agree sufficiently in genus with the above, though its calyx appears not to be keeled. The root is perennial. Stems herbaceous, annual, slender, nearly simple. Flowers purplish-blue, on very long simple stalks. It blossomed with Jacquin in the stove, from July to September, but he knew not its native country.

L. alatus. Aubl. Guian. v. 1. 204. t. 80.—Leaves elliptic-oblong, tapering at each end, smooth. Stem square, winged. Segments of the calyx rounded. Corolla declining.—Gathered by Aublet in cultivated as well as waste ground in Guiana and Cayenne. One of his specimens before us has the habit of a *Chelone*. Its calyx is blunt and rounded. Corolla declining, as well as the *stamens* and *style*, and somewhat irregular. The plant is said to be bitter, and its qualities deobstruent.

L. chelonoides. Linn. Suppl. 134.—Leaves oblong, slightly confluent at the base, smooth. Stem round, without wings. Branches of the panicle racemose. Calyx rounded.—Sent to Linnaeus from Surinam, and marked No. 141. in the *Planta Surinamensis*. It is so like a *Chelone* or *Pentstemon*, that Linnaeus actually took it for such. His son afterwards referred it to *Lisiantibus*, mistaking it for the above species of Aublet, from which it differs in the round stem, destitute of wings; more elongated and racemose flowering-branches; and nearly straight regular corolla.

L. glaber. Linn. Suppl. 134. Sm. Ic. ex Herb. Linn. t. 29. (*L. frigidus*; Swartz. Ind. Occ. v. 1. 352).—Smooth. Leaves ovate, stalked, acute. Flowers somewhat corymbose. Stem square below.—Native of South America and Jamaica. A large and handsome herbaceous plant, with yellow flowers, whose corolla is regular and dilated. The segments of the calyx are indeed more rounded and obtuse in the Jamaica specimens than in those of Mutis, but we cannot think that difference essential, every other part being so alike in both. The lower portion of the stem is wanting in Mutis's specimen, which caused that part to be described as round, the branches being so, as well as in Swartz's.

L. exsertus. Swartz. Ind. Occ. v. 1. 346.—Leaves ovato-lanceolate, on longish stalks. Calyx taper-pointed. Stamens and style much longer than the corolla.—Native of the cloud-capped fumants of the Blue Mountains of Jamaica. Swartz. It is said to have been alive at Kew, but not to have flowered. The stem is shrubby. Leaves numerous, elliptic-lanceolate, tapering at each end, smooth, on slender footstalks from half an inch to an inch long. Flowers rather small, in three-forked compound panicles; remarkable for the very long, slender, projecting organs of fructification. If this species be carefully considered, it will perhaps be found to conciliate, in some measure, the differences between the discordant ones above described. Its

calyx agrees most with the former, though neither keeled nor winged; its corolla with the latter; its habit is akin to both; its *stamens* peculiar to itself.

LISICZNIK, in *Geography*, a town of Poland, in Podolia; 28 miles W. of Kamimec.

LISIEUX, a town of France, and principal place of a district, in the department of the Calvados, and before the revolution, the see of a bishop. The place contains 10,192, and the canton 28,293 inhabitants, on a territory of 260 kilometres, in 30 communes. N. lat. 49° 8' 50". E. long. 0° 13' 32".

LISIGNANO, a town of Itria; 14 miles E. S. E. of Pola.

LISKEARD, a borough and market-town in the hundred of West and county of Cornwall, England, is situated partly on rocky hills and partly in a bottom; and through this inequality of the ground, the streets have the appearance of being disposed with studied irregularity. The basements of the houses are consequently diversified; the foundations of some buildings being on a level with the chimneys of others. The church consists of three spacious aisles, and has a tower built mostly of granite; the south side of the church is ornamented with pinnacles and battlements, also of granite; but the greater part of the structure is composed of slate-stone, which likewise constitutes the foundation of the town. The town-hall is supported on granite columns, in the space between which a considerable market is held on Saturdays. Here are six annual fairs. On an eminence north of the town are the mouldering foundations of a castle, but every trace of its shape and architecture is nearly obliterated: near it is a large field, still called Caille-park; but no fragments appear of the "Chapel of our Lady," mentioned by Browne Willis to have stood therein. There is, however, a house standing at the bottom of the town, which, from its windows, gateway, and sculptured ornaments, seems to have been connected with some religious establishment. Liskeard was constituted a free borough by Richard, brother to Henry III. by charter dated June 5, 1240. Queen Elizabeth, in the year 1580, granted a charter of incorporation, by which the civil government was vested in a mayor, recorder, eight capital burgesses, and fifteen assistants, who, with the other freemen of the borough, elect two members of parliament. Liskeard is 16 miles distant from Plymouth, and 237 from London: in the year 1800 the parish was returned to parliament as containing 507 houses, and 2708 inhabitants.

In the parish of St. Cleer (to the north of Liskeard) are various Druidical and other antiquities; particularly the Hurlers, which consisted, when perfect, of three contiguous circles of upright stones from three to five feet in height; the Cheese-Wring, a natural pile of rude rocks, rising to the height of thirty-two feet; the Other Half-stone, which appears to have been the shaft of a cross which originally stood upright. To these may be added, a cromlech of great magnitude, called Trevethey-stone. St. Cleer's well, of which some remains are still extant, was in the times of ignorance and superstition esteemed a bath of sovereign virtue. South of Liskeard is St. Keyne's well, which is classed by Carew among the natural wonders of Cornwall. Of this faint, and of the well, many poetical and legendary tales are extant. The spring is arched over, and on the mould which covers this arch five large trees are growing. Beauties of England and Wales, vol. ii.

LISLAU, a town of Bohemia, in the circle of Bolestaw; six miles S. of Benatak.

LISLE, CLAUDE DE, in *Biography*, a celebrated French writer in history, was born at Lorraine in the year 1644.

He was received a member of the Jesuits' college at Pont-à-Mousson, took his degrees in law, and was admitted an advocate. Conceiving, in a very short time, a great dislike to the law, he devoted himself to the study of history and geography. For the sake of the superior advantages to be obtained in the metropolis, he removed to Paris, and applied himself to the instructions of the most distinguished professors. Having obtained a large fund of knowledge on the subjects referred to, he commenced private lecturer, and acquired such a high reputation in his profession, that he could boast of having been master to the principal nobility at the French court. M. de Lisle died at Paris in 1720, in the seventy-sixth year of his age. He was author of "An Historical Account of the Kingdom of Siam;" "A Genealogical and Historical Atlas, on engraved Plates;" "An Abridgment of Universal History, from the Creation of the World to 1714," in 7 vols. 12mo.; and several other works, one of which was "An Introduction to Geography, with a Treatise on the Sphere;" published in 1740, in the name of his eldest son. Moreri.

LISLE, WILLIAM DE, a learned French geographer, son of the preceding, was born at Paris in 1675. He discovered at a very early age a genius for geographical studies, and designed maps before he was nine years of age. In the year 1696 he published a map of the world, maps of the four quarters, as they are called, *viz.* Europe, Asia, Africa, and America, a map of Italy, one of Ancient Africa, and two globes, a celestial and terrestrial one. These performances were not only well received, but established the author's fame. In 1702 he was elected a member of the Academy of Sciences, and in 1718 he was appointed first geographer, with a pension. He was about the same time appointed geographical tutor to the young king, Lewis XV., for whose use he drew up several works, among which was a general map of the world, and another of the retreat of the ten thousand. He also gave the world "A Treatise on the Course of all the known Rivers." The reputation of M. de Lisle was now so great, that all authors of respectability who wrote on history or subjects connected with it, were desirous of embellishing them with his maps; and many sovereign princes endeavoured to tempt him to enter into their service. The emperor, Peter the Great, paid him a visit with the view of obtaining from him a knowledge of the extent and situation of his own dominions. He died in the fifty-first year of his age, while he was engaged in many useful and important works. Moreri.

LISLE, LEWIS DE, brother of the preceding, celebrated for his knowledge in astronomy, rendered some important service to the interests of science, by the hazardous journeys and voyages which he undertook to promote them. In the year 1726 he went to Russia with his brother Joseph, who had been appointed astronomer to the Academy of Sciences at Petersburg. Lewis, at this time, made excursions beyond the utmost boundaries of the immense Russian empire. He took several journeys to the coasts of the icy sea, to Lapland, and the government of Archangel, to determine the situation of the principal places by astronomical observations. He afterwards traversed a great part of Siberia, with M. Mulier and M. Gmelin, professors of the academy at Petersburg. In 1741 he proceeded alone to Kamtschatka, and went from thence to Cape Beerig, to examine the unknown northern coasts of America, and the seas between them and the Atlantic continent. He died in the same year. On account of his great merit he obtained a seat in the Academy of Sciences, and was author of some papers in the "Memoirs" of that learned body, and of the Academy of Sciences at Petersburg. Moreri.

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LISLE, JOSEPH NICHOLAS DE, younger brother of the preceding, was born at Paris in 1688. Having received a good education in the elements of learning, he attended lectures in the Mazarine college. The total eclipse of the sun which occurred in March 1706, led him to pursue with avidity mathematical learning, particularly in its application to astronomy, and he soon exhibited a surprising genius for invention, combination, and calculation. In 1709, he obtained leave to occupy the cupola of the Luxembourg palace for an observatory; he was now enabled to make a wooden quadrant, which he divided with great care, and which he found to answer his purpose in his early observations. Shortly after this, his father's numerous family made it necessary for him to endeavour to procure for himself the means of support; and in doing this he found himself obliged to render his astronomical skill subservient to the revenues of judicial astrology, for which he was not only remunerated by pecuniary presents from the regent, marshal de Noailles, and other great men, but had the grant of a pension of 600 livres. This was in the year 1715, when he was deeply engaged in calculating the tables of the moon according to the theory of sir Isaac Newton. He had, previously to this, been elected a member of the Academy of Sciences, which gave new energy to his exertions, and the memoirs of that body were in a short time enriched with his valuable reflections and dissertations. He made many observations on the spots in the sun, and was led to form from them a theory to determine the sun's rotation on his axis. In 1720 he delivered a proposal to the Academy for ascertaining in France the figure of the earth, and some years afterwards his designs relative to that object were carried into execution. In 1724, M. de Lisle paid a visit to England, obtained the notice and friendship of Newton and Halley, and was admitted a fellow of the Royal Society. In 1726, by the invitation of Catharine, empress of Russia, he went to Petersburg, to fill the post of astronomer royal in the Imperial Academy of Sciences. In this situation he occupied the house of the observatory built by Peter the Great, in which he spent nearly twenty-one years, in incessant labours for the improvement of astronomy and geography. The first series of his observations were employed in ascertaining the longitude and latitude of Petersburg, and the refractions in that northern region. After this he devoted several years to an assiduous observation of the meridional height of all the planets, and of the fixed stars of the three first magnitudes, and published memoirs illustrative of the history of astronomy, in two vols. 4to. In the year 1740, a transit of Mercury was expected, which, as it would not be visible in Europe, he was determined to travel into Asia to observe. His first observations in the climate of Siberia, were on the intenseness of the cold, which was greater than had ever been pointed out by a thermometer, or than it was conceived possible for human nature to sustain. He published a memoir on this subject in the volume of the Transactions of the French Academy for 1749. When the time for observing the transit arrived, the cloudiness of the weather totally frustrated the design of his journey. His time and labour were not however wholly lost, as he employed himself in making geographical and physical observations, and in drawing up a description of the country, which description is inserted in the eighteenth volume of Quérion's History of Travels, &c. Another fruit of his expedition into the Russian dominions, was an atlas of the country, first published in the Russian language, and afterwards in the Latin. Connected with his meteorological observations, he constructed a thermometer, which was differently graduated from those then in use: the degrees began at the heat of boiling water,

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and

and thence increased to 150, which was the freezing point. In the year 1747, after much ill treatment on the part of the Russian government, he obtained his dismissal, left Peterburg in the month of May, and arrived in Paris in September of the same year. On his return he was appointed professor of the mathematics at the college royal, in which situation he lived to render the greatest service to the interests of science, by training up pupils worthy of such a master, among whom was the celebrated M. de la Lande. He now fitted up and furnished an observatory, in which he continued his labours, without interruption, for several years. In the year 1748, his pupil M. Monnier took a voyage to Scotland to observe an annular eclipse of the sun, which furnished an opportunity for measuring the diameter of the moon at the time when it should be entirely visible on the sun's disk. On this subject De Lisle published a large advertisement, which was reckoned a complete treatise on annular eclipses. He afterwards entered more fully on the consideration of the theory of eclipses, and he communicated a part of his researches on the subject to the Academy in 1749. He was so expert in calculations, that he made many founded on the observations of Greenwich, Berlin, Scotland, and Sweden. He published "New Charts of the Discoveries of Admiral de Fonte, or Fuente, made in 1640, and those of other navigators, Spanish, Portuguese, English, Dutch, French and Russian, in the Northern seas, with explanations." This work was presented to the public in 1750 and 1753. In the latter of these years he published a curious map of the world, in which he represented, for the benefit of astronomers impatiently waiting for the transit of Mercury over the sun, the effect of the parallaxes of Mercury in different countries, in order to point out the proper places for making such observations on the transit, as should, from the difference of their result, furnish a method of determining the distance of the sun, in a manner similar to that applied by Halley to the transit of Venus. Another work of this laborious and indefatigable philosopher, published in the Transactions of the Academy, was on the comet of 1758, which had been first discovered by a peasant in the neighbourhood of Dresden, and which was visible several months; but he was principally attentive to the one predicted by Dr. Halley, forty years before, as to make its appearance in 1759, and which was first seen in January of that year. He gave an account of his observations on that comet in the first volume of the "Mercure," for July 1759. He was afterwards assiduously engaged on the subject of the transit of Venus, which was expected in 1761, in order that he might correct the error of Halley, and thus prevent persons from undertaking long voyages for the sake of observing it, whose labours would have proved useless with respect to the object in view.

M. de Lisle had, some years previously to this, been appointed astronomical geographer to the marine, an office which had been established many years, with the express view of having a dépôt, in which might be preserved all the designs, plans, charts, &c. of the coasts of France, and of the colonies and establishments in different parts of the world, with the memoirs relating to them: to M. de Lisle's office was attached the business of collecting and arranging the plans and journals of naval captains, and to extract from them whatever might be found beneficial to the king's service in this department. His majesty now purchased, with a pension for life, all M. de Lisle's rich astronomical and geographical collections, which were added to the MSS. in the depot. In the year 1758, our author felt some symptoms of decline, and withdrew as much as he could from public life, leaving the care of his observations to M. Messier,

and obtaining from the minister the appointment of M. de la Lande for his coadjutor at the college royal. He went to reside at the abbey of St. Genevieve, where he spent much of his time in devotional exercises, and devoted the greatest part of his income to acts of benevolence and charity. In his retirement he cherished his taste for astronomy and geography, corresponded with men of science, read new works, and even selected some of his own in MS. with a view to publication. He died on the 11th of July 1768, being in the 81st year of his age. As a man of science his merits are very great, and in private life he was distinguished by unaffected piety, pure morals, undeviating integrity, and most amiable manners. Gen. Biog.

LISLE DE LA DREVETIERE, LEWIS-FRANCIS DE, a French dramatic writer, was descended from a noble family, and born in the province of Dauphiné. His friends intended him for the bar, but his own inclinations were decidedly against the profession of the law, and as his father could not support him in the style which his dissipated turn required, he was resolved to maintain himself by his talents, and began to write for the Italian theatre. In 1721 he presented for public exhibition his comedy of "Arlequin Sauvage," which was successful, and which is even now occasionally brought before the public. His "Timon le Misanthrope" acquired a much larger share of popularity: he published and brought on the stage many other pieces, chiefly of the comic cast: and he composed a tragedy entitled "Danaus," and a poem entitled "Essai sur l'Amour Propre;" which, with several other pieces, were collected in a single volume. He died in 1756, and has been described as a haughty, taciturn, and thoughtful character.

LISLE, in *Geography*. See LILLE.

LISLE, a town of France, in the department of the Dordogne; 9 miles N.W. of Périgueux.—Also, a town of France, in the department of the Yonne; 24 miles S.E. of Auxerre.

LISLE, a post-town of America, in Tioga county, New York; through which passes a branch of the Chenango, uniting with the Chenango in the S.E. corner of the township. It contains 660 inhabitants.

LISLENA, a town of Sweden, in the province of Uppland; 16 miles S.S.W. of Upsal.

LISMORE, an island of the Hebrides, in the county of Argyre, Scotland. It is situated at the mouth of the great arm of the sea called Loch-Linnhe, and extends about ten miles in length and two in breadth. The whole of this island lies on a stratum of excellent lime-stone, unfortunately rendered of little value to the inhabitants by the deficiency of fuel to burn it. Mr. Pennant says the derivation of its name is from *Liosmor*, or the great garden. According to tradition, however, it was not a garden, but a deer-forest, and as a proof of this, multitudes of stags' horns of uncommon sizes are frequently dug up in the mossy parts of it. At present there is very little wood, but the soil being fertile, the lesser vegetables shoot up with uncommon vigour. The chief productions of the ground are beans and oats. The former are mostly applied to the purposes of distillation; and the latter go to the discharge of rents, so that the inhabitants are obliged to import large quantities of meal for their subsistence. There are a considerable number of cattle reared in this island, but they are generally of very small stature. The author already mentioned thinks they must have greatly degenerated from their original growth, for he informs us that he saw the skull of an ox dug up here, which was of much larger dimensions than any now living in Great Britain. About a hundred head of the largest are exported annually. The horses bred here are extremely short-lived.

They are harnessed when only two or three years old, which practice will no doubt assist in shortening the period of their existence. Neither foxes, hares nor rats can be found in the island; otters and mice however are abundant. It contains three small lakes, two of which are famed for excellent trout, and the third for eels.

Lismore was formerly the seat of the bishop of Argyle, who was thence styled Episcopus Lismorensis. Mr. Pennant says there are no remains either of the cathedral or the bishop's palace. In the Beauties of Scotland, however, it is asserted, that vestiges of both are still to be seen. The chancel of the former is there stated to be used as the parish church, and the walls of the latter are said to be pretty entire, and distant about four miles from the cathedral. Several fortified camps can yet be discovered in different parts of the island. A Danish fort, surrounded by a deep fosse, is likewise in tolerable condition. The walls are now 17 feet high, having a gallery within, and round the area a stone seat, which Mr. Pennant supposes might have been intended as a general resting place for the chieftains and their foldiers. The church, says the same author, in conformity with his assertion that there are no remains of the cathedral, "is a mean modern building." In the church-yard several old monuments are still standing, one of which is very remarkable, as consisting of nothing more than a thick log of wood. Its antiquity must be very great, as there is no word in the Erse language to denote this kind of monument. On a rock are cut the radii of a dial, but the index is destroyed. A small basin is excavated in another rock, which was probably used by the Druids in some part of their religious ceremonies.

There is no special return of the number of inhabitants in this island, but they are reckoned to exceed 1100 souls. Pennant's Tour in Scotland. Beauties of Scotland.

LISMORE, a post-town of Ireland, on the river Blackwater, and in the county of Waterford. The bridge over the river is a fine erection of the duke of Devonshire's. The span of the principal arch is 190 feet. There are excellent salmon weirs at this place, which return a considerable profit. The appearance of Lismore from the bridge is awfully sublime and interesting. The castle is seated upon a rock, which rises in perpendicular shelves from the river to a tremendous height. The rude rocks are richly crowned with trees, whose verdant boughs in some parts embrace the placid streams, and in others ascend to shelter the ruined towers, and shade the antique windows of the fort. This venerable and extensive castle, the property of the duke of Devonshire, was built by king John, in 1185, on the ruins of the abbey of St. Carthagh. It afterwards became the episcopal residence, till Myler Megrette, bishop of the see, conveyed it to sir W. Raleigh. From sir Walter it was purchased, with the rest of his property in Ireland, by Richard Boyle, afterwards the first earl of Cork, and his youngest son, the celebrated and deservedly esteemed philosopher Robert Boyle, was born in it. It has since become the property of the duke of Devonshire, who is descended by the female line from the eldest branch of the Boyle family. In the town of Lismore are a neat court-house, in which the sessions are held, a small prison, and a very respectable inn. The church, which serves both as a parish church and as the cathedral of the bishopric, is old, and was lately in indifferent repair; it is however, according to Dr. Beaufort, spacious and handsome, and will probably be thoroughly repaired. The dean of Lismore has a peculiar jurisdiction over this, and two adjoining parishes. It has been already mentioned that St. Carthagh founded an abbey here. This was in the seventh century, and the abbey was erected into

a bishopric in 633. A number of monks repairing hither, several churches and cells were built, and these being usually the seat of any learning that existed during the middle ages, a school was soon instituted, which, for a long period, became the great resort both of natives and foreigners. In 1536, this see was united to that of Waterford, under which an account of it will be given. Before the union, Lismore returned two members to the house of commons, but this privilege has ceased. It is 101 Irish miles S.W. by S. from Dublin, and 26 N.E. from Cork. Beaufort, Robertson, &c.

LISNAKEA, a post-town of Ireland, in the county of Fermanagh; 70 miles N.E. from Dublin.

LISSA, a town of Holland; eight miles N. of Leyden.

LISSA, a town of Silesia, in the principality of Breslaw, on the Weistritz; seven miles W.N.W. of Breslaw. N. lat. 51° 7'. E. long. 16° 50'.

LISSA, anciently *Lissa*, (which see,) an island of the Adriatic, near the coast of Dalmatia, once famous for the commerce, wealth, and power of its inhabitants, is a mountainous and thinly inhabited island, 30 miles in circuit. In many parts the soil is good, but not sufficiently cultivated. In its ancient state it was in alliance with Rome, and carried on war against the kings of Illyrium; but with the decline of the Roman empire, it sunk into a successive dependence on Narenta, Lelina, and Venice. Its mountains contain marble, and are intersected by fertile valleys. It produces wine, fruits, and excellent honey. But its principal source of wealth is its fishery, particularly that of sardines. The ruins of its capital of the same name appear above the harbour, near a village of the same name. It has also a well-built populous town, called "Comisa," near the sea, on the E. side of the island, where are the ruins of the ancient city of Meo. N. lat. 43° 25'. E. long. 16° 18'.

LISSA, or *Lechno*, a town of the duchy of Warsaw; raised from the condition of a village to that of a town, by the influx of Protestants driven by persecution from Silesia, Bohemia, Moravia, and Aultria. The inhabitants carry on a good trade. In this town are a Lutheran and also a Calvinist church, and a seminary; 44 miles S.S.W. of Posen. N. lat. 51° 55'. E. long. 16° 35'.

LISSA, or *Thynnus Lyssa*, in *Ichthyology*, a name by which some authors have called the fish more usually called *gliffa*, a large sea-fish of the tunny kind.

LISSABATTA, in *Geography*, a town on the N. coast of the island of Ceram, inhabited by an assemblage of different people, which have been troublesome to the Dutch. S. lat. 2° 55'. E. long. 128° 44'.

LISSANTHE, in *Botany*, so named by Mr. R. Brown, from *λίσσω*, *smooth*, and *ανθε*, a *flower*, because of the naked and beardless limb of the corolla; that part being densely covered with hairs in *Leucopogon*, and more or less fringed or tufted in several other genera, of the same natural order, found in New Holland. Brown Prodr. Nov. Holl. v. 1. 540. Class and order, *Pentandria Monogamia*. Nat. Ord. *Epacridae*, Brown.

Gen. Ch. *Cal.* Perianth inferior, of five equal, concave, permanent leaves, sometimes accompanied by two rather smaller ones at the base. *Cor.* of one petal, funnel-shaped; tube nearly cylindrical, generally hairy within; limb in five lanceolate, equal, spreading, beardless segments. Nectary a five-lobed gland, at the base of the germen. *Stam.* Filaments five, short, within the tube; anthers roundish, of two cells, bursting lengthwise. *Pist.* Germen superior, globular, with five slight angles; style pentagonal, rigid, shorter than the tube; stigma obtuse. *Peric.* Drupa succulent. *Nuc.* hard, of five cells.

Fil. Ch. Calyx of five or seven leaves. Corolla funnel-shaped; its limb beardless. Stamens inserted into the tube, very short. Drupa succulent. Nut hard, of five cells.

Mr. Brown defines six species of this genus, separated by him from the *Styphelia* of preceding botanists, which are disposed in three sections. They are small, rigid, upright shrubs; with scattered leaves, furrowed beneath; and rather small white flowers.

SECT. 1. *Calyx of only five leaves. Clusters axillary, of few flowers, their partial stalks furnished with a pair of bractes at the base. Tube of the corolla hairy within.*

1. *L. sapida*. "Clusters of two or three flowers, recurved. Leaves oblong-linear, sharp-pointed, revolute; white and striated beneath." Br.—Gathered by Mr. Brown near Port Jackson, New South Wales.—By the name, we presume the fruit is eatable.

2. *L. subulata*. "Clusters of four or five flowers; erect. Leaves linear-awl-shaped. Branches smooth. Fruit with ten furrows."—Gathered by Mr. Brown in the same country. The leaves are about half an inch long.

3. *L. strigosa*. (*Styphelia strigosa*; Sm. New Holl. 48.) Clusters collected towards the ends of the branches, erect, of few flowers. Leaves linear-awl-shaped. Branches downy. Drupa with five slight angles.—Sent from Port Jackson by Dr. White in 1793. Found there also, as well as in Van Diemen's land, by Mr. Brown. The stem is shrubby, rigid, finely downy, with numerous, short, crowded, leafy, lateral branches. Leaves scattered, sometimes imperfectly whorled, nearly sessile, about half an inch long, rigid, pungent, revolute; smooth, even and convex above; ribbed beneath. Clusters axillary and terminal, generally crowded about the ends of the branches, short, erect, of very few flowers, their stalk downy, with several pale, concave, fringed bractes. Calyx-leaves like the bractes. Tube of the corolla thrice as long as the calyx; limb acute, one-third the length of the tube. Anthers rising just above the mouth, accompanied by a few erect hairs from the inside of the tube. Germen and lower part of the style clothed with fine, short, hoary down.

SECT. 2. *Calyx of seven leaves. Corolla short, its tube and mouth without hairs. Spikes axillary, of few flowers.*

4. *L. montana*. "Leaves oblong-linear, obtuse, point-les; glaucous beneath."—Gathered by Mr. Brown at Van Diemen's land.

SECT. 3. *Calyx of seven leaves. Corolla elongated, its mouth beset with deflexed hairs within the tube. Flowers axillary, solitary.*

5. *L. daphnoides*. (*Styphelia daphnoides*; Sm. New Holl. 48.)—Leaves elliptic-lanceolate, slightly concave, with a blunt callous point; their edges naked, roughish. Sent from Port Jackson by Dr. White, in 1792. Mr. Brown found it both in the tropical part of New Holland, and in Van Diemen's land. The stem is much branched, leafy, and finely downy. Leaves scattered, from $\frac{1}{2}$ h to $\frac{3}{4}$ h of an inch long, very various in breadth, more or less elliptical, smooth, slightly concave, entire; minutely roughish at the edges; furnished with numerous branching ribs beneath. Flowers numerous, axillary, solitary, on short hairy stalks. Calyx-leaves all nearly of equal size and appearance, ovate, pointed, smooth, finely fringed, two of them external. Corolla much like that of *L. strigosa*, but with rather longer and narrower segments, whose upper side appears, as far as we can judge from the dried plant, to be finely downy from their base to the middle. Mr. Brown however, who saw it alive, describes this part as entirely smooth. The aspect of this pretty species is much like that of some of the smaller kinds of *Daphne*.

6. *L. ciliata*. "Leaves elliptic-lanceolate, flat, with a pellucid point; their edges finely serrated and fringed. Limb of the corolla roughish."—Gathered by Mr. Brown in Van Diemen's land. We have seen no specimens of this species, nor of any others, except the third and fifth, nor do we know of any of them being introduced into the gardens of this country.

LISSE, in *Geography*, a town of Persia, in the province of Ghilan; 60 miles N.W. of Reshd.

LISSOUEN, a town of Prussia, in Natangen; 15 miles S. of Marggrabowa.

LISSUS, in *Ancient Geography*, a town of Illyria, in Dalmatia, between the mouth of the Drin and the frontier of Macedonia. Ptolemy. Pliny calls it "Lissum Oppidum," and adds that it was a colony of Roman citizens, 100 miles from Epidaurus, where Macedonia commenced.

LIST, in the *Manufactures*, denotes the border of a stuff, or that which bounds its width on each side.

Du-Cange derives the word from *licia*, which, in the age of corrupt Latin, was used for the inclosures of fields and cities, as being anciently made with cords interlaced; or from *lisla*, *quia campum claudubant inslar lislarum panni*; as inclosing the ground after the manner that a list does a piece of cloth.

All cloths, and stuffs of silk, wool, or cotton, have lists. Lists contribute to the goodness of the stuff, and further serve to shew their quality; which has given occasion to several regulations relating to their matter, colour, work, &c.

LIST is also used to signify the inclosed field, or ground, wherein the ancient knights held their jousts and combats. It was so called as being hemmed round with pales, barriers, or flakes, as with a list.

Some of these were double, one for each cavalier; which kept them apart, so that they could not come nearer each other than a spear's length. See TOURNAMENT, and DUEL.

LIST, *Listel*, or *Listello*, in *Architecture*, called also *cincture*, *fillet*, *square*, and *reglet*, is a little square moulding, serving to crown or accompany larger mouldings; and, on occasion, to separate the flutings of columns.

LIST, in the *Sea Language*, the same with *Lust*.

LIST, *Civil*. See *CIVIL list*, and *REVENUE*.

LISTENING, according to Rohault, consists in extending or bracing the tympanum of the ear, and putting it into such a condition, as that it shall be the more affected by any tremulous motion of the external air. See EAR.

LISTENING, in the *Manège*, as when we say a horse goes a listening pace. See *ECOUTE*.

LISTENING *Trumpet*. See *TRUMPET*.

LISTER, MARTIN, in *Biography*, a physician and naturalist, was born about 1638. He was of a Yorkshire family, (settled in Buckinghamshire,) which produced a considerable number of medical practitioners of reputation; among whom was sir Matthew Lister, physician to Charles I., and president of the College of Physicians. Martin was educated under the direction of his uncle, sir Matthew, and sent to St. John's college, Cambridge, where he took his first degree in arts in 1658. In 1665 he was made fellow of his college by royal mandate. Having made choice of the profession of medicine, he pursued his studies with zeal, and travelled to the continent for the purpose of farther improvement. On his return in 1670, he settled at York, where he practised his profession for many years with considerable reputation. At the same time he applied all the leisure, which his avocations allowed him, to the investigation of the natural history and antiquities of the north of England; and having communicated several papers on these

subjects to the Royal Society, he was elected a fellow of that body. He contributed many coins, altars, and other antiquities, together with a great number of valuable natural curiosities, to the Ashmolean museum at Oxford. His various productions having made him well known to the learned in the kingdom, upon the solicitation of his friends he removed to London in the year 1684. He was at that time created doctor of physic by diploma at Oxford, upon the particular recommendation of the chancellor; and was soon afterwards elected a fellow of the College of Physicians. In 1698 he accompanied the earl of Portland in his embassy from king William to the court of France; when, having obtained introductions to the most eminent men of science at Paris, he viewed all the curiosities of that capital. On his return he published an account of this journey, which contained some things of a trifling nature, and gave occasion to a burlesque imitation, entitled "A Journey to London," by Dr. William King. At that time, indeed, when the study of natural history was little attended to, a man who had written on snails and spiders, and bestowed his attention on the minutest parts of natural knowledge, was particularly liable to incur the ridicule of wits. In consequence of the illness of Dr. Hannes, in 1709, Dr. Lister was made second physician in ordinary to queen Anne; an appointment which he did not hold long; for he died in February 1711-12.

The medical writings of this physician are not void of valuable observations, deduced from his own experience; but they are marked by a propensity to hypothesis, and too strong an attachment to ancient doctrines. There are two works on English medicinal waters, entitled "De Fontibus Medicatis Angliæ, Exercitatio nova et prior," 1682, "altera," 1684: "Exercitationes sex Medicinales, de quibusdam morbis chronicis," 1694, which was republished, with additions, in 1697. The diseases here treated of are dropsy, for which he recommends the use of drastic purgatives; diabetes, hydrophobia, syphilis, for which he admits that mercury is a specific, but avers that the mercury itself requires an antidote, which is found in the guaiacum; scurvy, gout, stone, and small-pox, for which last he extols the remedial effects of the alexipharmic medicines, and condemns the cooling practice introduced by the sagacious Sydenham. In general, indeed, he is a keen controversialist, and indulges in severe remarks upon some of his contemporaries, especially Sydenham. In his "Dissertatio de Humoribus," 1709, which is full of hypotheses, he is not less severe in his treatment of Drake and Rayfish.

The reputation of Lister is principally founded on his researches in natural history and comparative anatomy. He published nearly forty papers in the Philosophical Transactions, Nos. 25 to 585 inclusive, in addition to the following works. "Historiæ Animalium Angliæ Tractatus tres: unus de Araneis: alter de Cochleis, tum terrestribus, tum fluviatilibus: tertius de Cochleis marinis," 1678, 4to. "Exercitatio Anatomica de Cochleis maxime terrestribus et Limacibus," 1694, 8vo. "Exercitatio Anatomica altera de Buccinis fluviatilibus et marinis," 1695, 8vo. "Exercitatio Anatomica tertia de Conchyliorum bivalvium," 1696, 4to. In all these works Dr. Lister has displayed great accuracy of observation, and indefatigable industry, in detecting the most minute and curious particulars of the economy of these creatures. He also edited a correct and better arranged copy of Goedart's Treatise on Insects, in 1685; and an edition of Sanctorius's "Medicina Statica," with a commentary, in 1701. His "Journey to Paris," notwithstanding the efforts of ridicule, was well received, and contains a variety of curious matter. Gen. Biog. Hutchinson, Biog. Med. Eloy Dict. Hist.

LISTERLAND, in *Geography*, a cape on the S. coast of Norway; 20 miles N.W. of Lindesnes.

LISTING, or INLISTING, in *Military Language*, denotes the retaining and enrolling soldiers, as volunteers, for the national service. When any person is enlisted as a soldier, he shall within four days, but not sooner than twenty-four hours, be taken before the next justice of peace, or chief magistrate of a town corporate, not being an officer in the army; and before him shall be at liberty to declare his dissent to such enlisting; and on such declaration, and returning the enlisting money, and paying 20s for the charges expended on him, he shall be forthwith discharged, in presence of such magistrate. But if he shall refuse or neglect in twenty-four hours to return and pay such money, he shall be deemed to be enlisted, as if he had given his assent before the magistrate. If he declare that he voluntarily enlisted himself, the magistrate shall certify under his hand, that such person is duly enlisted, setting forth the place of his birth, age, and calling, if known; and that the third and fourth articles of the second section, and the first article of the sixth section of the articles of war against mutiny and desertion were read to him, and that he has taken the oaths mentioned in the said articles of war; viz. the oath of fidelity and the oaths in the schedule marked A and B; except in the case of recruits enlisted either in his majesty's service or in the East India company's forces under 39 Geo. III. c. 109, in which case each recruit shall, instead of the said oath of fidelity, and that contained in the schedule A or B, take the oath of allegiance directed by the 39th of the king, and contained in schedule E, and the justice or magistrate shall certify such enlistment and swearing according to the schedule F; and if any person so certified as duly enlisted shall refuse to take the said oath of fidelity before such magistrate, &c. the officer, from whom he hath received such money, may detain and confine him till he shall take it; and every military officer that shall herein offend, shall be cashiered and displaced from their office, and disabled from holding any military post, and forfeit 50l. See FOREIGN SERVICE.

LISTOWHILL, or LISTOWELL, in *Geography*, a port-town of Ireland, in the county of Kerry, situated on the river Feale. The castle, on the summit of a steep precipice above the river, was the last strong hold which held out against queen Elizabeth in 1600. It is 131 miles S.W. by W. from Dublin, and 13 N.E. from Tralee.

LISTVENNISCHNA, a town of Russia, in the government of Irkutsk, on the Argun, on the confines of China. N. lat. 51 44'. E. long. 121 20'.

LIT, a town of Sweden, in Jamtland; 10 miles N. of Östersund.

LITA, in *Botany*, so named by Schreber, from *lita*, simple, naked, or destitute, because the plant consists chiefly of flowers, with a very trifling stem, and no leaves, but a few small scales. Schreb. 795. Willd. Sp. Pl. v. 1. 1071. Mart. Mill. Dict. v. 3. (Voyria; Aubl. Guian. v. 1. 268. Vohiria; Juss. 141. Lamarek Illustr. t. 109.—Clas and order, *Pentandria Monogynia*. Nat. Ord. *Rutaceæ*, Linn. *Gentianeæ*, Juss.

Gen. Ch. Cal. Perianth of one leaf, inferior, tubular, erect, coloured, five-cleft, acute, permanent. Cor. of one petal, valvular shaped; tube cylindrical, very long, dilated at the top and bottom; limb in five equal, ovate, spreading, deep segments Stam. Filaments scarcely any; anthers five, roundish, two-lobed, nearly sessile, in the throat of the tube. Pist. Germen superior, ovate-oblong; style thread-shaped, the length of the tube; stigma capitate, abrupt. Pericarp. Capsule oblong, of one cell and two valves. Seeds very numerous.

numerous, minute, chaffy, attached to the inflexed margins of the valves.

Eff. Ch. Corolla falver-shaped. Anthers sessile, within the tube. Stigma abrupt, undivided. Capsule of one cell and two valves.

1. *L. rosea*. Willd. n. t. (*Voyria rosea*; Aubl. Guian. v. 1. 209. t. 83. f. 1.)—Flowers in pairs. Segments of the corolla acute. Root tuberous.—Gathered by Aublet in the forests of Guiana, where the natives call it *Voyria*, and eat the roasted root, which is tuberous, resembling a potatoe in shape and flavour, and throws out various spreading fibres. The stem is solitary, several inches long, chiefly concealed under the ground, square, knotty, smooth, bearing several, opposite or ternate, little, acute, fleshy scales, instead of leaves, in the manner of a *Lathraea*, and dividing at the top, where it rises above the surface, into several branches about an inch long, with more frequent knots, and rather larger scales. Each branch bears two large and handsome, rose-coloured flowers, whose tube is near two inches long, swelling at the top as well as at the base, but contracted again at the orifice. The limb is about half an inch in diameter, spreading like a star, with sharp points. Calyx short, bell-shaped. Sometimes the flowers are solitary.

2. *L. cærulea*. Willd. n. 2. (*Voyria cærulea*; Aubl. Guian. v. 1. 211. t. 83. f. 2.)—Flowers in pairs. Segments of the corolla rounded, obtuse. Root tuberous.—Native of palm forests in Guiana, where it blossoms in May. This differs from the preceding in having blue flowers, whose limb is larger, with round or obovate blunt segments, and a more dilated orifice; as well as a more deeply cut calyx. Aublet says the flowers are occasionally six-cleft, with six stamens.

3. *L. lutea*. (*Gentiana aphylla*; Jacq. Amer. 87. t. 60. f. 3. Helleborine aphyllus, flore luteo; Plum. Cat. 9?)—Stems simple, single-flowered. Segments of the corolla acute. Root fibrous, fasciculated. Gathered by Jacquin, flowering in May as well as December, in the extensive damp mountainous forests of Martinico. It is a small and tender plant, evidently akin, as Aublet remarks, to his two species above described; though the root consists only of thick entangled fibres. Stems four inches high, of a shining straw-colour, jointed, single-flowered, bearing several pairs of minute, opposite, acute scales. Flowers an inch long, slender, yellowish, inodorous, with a small, acute, stellated border. Their stigma is described as simple, capitate, and obtuse, as it ought by analogy to be, though in the figure represented cloven.

LITADA, in *Geography*, a town of the island of Negroponte, in the Grecian Archipelago; 48 miles N.W. of Negroponte.

LITANY, an old church term, applied to the processions, prayers, and supplications used for appealing the wrath of God, averting his judgments, or procuring his mercies.

The word comes from the Greek *λιτανεια*, *supplication*; of *λιτανευω*, *I beseech*. Pezron would go farther, and derive the *λιτομαι*, or *λισσομαι*, of the Greeks, from the Celtic *lit*, *feast*, *solemnity*.

Ecclesiastical authors, and the Roman order, by the word litany usually mean the people who compose the procession, and assist at it; and Du-Cange observes, that the word anciently signified *procession*.

Simon of Thessalonica mentions, that, in the ancient litanies, the people went out of the church, to denote the fall of Adam; and returned into it again, to shew the return of a pious soul to God by repentance.

LITANY, in a modern sense, denotes a form of prayer, sung or said in churches; consisting of several periods, or articles; at the end of each of which is an invocation in the same terms.

Before the last review of the common prayer, the litany was a distinct service by itself, and used some time after the morning prayer was over. At present it is made one office with the morning service, being ordered to be read after the third collect for grace, instead of the intercessional prayers in the daily service.

It has been observed, that none but those who are avowed Trinitarians can conscientiously join in this part of the church service; it has been also observed, that in the petition to be delivered from "all deadly sin," there seems to be an intimation of the popish doctrine of venial and mortal or deadly sin, and that the petition in the mass-book, from which a great part of the litany is taken, for deliverance from "sudden death," is more guardedly expressed, "*à subitâ et improvisâ morte*," i. e. from death sudden and unprovided for.

LITAO, in *Geography*, a town on the N.W. coast of the island of Timor. S. lat. 9° 2'. E. long. 124° 42'.

LITCHFIELD. See LICHFIELD.

LITCHFIELD, a township of America, in Lincoln county, Maine, 45 miles from Hallowell; containing 1044 inhabitants.—Also, a township in Hillsborough county, New Hampshire, situated on the E. side of Merrimack river, about 54 miles W. of Portsmouth; settled in 1749 and containing, in 1800, 372 inhabitants.—Also, a populous and hilly county of Connecticut, bounded N. by Massachusetts, S. by New Haven and Fairfield counties, E. by Hartford, and W. by New York. It is divided into 20 townships, containing 41,214 inhabitants. Although the face of the country is generally mountainous, the soil is fertile, yielding large crops of wheat and Indian corn, and affording fine pasture. The inhabitants are almost universally farmers, and wholly detached from maritime commerce.—Also, the chief and post-town of the above county, seated on an elevated plain, exposed to the cold winds of winter, but enjoying a large portion of the refreshing breezes of summer. Its situation is handsome, and it contains about 60 or 70 compact dwelling-houses, a court-house, a meeting-house, and 4285 inhabitants; 32 miles W. of Hartford. N. lat. 41° 46'. W. long. 73° 37'. On several small streams, some of which fall into Great Pond, a beautiful sheet of water, are three iron-works, an oil-mill, and a number of saw and grist-mills.—Also, a township in Herkemer county, New York, taken from German Flats, incorporated in 1796, and containing 1976 inhabitants. Morfe.

LIT-CHI, or LICHI, in *Botany*, Sonnerat Voy. v. 2. 230. t. 129, a valuable Chinese fruit, which, after being dried in an oven, becomes an object of commerce. It is globose, the size of a small walnut, consisting of a thick tuberculated coat, enclosing a large hard seed, enveloped in a quantity of pleasantly acid pulp. See *ΕΥΡΗΘΙΑ*, *SCYTALIA*, and *DIMOCARPUS*.

LI-TCHUEN, in *Geography*, a town of Corea; 15 miles N.W. of Long-kouang.

LITE, the name of a plaster much commended by the ancients: it consisted of verdigris, wax, and resin. Whatever virtues this plaster possessed, might be probably found in the melilot plaster of the shops in general, till the late reformation made by the London Pharmacopœia, the colour being generally given by our wholesale dealers with verdigris, not with the juice of the herb from which it took its name.

LITERÆ COMMUNICATORIÆ, in *Church History*, letters granted by the bishops to penitents, when the time of their penance was finished, by which they were again received into the communion of the faithful.

LITERAL ALGEBRA. See **ALGEBRA**.

LITERAL Character. See **CHARACTER**.

LITERALIS Calculus. See **CALCULUS**.

LITERARY PROPERTY, is that property which an author, or his assignee, may be supposed to have in his own literary compositions; so that no other person without his leave may publish or make profit of the copies. The Roman law adjudged, that if one man wrote any thing on the paper or parchment of another, the writing should belong to the owner of the blank materials (Just. 2. 1. 33.); meaning thereby the mechanical operation of writing, for which it directed, the scribe to receive a satisfaction; for, in works of genius and invention, as in painting on another man's canvas, the same law gave the canvas to the painter. As to any other property in the works of the understanding, the law is silent; though the sale of literary copies, for the purposes of recital or multiplication, is certainly as ancient as the times of Terence (Prolog. in Eunuch. 20.), Martial (Epigr. i. 67. iv. 72. xiii. 3. xiv. 194.), and Statius (Juv. vii. 85.) Neither with us in England hath there been, till some few years ago, any final determination upon the right of authors at the common law. In case of a bargain for a single impression, or a sale or gift of the copy-right, the reversion is plainly continued in the original proprietor, or the whole property is transferred to another. It has been a question much agitated in our superior courts of judicature, and at length determined by the house of lords against authors and their assigns, whether the copy-right of a book belongs to the author by common law. But, exclusive of such copy-right as may subsist by the rules of the common law, the statute 8 Ann. cap. 19, amended by statute 15 Geo. III. c. 53, has protected, by additional penalties, the property of authors and their assigns for the term of fourteen years, and hath directed, that if, at the end of that term the author himself be living, the right shall then return to him for another term of the same duration: and this is the sole right now vested in the proprietors of copies. By the statute 15 Geo. III. c. 53, some additional privileges in this respect are granted to the universities, and certain other learned societies. A similar privilege is extended to the inventors of prints and engravings, for the term of twenty-eight years, by 8 Geo. II. cap. 13. and 7 Geo. III. cap. 38. besides an action for damages, with double costs, by statute 17 Geo. III. c. 57. All which parliamentary protections appear to have been suggested by the exception in the statute of monopolies, 21 Jac. I. c. 3, which allows a royal patent of privilege to be granted for fourteen years to any inventor of a new manufacture, for the sole working or making of the same; by virtue whereof it is held, that a temporary property therein becomes vested in the king's patentee. 1 Vern. 62.

LITERARY Criticism. See **CRITICISM**.

LITERATI, **LETRADOS**, lettered, an epithet given to such persons, among the Chinese, as are able to read and write their language.

The literati alone are capable of being made mandarins.

The literati form the most distinguished part of the Chinese nation. Since the dynasty of Han, *i. e.* for more than 2000 years, they have constantly held the chief rank in the empire; and it is always from among them that masters are chosen for the education of youth; ministers, for the administration of public affairs; and magistrates, for judging the people: in a word, the literati are, in some

measure, the soul of the Chinese nation, since it is from them that it receives its moral exultance, and its civil and political being. The literati must therefore be very numerous in a state, where they enjoy every distinction attached to pre-eminence, and where every thing favours their increase. Since learning is the only means that conduct to honours, it is necessary that those who aspire to them should cultivate letters; and they must make it appear, that they have cultivated them with success, before they can obtain any civil employment. To guard against imposition, government has fixed for every city of the first, second, and third class the number of literati who can be legally promoted every year to the first degree of literature, which is that of "sieou-tsai," and which answers to bachelor of arts in our universities. Every "sieou-tsai" is accounted noble, and is never enrolled among the taxables. Of these there are reckoned to be in China 247,701 individuals, who are annually introduced to the first degree of literati; and the number of those admitted before may be supposed to be at least 20 times as great. According to this estimate there are always in China 494,020 literati, who have taken degrees, and who are, consequently, not included among the taxables. See **MANDARINS**.

LITERATI is also the name of a particular sect, either in religion, philosophy, or politics; consisting principally of the learned men of that country: among whom it is called *jukiao*, *i. e.* *learned*.

It had its rise in the year of Christ 1400, when the emperor, to awaken the native affection of the people for knowledge, which had been quite banished by the preceding civil wars among them, and to stir up emulation among the mandarins, chose out forty-two of the ablest among their doctors, to whom he gave a commission to compose a body of doctrine, agreeable to that of the ancients, which was then become the rule, or standard, of the learned. The delegates applied themselves to the business with very great attention; but some fancied them rather to have wrested the doctrine of the ancients, to make it consist with their's, than to have built up their's on the model of the ancients.

They speak of the Deity, as if it were no more than mere nature, or the natural power or virtue, that produces, disposes, and preserves the several parts of the universe. It is, say they, a pure, perfect principle, without beginning or end; it is the source of all things, the essence of every being, and that which determines it to be what it is. They make God the soul of the world: they say he is diffused throughout all matter, and produces all the changes that happen there. In short, it is not easy to determine, whether they resolve God into nature, or lift up nature into God; for they ascribe to it many of those things which we attribute to God.

This doctrine, in lieu of the idolatry that prevailed before, introduced a refined kind of atheism. The work, being composed by so many persons of learning and parts, and approved by the emperor himself, was received with infinite applause by all the people. Many were pleased with it, because it seemed to subvert all religion; others approved it, because the little religion that is left them, could not give them much trouble. And thus was formed the sect of the Literati; which consists of the maintainers and adherents to this doctrine.

The court, the mandarins, and the persons of fortune and quality, &c. are generally retainers to it; but a great part of the common people still hold to their worship of idols.

The literati freely tolerate the Mahometans, because they adore, with them, the king of heaven, and author of nature;

nature; but they bear a perfect aversion to all sorts of idolaters among them: and it was once resolved to extirpate them. But the disorder this would have occasioned in the empire prevented it: they now content themselves with condemning them in general, as heretics; which they do solemnly every year at Pekin.

LITERNUM, or LINTERNUM, in *Ancient Geography*, a town of Italy, in Campania, at the mouth of the Csanis, and near the lake called by Statius "Linternus Palus." It was a Roman colony, improved and enlarged by Augustus. The ruins of it, consisting of some heaps of stones, may be traced on the edge of a large pond in a dreary flat shore, between the mouth of the Volturnus and the promontory of Misenum. Hither Scipio Africanus withdrew from the accusations of his enemies, and here he spent his days in retirement. Tradition says, that his ashes were deposited in this place.

LITHAGOGI, of *λίθος*, *stone*, and *αγω*, *I bring away*, an epithet given by some medical writers to such medicines as work by urine, and are supposed to have the virtue of expelling the stone.

LITHAGROSTIS, in *Botany*, from *λίθος*, *a stone*, and *αγρας*, *grass*, a name faulty in itself, as composed of that of another established genus, and quite unnecessary. Gartner contrived it for the *Coix* of Linnæus, Jussieu, and others, because the *ροίζ* of Theophrastus seems to be a sort of palm. But there is no end of such critical alterations, especially when they are not founded on any thing like certainty.

LITHANTHRAX, of *λίθος*, *stone*, and *ανθραξ*, *coal*, in *Natural History*, is used as the name of the common pit coal. See *COAL*.

LITHARGE, composed of *λίθος*, *a stone*, and *αίθυρα*, *flavor*, a metallic substance, formed of the spume of lead; or, it is a calx of lead in an imperfect state of vitrification. When silver is refined by cupellation with lead, this latter metal, which is purified, and which causes the scorification of the imperfect metals alloyed with the silver, is transformed into a matter composed of small semi-transparent shining plates, resembling mica, which is *litharge*. See *Alloys of LEAD*.

This preparation of lead is of great use in roasting the stubborn ores of gold, silver, and copper; for it melts all kinds of stones and earth into glass, sooner than the metals; and by this means the metal, which is heavier, will fall through the glass, which is a thin and light substance, and will be collected under it into a regulus, with only a few dirty scoriae adhering to it. But if it be copper that is thus separated, a small portion of it is always destroyed; and if gold or silver, a like small portion is always lodged and detained in the scoriae.

But as the litharge penetrates through all sorts of vessels, and while melting rises into a scum, that often runs over their edges, the assayers never use it alone, but always mix with it such substances as may give it a clamminess, such as flints, sands, clay, or the like: they mix two parts of litharge with one part of any of these substances, and add some nitre, or common salt, that the whole may run the more easily. They shut up the vessels, which must be made very thick and solid, with a small cover or lid, cut close, and placing this in a wind-furnace, they keep it in fusion a quarter of an hour, looking at times into the ash-hole, to see if the glass have not escaped through the vessel, and run down thither. Very often it is found sweating through the sides of the vessel, like water, and falling in drops into the ash-hole; and in this case, there is no way to preserve the remainder, but to take the vessel out of the fire.

When the whole is cool, the vessel must be broke, and at

the bottom there will be found a small quantity of a regulus of lead, revived by means of the salt; in the middle, the glass of lead, which must be kept for use; and at the top a saline crust, which is to be thrown away.

Litharge is more or less white or red, according to the metals with which the silver was alloyed. Accordingly the white is called litharge of silver, and the red has been improperly called litharge of gold.

Litharge may be easily revived into lead; accordingly, much of that which is produced by refining in great is reduced, by being melted upon burning coals. The part which is least altered by mixture with other metals is thus reduced, and thus good and saleable lead is obtained. The rest of the litharge of these refineries is sold and used for various purposes.

The potters use much of it to give a beautiful gloss to their wares; it is also employed in the composition of some glasses, for it is very fusible, and assists the fusion of other substances; and it is also used by painters, dyers, skinners, and glaziers. When mixed with wine, it gives it a bright sprightly colour, but renders it extremely unwholesome. In general, it has the same properties with the other calces of lead. The litharge commonly sold is obtained from refineries, and the quantity thus procured is more than sufficient for the demand. It is employed for the preparation of some plasters and other external remedies. See *LEAD*.

LITHARGE, *Plaster of*. See *EMPLASTRUM commune*.

LITHARGE, *Vinegar of*. See *VINEGAR of Lead*.

LITHAY, or LITAY, in *Geography*, a town of the duchy of Carniola, on the Save; 15 miles E. of Laybach. N. lat. 46 3'. E. long. 15'.

LITHIASIS, (from *λίθος*, *a stone*), in *Surgery*, the disorder in which calculous concretions are formed in the urinary organs, and more especially in the bladder, occasioning a variety of symptoms dependent upon their shape, size, and situation. For further details upon this subject, see *LITHOTOMY* and *STONE*.

LITHIC, or URIC ACID. See *URINARY Calculus*.

LITHIDIA, a name which, in Hill's History of Fossils, is given to an assemblage of stones of the siliceous class, belonging to the quartz and flint tribes.

LITHOBOLIA, *Λιθοβολία*, in *Antiquity*, a festival celebrated by the Træzenians, in memory of Lamia and Auxetia, two virgins, that coming from Crete to Træzene, in a time of tumult and sedition, became a sacrifice to the fury of the people, by whom they were stoned to death.

LITHOBOLIA, or *Lapidation*, was also a common punishment inflicted by the primitive Greeks upon such as were taken in adultery.

LITHOCOLLA, or LITHOCOLLUM, formed of the Greek *λίθος*, *stone*, and *κόλλα*, *glue*, a cement used by the lapidaries to fasten their precious stones, in order for cutting them.

It is composed of resin and brick-dust. For diamonds, they use melted lead, putting them into it before it be quite cold: for other cements, they mix marble-dust with strong glue; and, to fasten their sparks, add the white of an egg, and pitch. See *CEMENT*.

LITHODÆMON, or *Lapis Dæmonum*, a name given by some authors to jet.

LITHODENDRON, a name by which, according to Dioscorides, many of the ancients express the common red coral.

LITHOGENESIA, a term used by some authors to express the formation and original of stones.

LITHOLABON, a name given by some surgical writers

writers to an instrument used in the operation of lithotomy; it is a forceps intended for taking hold of the stone.

LITHOLOGY, the systematical arrangement of stones; which see.

LITHOMANTIA, *Λιθομαντία*, in *Antiquity*, a species of divination performed with stones. Sometimes the stone called *fidrites* was used: this they washed in spring-water in the night by candle-light; the person that consulted it, was to be purified from all manner of pollution, and to have his face covered: this done, he repeated divers prayers, and placed certain characters in an appointed order; and then the stone moved of itself, and in a soft, gentle murmur (or as some say) in a voice like that of a child, returned an answer. By a stone of this nature, Helena is reported to have foretold the destruction of Troy.

LITHOMARGE, *Steinmarg*, Wern. *Argile lithomarge*, Hall. *Steinmarg*, or *Stalmar*, Swed.

This substance, which is related to the finectic kinds of clay and to steatite, occurs friable and compact.

1. *Friable lithomarge*, *Zerreibliches Steinmarg*, Wern.

Its colour is snow-white, oftener yellowish, and sometimes reddish-white.

It is found massive, disseminated, and in crusts, consisting of fine, dull, sometimes feebly glimmering scaly particles, which are either coherent or loose.

It is light, rather greasy to the touch, but adheres to the tongue. Streak shining.

It occurs in Saxony, on the Hartz, &c. generally in small masses, particularly in metalliciferous veins.

A variety from the Hartz, where it occurs in grey wacke, shews phosphorescence by friction.

2. *Compact or indurated lithomarge*, *Fest Steinmarg*, Wern.

Its colours, besides those of the friable lithomarge, are pearl-grey, lavender and purplish-blue, yellowish-grey, several shades of ochre yellow, and also flesh-red; several of these colours frequently occurring together as clouded, veined, striped, and spotted delineations.

It is found massive.

Internally it is dull. Streak shining.

Fracture large and flat conchoidal, passing into even and fine earthy; fragments indeterminate angular, blunt-edged.

It is very soft and mild, and easily frangible; greasy to the touch, but strongly adhering to the tongue. It is light.

The variegated bluish and purplish earth, vulgarly called *Wundererde* in German, or *Terra miraculosa Saxonia*, is one of the best known and finest variety of lithomarge. It is found at Planitz, near Zwickau, in Saxony, in beds of coal. A fine flesh-red variety occurs at Rochlitz in Saxony, in disintegrated porphyry. Lithomarge is also met with in several other parts of Saxony, and on the Hartz, in Bohemia, Moravia, Bavaria, and Siberia.

Compact lithomarge is partly found in veins, such as tin stone veins, partly, as that of Planitz, on beds of coal; also (the yellow variety) in the crystalline geodes of the Topaz rock, in basalt and amygdaloid. At Zöblitz, in Saxony, it occurs in serpentine.

This substance, of which we are still without a good chemical analysis, appears to pass into steatite, meer-schaum, and also into variegated clay.

It has been frequently confounded by authors with porcelain earth, fullers' earth, bole, &c.

The variety of lithomarge occurring in serpentine, is used for polishing this latter stone. It was also formerly employed in medicine, particularly the variegated variety, which was dignified with the appellation of *terra miraculosa*.

VOL. XXI.

LITHONTRIPTICON TULPII, the name of a famous diuretic medicine, invented by Tulpinus, and given with great success in cases of the stone, but requiring great judgment and caution in the administering of it.

The preparation is this: take a drachm of carduus without their wings, and a drachm of lesser carduus without their husks, powder them fine, and pour upon them an ounce of rectified spirit of wine, and half an ounce of spirit of nitre; set them to infuse, without heat, for five or six days, stirring them from time to time. The phial must not be stopped close; because, if it be, the continual fermentation will burst it. The dose is from fourteen to fifteen, or twenty drops, in a glass of wine and water. It is to be taken in a morning, an hour after eating a mess or broth, and may be repeated for three or four days.

It is remarkable, that this mixture never ceases fermenting for many years; but if it be too fast corked, will break the glass; if it be slightly stopped, it only throws out the cork with an explosion. Mem. de l'Acad. Par. 1709. 1. 25^e. edit. Par.

LITHONTRIPTICS, or as it is perhaps more correctly written, LITHONTHRYPTICS, in *Medicine*, from the Greek *λίθος*, a stone, and *τρύπτω*, I break, such medicines as were supposed to possess the property of dissolving the stone in the bladder and kidneys. See STONE.

Various simple and compound drugs were believed to be capable of dissolving the calculous concretions of the urinary passages, in ancient times. These medicines, however, had been but too generally found, by modern practitioners, to be destitute of any active power of this sort, when, in the former part of the last century, a new solvent for the stone was announced by a lady, with so much evidence in favour of its efficacy, that the English parliament granted her a large pecuniary reward for divulging the secret, and medical practitioners resorted to it with eagerness, and investigated its properties with great care, and in many instances had the satisfaction to observe a temporary removal of the distressing symptoms succeed to its use. It appeared, however, ultimately, that the solvent power of Mrs. Stephens's medicine was a gratuitous supposition; for on examining, after death, the bodies of the persons in those very instances, on the success of which the reward was given, it was discovered that the stones had all the time remained in the bladders of the patients, though they were supposed to have been voided by the gradual solution of them effected by the medicines.

The principal instance of a supposed cure which was brought forward, was that of Mr. Gardner. This man was examined in December 1748, by able surgeons, and found to have a stone in his bladder; after this he took Mrs. Stephens's medicines for eight months without intermission; and at the end of that time he declared himself free from all his usual complaints; and on searching him no stone was perceived in the bladder. Mr. Gardner died about three years afterwards, and his body was opened. When the bladder was examined, there were found in it six preternatural apertures of different sizes, the largest of which was capable of admitting the end of a finger. These passages led to morbidly formed sacs in the internal coat of the bladder, which shielded the calculi from the touch of the surgeon's sounding staff. In a word, though the subject was taken up by Dr. Hartley and others, and the medicine believed by some to possess all the powers which had been ascribed to it; it was not only found, in several instances, that the calculi still remained in the bladder after death; but the distressing symptoms were found to recur, or even

to resist the influence of the medicine, in a great many others.

Mrs. Stephens's medicine consisted principally of *soap*, and *lim*, prepared from shells; *i. e.* of lime, a fixed alkali, and a little oil. From theoretical notions, the celebrated Dr Mead pronounced that a medicine containing such caustic materials as *lime*, must injure the bladder by its corrosive powers, and therefore condemned the internal administration of it. Yet he did not know whether the lime could actually reach the bladder through the medium of the circulation with its caustic powers unchanged; a circumstance which the investigations of modern chemistry render improbable. And as for the substitute, soap-lees, which had been proposed for the lime, he thought it scarcely less safe than the former. Dr. Whytt, of Edinburgh, after considering the inconveniences of this celebrated specific, resolved to omit the soap, and to try what virtues lime-water might have in dissolving calculi; and he made many experiments on the qualities of the varieties of lime-water, made with the lime from lime-stone, and that from oyster shells, upon fragments of urinary calculi immersed in it. He concluded by recommending the copious potation of lime-water from shells, and adduced several instances of the beneficial effects of this remedy.

Now the truth appears to be, according to the result of more accurate observation, that all the alkaline and absorbent medicines, potash, soda, lime, magnesia, &c. and especially the alkalis, are capable of affording very material relief to the distressing feelings, connected with the presence of calculi in the urinary passages; that they operate as preventives of a farther increase of the bulk and quantity of these concretions; but that they do not reach the urinary organs (after having passed the organs of the digestion, been taken up by the lacteals, and mixed and circulated with the blood) unchanged in their chemical qualities, or in a sufficient quantity to produce any diminution of the calculi already existing there.

They seem to possess this preventive power, however, by their operation in the first passages. It is now known, that the ordinary calculus of the bladder and kidneys consists of a peculiar animal *acid*, which has been called the *uric* or *lithic acid*, from its abundant existence in the urine and its calculi. Now, although this acid is not formed in the chyle, or any of the fluids in the first passages; yet its rudiments appear to exist there; and experience has determined, that whatever diminishes the formation of acidity in the organs of digestion, diminishes also the quantity of the *uric acid* which shews itself in the urine, and *vice versa*. But it is the peculiar property of the alkalis and absorbent earths, to neutralize acidity of every description; and the alkalis are possessed of this property in a greater degree than the earths. Whence we may readily perceive how the use of these medicines, by neutralizing the acids, which are produced by a morbid or imperfect digestion of the food, and preventing the formation of that matter, which concretes in the urine into calculi, should give material relief to the patient. It is not, however, very easy to understand how the prevention of this formation should give so much relief, while the original concretion remains in the bladder, undiminished in weight and size. Whether its surface becomes more uniformly smooth and less irritating, therefore, to the internal coat of the bladder, under the use of these medicines, it would be very difficult to ascertain, since we have no opportunity of comparing its present condition.

It is further to be observed, however, that there is one variety of calculus found in the urinary passages, for which the alkalis and absorbents are incapable of affording any

relief; as, from its chemical composition, it is altogether insoluble in these substances, even when directly immersed in them. It is a triple salt formed by combination with the phosphoric acid, and is, therefore, only to be dissolved or decomposed by an agent of a directly opposite quality to that of the alkalis; namely, by a mineral acid, which unites with the earthy and alkaline base. See NEURALGIA and STONE.

Dr. Hartley has published, in the London Gazette, the following receipt for making a lithontriptic electuary. Take five pounds of Alicant soap, shaved, and one pound of oyster-shell-lime: put them into a tin vessel, and pour upon them five quarts of water; make the water boil, till the soap be perfectly dissolved in it, and then strain all into a glazed earthen vessel. Expose the mass to the air, stirring it every day till it becomes both mild to the taste, and of a proper consistence to be formed into pills, or long pellets, without sticking to the fingers. This may be expected to happen in two or three months. If it becomes sufficiently mild before it has acquired a due consistence, it may be brought to this, by being heated over the fire, in a tin vessel: if it acquires a too hard consistence, before it is sufficiently mild, it must be softened with water. This is what the doctor calls the lithontriptic mass or electuary; which he orders to be made in a tin vessel, because a brass or copper one would make it emetic.

He gives another more expeditious way of making it, which is this: pour two gallons of water upon a pound of oyster-shell-lime; stir it two or three times, and when it has fallen to the bottom, pour off the clear part of the water. Repeat this fifteen or twenty times, or till the clear water, which is poured off, be almost tasteless; leaving about five pints of water upon the lime, after the last ablution. Then pour this mixture of water and dulcified lime upon five pounds of Alicant soap, shaved; and proceed as directed in the first receipt. The mass, prepared in this manner, will be fit for use in a few days, or even immediately; but then the doctor prefers the foregoing receipt, where time can be allowed for it.

If the mass of soap, and oyster-shell-lime, dulcified in either of the above-mentioned ways, be made of the consistence of an electuary, it is then called the lithontriptic electuary; which for cure is more convenient than the mass, for those who desire to take the medicine dissolved in a liquid vehicle, as milk, water sweetened with honey or sugar, water flavoured with brandy or rum, and small beer.

Where a person is supposed to have a large stone in the kidneys or bladder, he ought to take every day as much of the mass or electuary as contains two ounces of the soap, unless his pain and provocation to make water be violent; in which case it will be proper to begin with about half this quantity, and to increase it as he can bear. The medicine ought also in this case to be dulcified in an extraordinary degree.

By this medicine, the doctor thinks the generation of gravel, and gravel-stones, may be entirely prevented. See STONE.

It is likewise recommended in disorders of the stomach and bowels, arising from, or attended with, acidities there; and in gouty habits. The patient may, in many of these cases, begin with such a quantity every day as contains an ounce of soap, and afterwards increase or lessen this quantity, as he finds occasion.

LITHOPHAGI, of *lithos*, *stone*, and *phago*, *to eat*, a name given to those who are capable of eating and digesting stones; instances of which are given by Boyle, Exp. Phil. p. 11. eT.

eff. iii. p. 86. Bulwer, Artificial Changeling, p. 327. and Paulhan, D. S. Physique, art. *Diglossin*.

LITHOPHAGUS, or **STONE-EATER**, in *Natural History*. Under this name DeBois describes a small worm, which destroys and feeds upon bones. It is covered by a small, very tender, and brittle shell, of ash-gray and greenish colour. This shell is pierced at both extremities; the worm evacuates its excrements through one of the apertures, while the other functions for an outlet to the head and legs. The animal itself is blackish; its body is composed of rings with six feet, three at each side; each foot with two joints. Traces of this worm are, according to the same author, sometimes seen in the layers of testis. Its progressive motion is effected by its head, with which it works its way, while the remainder of its body rolls on its feet. It has four jaws, which serve the purposes of teeth; and from its mouth issues a thread, of which it combs out its shell. It is furnished with ten small black eyes, five on each side, and disposed in a curved line like a crescent. This worm undergoes a metamorphosis in its shell, but it is not yet known what new form it adopts. DeBois adds, that more than forty worms have been seen to issue from out the chrysalis: their heads were black, the feet very distinct, and the body partly of a yellow and partly of a red colour. Latreille conjectures this to be the larva of an insect belonging to the tinca tribe.

LITHOPHILA, in *Botany*, so called by Dr. Swartz, being derived from *lithos*, a stone, and *philos*, or *stems*, for it is an inhabitant of barren, stony places. Swartz Prod. 14. Ind. Occ. v. 1. 47. Schreb. 782. Willd. Sp. Pl. v. 1. 154. Mart. Mill. Dict. v. 3. Class and order, *Diandria Monogynia*. Nat. Oed. *Caryophyllis*, Linn. *Caryophyllis affinis*, Juss.

Gen. Ch. Cal. Perianth inferior, of three lanceolate, acute leaves. Cor. Petals three, ovate lanceolate, erect, meeting together, the length of the calyx-leaves. Nectary of two opposite leaves, smaller than the corolla, carinated, acute, erect, compressed. Stam. Filaments two, awl-shaped, erect, from the base of the germin, as long as the nectary; anthers roundish. Pyl. Germen superior, roundish; style erect, equal in length to the filaments; stigma obtuse, emarginate. Peris. two-celled? Seeds unknown.

Eff. Ch. Calyx of three leaves. Corolla of three petals. Nectary of two leaves.

1. *L. micoides*. Swartz Ind. Occ. v. 1. 48. t. 1.—A native of rocks in the desert island of Navara, in the Western ocean.—Root very firmly attached to the rocks. Stems numerous, branched, very short, thickish. Branches set with withered, whitish scales. Leaves small, stem-filike, narrower and embracing the stem at their base, linear, obtuse, channelled, spreading. Flowers crowded together, whitish, on axillary and terminal stalks; each flower the size of a small pin's head. The whole plant is extremely minute, scarcely half an inch high, and the parts of fructification are so small as to require a magnifying glass for examination. This is the only species known.

LITHOPHOSPHORUS, the *stone phosphates* described under the name, in the works of ancient mineralogists, belong partly to a variety of sulphate of barytes (Bosnian stone), partly to some varieties of fluor spar; the name being derived from the property they possess of giving out light when scratched, or thrown on burning coals.

LITHOPHYTA, in the Linnæan system of *Natural History*, the fourth order of vermes or worms; being composite animals, sessile to, and fabricating a fixed calcareous base, each animal: this order contains 59 species under four

genera; viz. the *tubifera*, or red tubular coral, *madreporas*, or brain-stones, *milipora*, and *elipora*. See GERMANIA.

One of the most remarkable species of the first lithophyta we have any where an account of, is that described by Mr. Lowenheek, though without any particular name, in the Philosophical Transactions, 1762, p. 142.

LITHOPTERIS, in Botany, in *Journal de Botanique*, a name given by Mr. Lloyd to one of the lithophytes of the fern kind.

LITHOPERMUM, in Botany, from *lithos*, a stone, and *perma*, the *calyx*, meaning the small dark, blackish and polished part of the fruit. Linn. t. 1. 70. DeCand. v. 2. Willd. Sp. Pl. v. 1. 211. Mart. Mill. Dict. v. 3. 154. Pl. Brit. 215. Nat. Oed. v. 1. 130. Tournef. t. 25. Class and order, *Diandria Monogynia*. Nat. Oed. *Alyrifolia*, Linn. *Perispermum*, Juss.

Gen. Ch. Cal. inferior, of three or four, or five deep, awl-shaped, erect, lanceolate, acute leaves. Cor. of one petal, five-lobed, erect, as long as the calyx; tube cylindrical; limb obtuse, or erect, closed, hard, and divided into five segments; throat pervious. Stam. Filaments two, very short; anthers of long, in the mouth of the corolla. Pyl. Germens four; style central between them, three-lobed, the length of the tube; stigma oblique, divergent. Perisperm, except the calyx, become spreading, and lobed; the fruit, which it exceeds in length, in its early state, four, ovate, pointed, hard and smooth.

Obs. *L. difformis* has an inflated calyx, and but two seeds, each, as in the others, of a single cell.

Eff. Ch. Corolla funnel-shaped, its mouth pervious and naked. Calyx in five deep segments.

The genera of the order of *Alyrifolia* have been thought by some to have been distinguished with too great minuteness by Linnaeus. The character of the present chiefly differs from *Pulmonaria* in the deep divisions of its calyx; which part, nevertheless, in some species of the latter, is very nearly as much divided. Willdenow has sixteen species of *Lithospermum*, of which three are British, *officinale*, *arvensis*, and *purpureo-ceruleum*. The flowers are generally blue or whitish, rarely yellow; the habit herbaceous, rarely in some degree shrubby, very hairy or batty; most of them annual; leaves simple, undivided, entire, alternate, almost universally sessile. The following examples may suffice.

1. *L. officinale*. Common Groundsel, Gray M.F. or Gray Millat. Linn. Sp. Pl. 189. Engl. Bot. t. 112.—Corolla even. Corolla scarcely longer than the calyx. Leaves lanceolate, venous, rather acute.—Native of waste ground, where the soil is dry, gravelly, or chalky, in various parts of Europe, being perennial, and flowering in May. The whole herb is of a dull dusky green, leafy, and grows to a high; the leaves paler beneath, the roots and a good deal of their upper surface each spreading, in many places, polished tubercles. The fruit small, like bird's-foot, each leafy spike, which are first received, thence, etc. The seeds, two of which only are usually perceived, or perhaps, are remarkable for their pointed, finely wrinkled, though sometimes tinged with brown. Theorist says, however, has given occasion to a report of its being a great worm-eater, and really calcareous, but this appears to be without foundation; as well as their supposed ability to calcify complaints, which seems to have arisen from the fruit, green, three; just as spotted or blighted vegetables were presented good for the lungs.

L. arvensis. Corn Groundsel, or Bahad Alkanet. Linn. Sp. Pl. 190. Engl. Bot. t. 123. Pl. Dan. t. 2.

Seeds rugged. Corolla scarce longer than the calyx. Leaves obtuse, without lateral veins.—Native of fields and waste places, in a dry sandy soil, throughout Europe. The root is annual, its bark affording a fine red stain, like Alkanet, with which the country girls, in the north of Sweden, are accused by Linnæus of staining their cheeks. The stem is bushy, spreading, hardly a foot high. Corolla white. Seeds brown, rugose.

L. purpureo-ceruleum. Creeping Purple Gromwell. Linn. Sp. Pl. 190. Engl. Bot. t. 117. Jacq. Austr. t. 14.—Seeds even. Corolla much longer than the calyx. Leaves lanceolate, acute, without lateral veins.—Native of bushy waste ground, in the more temperate climes of Europe, especially where the soil is calcareous, flowering in May. With us it is esteemed a rare plant. The root is perennial, black and creeping. Stems herbaceous, scarcely branched, while barren procumbent and rooting, otherwise erect, round, leafy, about a foot high, terminating in a forked leafy cluster, of several handsome purple flowers, with a pale reddish tube. The seeds are often abortive. There are five blunt hairy swellings round the orifice of the tube, which, though they do not close that part, render the generic character somewhat ambiguous. Such however are found in all the British species, and in some, though not all, of the exotic ones.

L. fruticosum. Shrubby Gromwell. Linn. Sp. Pl. 190. (*Anchusa lignosior montpelienium*, flore violaceo; Barrel. Ic. t. 1168.)—Stem shrubby, erect. Leaves linear, hispid. Segments of the corolla slightly pointed; tube hairy.—This beautiful plant occurs on rocky exposed hills and cliffs in the south of France, Italy, and the Levant. Its shrubby bushy stem, and copious rosemary-like leaves, distinguish the species. The flowers are of a most vivid blue.

L. hispidulum. Bristly Woody Gromwell. Sm. Prodr. Fl. Græc. Sibth. v. 1. 114. Fl. Græc. ined. t. 162.—Stem shrubby, diffuse. Leaves elliptic-oblong, obtuse, hispid. Branches hoary.—Gathered by the late Professor Sibthorp, on rocks in the isle of Rhodes. Its flowers are nearly as beautiful as the last, but their segments are more rounded, and the throat more inflated, that part being, in both these, destitute of any marginal swellings or appendages. The present is not mentioned by Willdenow.

L. orientale. Yellow Perennial Gromwell. Linn. Syst. Veg. ed. 14. 185. Willd. n. 9. Curt. Mag. t. 515. (*Anchusa orientalis*; Linn. Sp. Pl. 191.)—Seeds rough with sharp points. Spikes long, leafy. Leaves oblong, wavy.—Native of the Levant; hardy and perennial in our gardens, flowering in May and June, and distinguished by its full-yellow corolla, whose segments are rounded, and orifice without swellings. The floral leaves are sometimes heart-shaped, sometimes ovate or lanceolate; those of the stem oblong or lanceolate, wavy at the edges; all hairy.

Several peculiarly bristly species of this genus were found and described by Forskäll, which have been adopted by Vahl and Willdenow.

LITHOSPERMUM Officinale, seu *Milium Solis*, Common Gromwell, in the *Materia Medica*, is found in various parts of England, on a dry gravelly soil, and flowers in May and June. According to Haller, this plant possesses narcotic powers; but its seeds only have been medicinally employed. These seeds have long excited the attention of naturalists, on account of their exquisitely polished surface, and stony hardness. The internal substance is softer, and seems to consist of a farinaceous, sweet, and oily matter, which becomes rancid on being long kept. The stony appearance of these seeds formerly suggested their efficacy in calculous and

gravelly disorders, to persons whose judgment was influenced by superstitious and absurd conceits. But though modern writers do not allow the lithoniptic character of the *milium solis*, yet they generally ascribe to them a diuretic quality, a power of cleansing the urinary passages, and of obviating strangury, especially when employed in the form of an emulsion; but Woodville observes, that the free use of any bland diluent would probably answer these purposes equally well. The absorbent virtue ascribed to these seeds is wholly groundless, being irreconcilable to the principles of chemistry. Woody. Med. Bot.

LITHOSTROTA, among the *Ancients*, pavements made up of small pieces of cut marble of different kinds and colour. See *TENSELATED*.

LITHOSTROTION, in *Natural History*, the name of a species of fossil coral, composed of a great number of long and slender columns, sometimes round, sometimes angular, jointed nicely to one another, and of a larry or radiated surface at their tops. These are found in considerable quantities in the northern and western parts of this kingdom, sometimes in single, sometimes in complex specimens.

LITHOTOME, from *λίθος*, a stone, and *τομή*, to cut, has been given to a variety of cutting instruments, which have been employed for making an opening into the bladder, in order to extract the stone. The most celebrated of all is the lithotome caché of Frère Côme, of whose instrument and methods of operating we shall have to speak in the following article.

LITHOTOMY, from *λίθος*, a stone, and *τομή*, to cut, signifies, in *Surgery*, the operation by which a stone is extracted from the bladder.

Surgical writers inform us, that urinary calculi admit of being extracted from three different situations, *viz.* from the kidney, the urethra, and the bladder. The question, whether a stone ought ever to be cut out of the kidney, will have due consideration given to it under the head *NEPHROTOMY*; and the removal of calculi from the urethra will be treated of in the article *URETHRA*. Our present observations will be confined to the stone in the bladder, a subject of infinite importance, whether we contemplate the severity or frequency of the affliction; its incurableness by medicines, or the perils and difficulties of the operation for its relief; the numerous modes of cutting for the stone, or the nice judgment requisite not only in the choice of a method, but also in the selection of instruments; the anatomical knowledge which the operator ought to possess; or, finally, that happy, though rare, combination of gentleness, dexterity, and resolution, so essential in constituting a distinguished and successful lithotomist. We have heard of a Pott, who would finish the operation by four or five movements, and fill every spectator with admiration of his superior skill. True skill, however, rather consists in doing a thing as safely as possible, than with the utmost quickness. Now, if it be certain that lithotomy is more likely to be followed by the patient's recovery, when no manual roughness is exercised, rapid operating must be condemned by the judicious and discerning, however calculated it may be to excite the applause and admiration of the inexperienced student. Pott, we are informed, was remarkably successful in his operations for the stone: but it must be asked, did he not lose some of his patients? If he did,—great as his success might be, we are justified in thinking that it would have been still greater, had it been his custom to aim at gentleness more than expedition. The example of Pott, therefore, is not to be imitated in this respect; and that he even acted in op-

position to his own principles is fully proved by the following passage: "I cannot omit this opportunity of adding a few words on a subject, which appears to me highly deserving of some notice, as its influence may be very extensive, and very prejudicial: it is the false idea which the by-standers at an operation generally have of chirurgic dexterity: to which word they annex no other idea than that of quickness. This has produced a most absurd custom of measuring the motion of a surgeon's hand, as jockeys do that of the feet of a horse, viz. by a stop-watch; a practice which, though it may have been encouraged by operators themselves, must have been productive of most mischievous consequences. *Vite et celerrime* are both very proper characteristics of a good chirurgic operation: but *vite* stands, as it should do, in the first place; as the patient, who suffers the smallest injury from the hurry of his operator, has no recompence from the reputation which the latter obtains from the by-standers. In most of the capital operations, unforeseen circumstances will sometimes occur, and must be attended to; and he who, without giving unnecessary pain from delay, finishes what he has to do in the most perfect manner, and the most likely to conduce to his patient's safety, is the best operator." (Pref. to Obs. on Fist. Lachrymalis.) We should not have premised these remarks, had we not often seen surgeons guilty of unwarrantable hurry and roughness in the performance of lithotomy; and did we not believe that the inflammation of the bladder and peritoneum, of which patients usually die after the operation, may, in numerous instances, be imputed to such a cause.

The stones, which are met with in the human bladder, are not all originally formed in this viscous: many descend through the ureters from the kidneys; but yet it is not to be denied, that most of them are first produced in the bladder itself, by a spontaneous concretion of particular salts contained in the urine. It may be inquired, Is the existence of a centre, round which the calculous materials are deposited and arranged, absolutely necessary to the formation of such concretions? It is well known, that whenever an extraneous substance lodges in the bladder, it becomes the nucleus of a stone: but, on the other hand, the centre of many calculi presents no particular appearance, nor any mark from which we can infer that they had any central substance, upon which they increased to their present size. Possibly, says Richerand, a clot of blood, or a piece of thickened mucus, may serve as their base, and yet, after a time, disappear. However this may be, urinary calculi offer numerous differences in respect to their size, shape, number, density, composition, and the manner of their being contained in the bladder. *Nesogr. Chir. tom. iii.*

In some cases, the bladder only contains one stone; in others, it includes several. In this last circumstance, the calculi are always smaller; their diminished size being in proportion to the greatness of their number. It has been estimated that, on the average, about three-fourths of calculous patients have only one stone in their bladder. Our own individual experience would make the proportion much higher, perhaps five or six out of every seven. Sometimes the bladder contains two calculi; but a larger number may occur from three to sixty, or more. Their size varies from that of a bean to that of a cocoon. The museums of the *École de Médecine* at Paris, and that of professor Fourcroy, exhibit specimens of calculi, which filled the whole cavity of the bladder. In the *Philosophical Transactions* for 1800, Mr. James Earle has described an enormous stone, which could not be extracted from the bladder; the attempt having been made in vain by Mr. Cline. Indeed the calculus filled almost the whole of the pelvis, and could not

be taken out of the dead subject without considerable difficulty. The weight of this immense stone was forty-four ounces; its form elliptical, with a long axis of sixteen, and a shorter one of fourteen inches. This, however, was an extraordinary case; and the average size of calculi met with in the bladder, is from the bulk of a pigeon's to that of a hen's egg.

The varieties of shape are innumerable: most of the stones, however, which are found in the bladder, are oval, and more or less flattened. Their surface is sometimes smooth and rounded; very often it is irregular and rough. Stones, fludded with asperities, are frequently termed *mulberry calculi*, and that these must produce considerable irritation of the bladder, and a vast deal of pain, is a fact which requires no comment. We saw a stone extracted a few weeks ago, the outer surface of which was quite smooth and of a light colour; but on breaking a portion of it away, the inner part of the calculus presented a granulated and dark brown appearance. The generality of stones taken from the human bladder are hard and resisting; but some are exceedingly friable, giving way to the slightest pressure, and breaking into small pieces, or even into a sort of gritty matter.

The chemical composition of urinary calculi is far from being always the same. The learned investigations of Wollaston, Pearson, Fourcroy, and Vauquelin, have discovered, that the materials may consist of uric acid, urate of ammonia, phosphate of lime, ammoniaco-magnesian phosphate, oxalate of lime, silex, and a peculiar modification of animal matter. The basis of these concretions was ascertained by Scheele to be the uric acid. Other species were afterwards detected. Dr. Wollaston, whose dissertation was published in the *Philosophical Transactions* two years before the memoir of Fourcroy and Vauquelin was read to the French National Institute, anticipated nearly every thing which the French chemists announced as their own discoveries; and it is very remarkable (as professor Murray has noticed), that although the experiments of Pearson, published in the *Philosophical Transactions* the year after Wollaston's, are referred to in that memoir, not the slightest mention is made of the discoveries of this latter gentleman! As our department is surgical, and not chemical, we shall quit this subject with briefly stating, that Dr. Wollaston has arranged urinary calculi into four species. 1st. The uric acid concretion. 2dly. The fusible calculus, or phosphate of ammonia and magnesia. 3dly. The mulberry calculus, or oxalate and phosphate of lime. 4thly. The bone earth calculus, or that composed of the phosphate of lime.

It will be with regret, that we shall presently have to state the little practical advantage hitherto derived from the knowledge of the chemical composition of urinary calculi.

These concretions are usually quite free and unconnected, so that the particular situation, which they occupy in the cavity of the bladder, is subject to change, being determined entirely by their own weight, or the contractions of the organ containing them. In some instances, however, they are adherent to the parietes of the bladder, and continue fixed in one place. Such adhesion may happen in three manners. 1. The stone may have been formed in a cul-de-sac appendage, consisting of a protrusion of the lining of the bladder between the fibres of its muscular coat; or, after being originally lodged in the common cavity of the bladder, it may have been forced into a pouch of this kind by subsequent contractions of this viscous. 2. The stone may be lodged in that portion of the ureter which runs obliquely between the coats of the bladder. 3. Lastly,

the irregular surface of a calculus may be, as it were, implanted in the fungous granulations, which occasionally arise from the inside of the bladder, and, in this circumstance, the stone can only be extracted by tearing its connection.

The calculi, which lie in a sort of cul-de-sac protrusion of the lining of the bladder, are often named *encysted*. We believe that a stone, thus encircled, is not likely to cause any real pain; the containing pouch becomes habituated to its presence; and the sensible inside of the bladder is not exposed to any irritation or injury from it. We conceive it possible for some of the alleged dislocations of stones to have taken place, in which the extraneous body became thus pressed, between the fasciculi of muscular fibres, into a cul-de-sac of the inner membrane of the bladder. A stone encysted in this manner would, in all probability, neither require extraction, nor admit of it.

Blind and brutal operators are generally eager to try hold of any excuse for their misconduct, or ill success. The adhesion of the stone has been frequently employed as a defence against the attempt, when the attempts to extract the foreign body have failed. Encysted calculi, generally, cannot be touched with a sound, and both on this account, and because the symptoms are far more lenient than those of a stone in the bladder, such cases do not demand the performance of lithotomy. A stone in the lower part of the ureter could not be touched with the sound, and would be attended with effects different from those of a calculus in the cavity of the bladder. Now, these are the only examples where the extraction of the stone would be impracticable on the ground of adhesion, and they are certainly instances in which an intelligent surgeon would never begin the attempt. But we assert with confidence, that when a calculus is truly lodged in the cavity of the bladder, no adhesion can be a just excuse, or reason, for its not being extracted. We must be convinced, with that eminent surgeon Le Dran, that an animated body, which subsists by a circulation of fluids, and another body, which owes its bulk entirely to an apposition of matter, can never become one and the same by any kind of adhesion, let it be ever so strong. Le Dran made no doubt, that there were such things as adherent stones, because he had seen instances of them. But these adhesions ought not to have hindered the stone from being extracted, provided it could be laid hold of with the forceps. In 1733, this surgeon cut a lady, who extracted a stone, that weighed seven ounces and a half. The side of it was uneven, and in a manner entirely covered upon that part of the bladder which is connected with the rectum. This incrustation was occasioned by the inequalities of the stone, which had produced an excoriation of that part of the bladder upon which they pressed, and in consequence thereof, a number of fleshy or fungous excrescences arose from the excoriated surface, and had lodged themselves in the cavities of the stone. The adhesion was broken with terrible pain. Le Dran, at subsequent periods, extracted from three patients stones, which adhered in the same manner. In 1715, he was performing an operation, performed by M. Moreau, when a stone was extracted, which was shaped like a crab-shell, or gill, and brought out with it a fungus, that circled the stone at its narrowest part. As this fungous excrescence joined round, and covered the middle of the stone, no new incision could be formed in that part, but were made at the two extremities, which was the reason of its being so shaped. It had, however, fixed it so completely in the bladder, that it could not possibly change its situation. *Traité des Opérations de Chirurgie.*

Of all animals, man is said to be the most subject to urinary calculi. The human urine contains a particular acid, so little soluble, and so disposed to produce concretions, that, frequent as the disorder is, it is rather a matter of surprise, that it is not even more common. In warm countries, like Spain and Africa, as well as in nations much to the north, such as Sweden, the disease is exceedingly rare. In temperate climates, it prevails the most in cold damp countries, like England and Holland; and, according to Richerand, it occurs in some of the provinces of France much more than in others, patients with the stone being more numerous in the northern, than the southern departments of that empire.

Children and old people are more frequently afflicted than adults, and women are less exposed to the disorder than men.

Symptoms of a stone in the bladder.—A stone in the bladder occasions pain, and derangement of the excretion of the urine; and when a suspicion of the disease is excited by these ambiguous symptoms, it can only be confirmed by introducing an instrument, called a sound, into the bladder. The pain produced by the presence of a calculus in the bladder, has the particularity of always affecting, in a very remarkable manner, the extremity of the penis. The glans becomes the seat of an itching sensation, which daily increases in violence; and patients, especially children, often get into the habit of pulling forwards the prepuce, in order to obtain relief. Hence, this part is frequently elongated in an extraordinary degree. This sympathetic sort of pain is more acute the larger the stone is, and the greater the irregularity of its surface. When the bladder is full of urine, the pain is not insupportable; but just at the period when the discharge of that fluid is finished, the suffering becomes intolerable, because, at this instant, the bladder contracts, and embraces the foreign body with considerable force. All rough exercises augment the pain; but walking over an uneven country, riding on horseback, and the jolting of a carriage particularly, have such an effect. When the patient is subjected to these exercises, he not unfrequently discharges a few drops of blood from the urethra.

The desire to make water comes on very often, and the urine, as it flows, is attended with a sensation of heat, which changes into a burning kind of pain at the extremity of the penis. The stream of water is sometimes interrupted all on a sudden. The patient vainly endeavours to continue the evacuation; he applies his hand to the perineum; he moves about, lies down, or, in some way or another, alters his posture, and the urine then begins to run again. The movableness of the stone makes it every now and then fall against the orifice of the neck of the bladder, and thus prevent, for a time, the exit of the urine.

The incessant irritation, produced by the presence of the calculus, extends to the rectum; the patient is continually teased with an inclination to go to stool, and the efforts, which his imaginary want causes him to make, bring on, in many instances, hemorrhoidal complaints, or even a prolapsus ani.

In the course of time, the pain becomes more acute and unremitting. The stone increases in size, and, by continually pressing upon the inferior part of the bladder, makes the patient experience a most painful sense of weight about the rectum. The evacuation of the urine is attended with more and more difficulty. The parietes of the bladder inflame, and are rendered thicker; its inner surface ulcerates; the urine becomes blended with matter and blood; a slow sort of fever occurs; and the patient, after lingering a great while in misery and pain, falls a victim to the disorder.

disorder. On opening the body after death, the bladder is found contracted, and its coats thickened, indurated, and more injected with blood, than in the healthy state.

The fatal termination, to which these cases tend, when unrelieved, is subject to considerable variety. Some patients have been known to live with a stone in their bladder ten, twenty, and even thirty years, without the pain being so severe as to incline them to submit to lithotomy. Richerand moreover assures us, that calculi, of very large size, and irregular surfaces, have sometimes given rise to no symptoms, by which their presence could be suspected. This author tells us, that, as he was once practising operations on the dead subject in the Hôpital de la Charité, he extracted an enormous mulberry calculus from the bladder of a patient who had died of some other disease, and who, while living, had betrayed no complaints, indicating that he was afflicted with the stone. This calculus, which was composed of the oxalate of lime, was exceedingly heavy, and by its weight, darkness of colour, and the manner in which its surface was studded with obtuse points, bore a great resemblance to a scoria of iron. It is preserved in Fourcroy's museum, where it was deposited by Boyer.

The symptoms of a stone in the bladder are so fallacious and equivocal, that every prudent surgeon avoids delivering a positive opinion, before he has sounded the patient. Certain complaints may make him suspect the nature of the case; but he must never presume to be certain, until he has actually touched and felt the stone, by means of a metallic instrument, passed through the urethra into the bladder. The general symptoms of a stone in the bladder are not peculiar to this disorder; they belong to several other affections, for which the practitioner may be consulted. An enlarged prostate gland produces many effects, like those of a stone in the bladder. There is this difference, however, riding in a carriage, or on horseback, does not increase the grievances when the prostate is affected; but it does so, in an intolerable degree, in cases of stone. It also generally happens, that the fits of stone come on at intervals, whereas the pain from a diseased prostate is neither so unequal, nor so acute.

At this present time, (September 1811,) there is a man in St. Bartholomew's hospital who suffers many of the complaints usually attending a stone in the bladder; he has been sounded, but no calculus can be discovered; and it is now ascertained that his symptoms are dependent upon a contraction situated some distance up the rectum. The stricture is so considerable, that the feces can only pass in a liquid form, and the introduction of bougies above a small size is quite obstructed.

Who would suppose that symptoms, exactly similar to those of a stone in the bladder, could proceed from the venereal disease, and be cured by mercurial treatment? Yet, such a fact have we recorded by Richerand, now an eminent surgeon at Paris. See *Notographie Chirurgicale*, tom. iii. p. 506, edit. 2.

Nothing, therefore, except sounding the patient, will give the surgeon certain information of the presence of a calculus in the bladder. The symptoms which prevail may excite strong suspicions of the nature of the case; but since they may proceed from so many other different causes, they are not alone a sufficient warrant for venturing on the performance of lithotomy. When the surgeon undertakes this important operation, he must know with certainty that there is a stone in the bladder, and such positive knowledge can only be acquired by actually feeling and hearing the steel instrument, called a sound, strike against the foreign body. Nay,

further, as the stone may be in the bladder to day, but be protruded to-morrow on the outside of the muscular coat of this organ, so as to become as it were encysted and incapable of extraction, "it is an invariable maxim among all prudent surgeons never to begin the operation of lithotomy until they can clearly and distinctly perceive the stone with the finger, or at least with the staff at the time when the patient is brought forth to be operated upon." If the calculus cannot be plainly felt at this period, the operation is not justifiable. The importance of this precept cannot be too highly appreciated, by every practitioner who values either his patient's welfare or his own reputation; for were a different line of conduct pursued, an opening might be made into the bladder, so that it might be found, and, unfortunately, the patient lose his life from the operation, which, however well executed, is never free from a serious degree of danger.

The method of sounding will be described in a future volume of this Cyclopaedia. See *SONDING*.

The stone in the bladder is a disorder that is to be regarded as more grievous the longer it has existed, and the older and more debilitated the patient is. The crisis is particularly afflicting when the severe pain in the kidneys renders it not unlikely that there may be at the same time other calculi in the substance of these organs.

A stone is seldom known to be in the bladder until it is too large to pass out through the urethra. Should a very small one be detected, we are recommended to try the effect of introducing a large sound or bougie, making the patient drink abundantly of some diuretic liquor, and desiring him first to retain his urine, and then expel it as forcibly as possible, at the same time that the sound or bougie is withdrawn. In this manner, it is conceived, the stream of the urine might sometimes carry the calculus outward. Default had it in contemplation to adapt the port-crayon pincers, invented for the urethra by Mr. Hunter, to a common catheter, for the purpose of taking small calculi out of the bladder. This project, however, would be attended with much difficulty, and the sides of the bladder would be liable to laceration in consequence of becoming pinched. Instruments made on this principle, however, are sometimes successfully employed for taking small stones out of the urethra.

Dissolution of stones in the bladder.—The possibility of dissolving stones in the bladder was a thing believed for a very long space of time, and even at the present day is a scheme not altogether abandoned. The dissolution has been attempted both by internal medicines, and by certain fluids injected into the bladder.

The knowledge of the composition of urinary calculi at once apprises us that, as they consist of very different materials in different cases, the same solvent cannot be applicable to all of them.

It is observed by Murray, one of the learned professors of chemistry at Edinburgh, that long experience has sufficiently established the advantage derived in calculous affections from the use of alkaline remedies; and as the calculi, composed of uric acid, are those which appear to be most abundant, it is supposed to be from the chemical action they exert upon it that the benefit is derived. Where the pure alkali is used, a real solvent power may be exerted; and it has been proved that the alkali is secreted by the kidneys, so as to render the urine sensibly alkaline, and even capable of acting on the calculus out of the body. Yet the solvent power is very inconsiderable, and the remedy at the same time proves so noxious, when taken to any considerable extent, that the formation of a calculus, even of small size, can perhaps be scarcely expected. The pain and irritation which

attend the disease, however, are considerably alleviated by their habitual use, and this even when the alkali is saturated, or super-saturated with carbonic acid, a circumstance with regard to which there appears some difficulty in giving an explanation, since the alkalies in this state have been supposed not to act on the uric acid. But, from the experiments of Dr. Egan (*Philos. Magaz.* vol. 23 and 24), this appears to be a mistake; though the relief obtained from the use of these may also be in part derived from the saturation of the other acid, whether phosphoric or acetic, which is likewise secreted; the urine is thus rendered less irritating, and the tendency to a deposition of uric acid diminished, all acids hastening the precipitation of this acid from the urine. It has accordingly been found, that under the use of alkaline remedies, the sediment of uric acid from the urine, so often abundant in cases of calculus, rapidly diminishes. The increase of the concretion is thus prevented, and the principal cause of irritation removed.

So far, therefore, professor Murray acknowledges that the alkalies may act as palliatives; but he contends, that it must be very doubtful if they can be given to such an extent as to exert an actual solvent power. Besides, there is an effect which may attend their continued use, especially in large doses. It has been remarked by Mr. Brande, that the phosphates of lime and magnesia are held in solution in urine, chiefly by its excess of acid; if this be saturated, therefore, by the use of an alkali, although the deposit of uric acid may be checked, that of the phosphates will be favoured, and it appears that it is principally from a deposition of these that a calculus in the bladder increases in size. Some cases, adduced by Mr. Home, appear to support this conclusion.

Lime, under the form of lime-water, has been employed as a solvent. The experiments of Dr. Egan have shewn, that lime-water acts with more energy than an alkaline solution of similar strength in destroying the aggregation of urinary concretions, and Murray found the same thing. The lime probably operates more upon the albumen or animal matter, which appears to serve as the cement or connecting substance, than upon the uric acid; and Murray thinks that in endeavouring to discover solvents for these concretions, our views ought perhaps rather to be directed to this operation than to the effect on the saline matter. If, says he, lime, when received into the stomach under the form of lime-water, can be secreted by the kidneys, as the alkalies unquestionably are, it would appear to be superior to them as a solvent. But when we consider the sparing solubility of lime, and the small quantity of it therefore that can be brought to the kidneys, the possibility of its secretion may be doubted. Mr. Brande has even supposed that, were it secreted, it would rather prove hurtful, by forming an insoluble compound with the phosphoric or carbonic acids, which are always contained in the urine. Murray owns this to be possible; but he argues that if the concretion of these substances into a calculus is owing principally to the action of the animal matter, since this must be prevented, any deposit would be discharged, and perhaps the aggregation of an exsting concretion be destroyed. Under this view, Murray thinks that the proper practice would be the exhibition of alkali and lime together, the former neutralizing the excess of acid in the urine, and allowing the latter to exert its power; and it deserves to be remarked, that the celebrated Stephens's remedies are a combination of this kind. Calculi, composed of oxalate of lime, phosphate of lime, or phosphate of magnesia and ammonia, not being soluble by alkalies, the object has been attempted by the action of weak

acids, like that of lemons. It is questionable, however, whether any acid can be given so as to communicate to the urine a solvent power. Besides, though an acid were to remove the phosphates, or at least prevent their deposition, it might promote the formation of uric acid concretions. If, however, the lime-water and alkalies, by operating on the animal matter of calculi, tend to destroy their aggregation, these remedies may prove somewhat useful in all the varieties of stone. See Murray's *System of Chemistry*, vol. iv. p. 651, et seq.

Setting aside all chemical reasoning, we are sorry to be obliged to confess that practice does not justify any strong hopes of the sufficient efficacy of internal medicines to dissolve stones in the bladder. But though lithontriptics are not equal to this effect, they certainly alluage the severity of the symptoms, which is a benefit of infinite importance to the afflicted.

Medicines conveyed into the stomach having failed to dissolve urinary calculi, various practitioners have placed considerable expectation in the plan of introducing a solvent injection through a catheter directly into the bladder. It will be seen, from the article CATHETER in this work, that the ancients knew how to introduce fluids into the bladder many centuries before Mr. J. Foss published upon the "*Vesicæ Lotura*." Fourcroy and Vauquelin ascertained, that a ley of potassa or soda, not too strong to be swallowed, softens and dissolves small calculi, composed of the uric acid and urate of ammonia, when they are left in the liquid a few days. They have proved that a beverage, merely acidulated with nitric or muriatic acid, dissolves with still greater quickness calculi formed of the phosphate of lime, and of the ammoniacal magnesian phosphate. They have made out that calculi composed of the oxalate of lime, which are the most difficult of solution, may be softened and almost quite dissolved in nitric acid, greatly diluted, provided they are kept in the mixture a sufficient time. We know then liquids that will dissolve calculi of various compositions; but much difficulty occurs in employing them effectually in practice. For although we can easily inject them into the cavity of the bladder, this organ is so extremely tender and irritable, that it cannot bear the contact of any fluid, except that which it is destined by nature to contain, and the action of such liquids upon it as would be necessary to dissolve a stone in its cavity would not fail to produce sufferings which no man could endure, and the most dangerous and fatal effects on the bladder itself. Another objection to this experiment is the ignorance in which the practitioner is with regard to the chemical composition of calculi before their extraction, and of course the impossibility of knowing what solvent ought to be injected. Upon this reason, however, it is unnecessary to lay much stress; for were the previous more weighty objection done away, the latter difficulty might perhaps be obviated.

Desirable, therefore, as an effectual lithontriptic is, as it would be the means of freeing the afflicted from the terrible sufferings occasioned by a stone in the bladder, and of removing all occasion for a painful and hazardous operation, it is a melancholy truth that, notwithstanding every expectation, arising either from chemical reasoning, from quackish boastings, or from the palliation and temporary relief really obtained, we have no practicable means of dissolving a stone in the living bladder. Until this grand discovery is made, lithotomy will ever be an indispensable operation, and the views of enlightened surgeons should all be directed to render it as free as possible from pain and dangerous consequences.

We shall now endeavour to give an impartial description of the principal methods of cutting for the stone, beginning with such as are most ancient, and concluding with those which have been very recently suggested.

Of the Apparatus minor, Methodus Celsiana; or cutting on the gripe.—The operation which we are about to explain is by far the oldest species of lithotomy, its antiquity extending back to time immemorial. Although we are indebted to the immortal Celsus for the first description of it, he was in all probability not the original inventor. We learn from history, that Hippocrates made his pupils take an oath that they would never attempt to cut for the stone; and, according to Florus, the Latin historian, the son of Alexander, king of Syria, perished, when about ten years of age, in consequence of this operation, which had been villainously undertaken, though there was no stone in the bladder. It is plain then, that, long before the time of Celsus, the ancients were acquainted with some mode of lithotomy, which we may infer was what is now called the apparatus minor. This last appellation, deduced from the small number of instruments required, was not employed till the commencement of the sixteenth century, the period when another method, named the apparatus major, had its rise. The phrase of “cutting on the gripe,” came into use in consequence of the surgeon having to cut upon the stone, while he grasped it, with his fingers introduced within the rectum.

The manner of doing the operation is this. You first introduce the fore finger and middle finger of the left hand, dipped in oil, up the anus, and pressing softly with your right hand above the os pubis, endeavour to bring the stone towards the neck of the bladder; then making an incision on the left side of the perineum, above the anus, directly upon the stone, you turn it out through the wound, either with your fingers or a scoop. Sharp on the Operations, chap. 18.

Many objections have been urged against this method by surgical authors.

1. In the first place it is not applicable to adults, as, in such patients, it would seldom be found possible to fix the stone by the fingers introduced within the rectum. Celsus confined the operation to subjects between the ages of nine and fourteen, which is rather extraordinary, as it is more easy of performance the younger the child is, though certainly it hardly admits of being done at all after the patient is more than fourteen.

2. The same parts are not always cut, as this depends very much upon the degree of force with which the stone is made to project in the perineum, and the least inclination to one side or the other must also make a considerable difference. When the incision is favourably executed, the parts cut are nearly the same as those divided in the modern and most approved mode of operating. But as the operator always cuts directly on the projecting stone, the parts exposed to the knife must vary in different cases for the reasons already alleged; and the records of surgery prove, that in performing the apparatus minor, the urethra may be quite detached from the prostate, or the vesicula seminalis and vas deferens be injured.

3. The neck of the bladder must suffer very much from rough stones, when considerable force is exerted in pressing them towards the perineum. That this is not mere conjecture, is confirmed by the observations of Celsus, from whose account it plainly appears that, in his time, many actually died from the violence done to the bladder, in endeavouring to bring the stone forwards, though the operators failed in their attempt, and the patients were not cut. Fabricius Hildanus was well acquainted with all the uncertainty

of cutting on the gripe, and he endeavoured to improve the method by introducing a staff through the urethra into the bladder, so that the operator might avail himself of the guidance of this instrument in making the required opening for the extraction of the stone. Fabricius brought the stone into the neck of the bladder with his finger, which were passed up the rectum, just as Celsus describes, and then, guided by the staff, made such a division of the prostate and neck of the bladder, as sufficed for the passage of the calculus outward. The extraction was accomplished with a sort of hook.

The apparatus minor, done in this manner, is by no means an ineligible operation for young male children, when the surgeon can easily grasp the stone with his fingers, from within the rectum. We do not mean to say it is rash to make an incision into the bladder with a common scalpel, guided by a staff, even though the stone cannot be fixed with the fingers, only the operation would then not be that of “cutting on the gripe,” to which, at present, our remarks are limited. We agree entirely with Mr. John Bell, who, in commending the improved Celsian method, as practised by Fabricius, takes occasion to remark, that you cut upon the stone, and of course make, with perfect security, an incision exactly proportioned to its size. There is no difficult nor dangerous dissection; no gorget, nor other dangerous instrument, thrust into the bladder, with the risk of its passing between that and the rectum; you are performing, expressly, the lateral incision of Raw and Cheselden in the most simple and favourable way. John Bell's Principles of Surgery, vol. ii.

Of the Apparatus major, or Scēio Mariana.—This method of cutting for the stone was named *Apparatus major*, from the great number of instruments used in the operation; and *Scēio Mariana* from one Marianus, who published the first description of it. Johannis de Romanis, a surgeon at Cremona, was the inventor about the year 1523, or 1525, though the exact period is very uncertain. Marianus was the scholar of Romanis, and having learned his master's art of operating, printed an account of it in Latin. The date of this treatise seems rather undetermined, Douglas making it 1522, Sharp 1524, and Sabatier a period subsequent to 1540.

Experience has repeatedly proved, that, in consequence of the shortness and dilatable nature of the female urethra, calculi of considerable size may be extracted from women without employing any cutting instruments at all. The passage may be gradually dilated, so as to allow the forceps to be introduced into the bladder, and the stone taken hold of, and extracted. The adaptation of this plan to male patients was the principal object of the Marian operation. With this view, an incision was made into the urethra at the bulb. That part of the canal which was situated between the wound and the neck of the bladder, being short and somewhat straight, was thought to bear a resemblance to the female urethra. Instruments were therefore passed into the opening, for the purpose of dilating such portion of the urethra, sufficiently to let the forceps be introduced, and the stone extracted. It was never recollected that the male urethra, where it is surrounded by the prostate gland, could not rightly be compared with the meatus urinarius of the female, since it was totally incapable of being dilated in a degree at all adequate to the objects in view. Hence most dreadful injury was done to the part, which, instead of yielding, were torn and confused in a manner shocking to relate.

There were various modes of executing this barbarous operation; the following particulars, we presume, will at

once satisfy the curiosity of the professional reader, and make him for ever abhor a method that is so repugnant to the principles of good surgery, and the dictates of humanity and common sense.

The patient was bound in the position usually adopted in the more modern methods of cutting for the stone. After an opening had been made into the urethra, close behind the bulb, much in the same way as is practised in the performance of the lateral operation, the surgeon used to introduce into the bladder, along the groove of the staff, an instrument resembling a strong iron probe, and called a male conductor. The staff was then taken out of the urethra, and the female, or grooved conductor, guided along the male one into the bladder. By means of these two implements, endeavours were next made to dilate the undivided portion of the urethra, and the neck of the bladder, sufficiently to enable the operator to introduce the forceps. After much time spent in stretching the parts, the forceps were passed into the cavity of the bladder, and the stone was drawn out, though, in general, not without considerable force and violence. Sometimes the dilatation was attempted with a blunt gorget; sometimes by expanding the blades of the forceps. Many operators used different instruments for the purpose, called dilators. Franco, Tollet, the Collots, and Alghisi, employed them.

When we reflect that, in this method, the prostatic portion of the urethra was left undivided, a part which is very incapable of much dilatation, we must know that the opening through which the forceps was introduced, and the stone taken out, was not formed by the elastic yielding of the parts; but by an actual laceration of them, attended with an immense deal of contusion and violence. In what a degree such mischief must have taken place in cases where the stone was of large size, is easily conceivable. We cannot wonder, therefore, at the severe, and frequently fatal, consequences of so barbarous an operation. The patients very often perished of inflammation of the bladder and abdominal viscera. An extensive effusion of blood in the scrotum, abscesses and fistulae in perineo, incontinence of urine, and impotency, were also common consequences. With these facts before us, we must feel surprise that the operation of Marianus should have been practised for the space of two hundred years, by some of the most distinguished surgeons in Europe, as Paré, Le Dran, Le Cat, Méry, Morand, Maréchal, Raw, &c.

The foregoing account will serve to convey a general notion of the apparatus major, so famous a subject in the history of lithotomy; but such readers as wish to be acquainted with all the different modes in which it was practised by the old surgeons, ought to consult *De la Médecine Opératoire*, par Sébaste, tom. ii.; and the *Principles of Surgery*, by Mr. John Bell, vol. ii. Very clear and more concise descriptions of the apparatus major may be found in Sharp's *Treatise on the Operations*, or in Bertrandi's *Traité des Opérations*.

Apparatus altus.—This is the technical name given to the method in which the stone is extracted from the bladder, through an incision practised in the fundus of this organ from above the pubes. The inventor of this mode of cutting for the stone was Pierre Franco, a surgeon at Fourmies, in Provence. He was led to attempt the operation, from having under his cure a child with a calculus, that could not be brought towards the perineum on account of its magnitude. Although the little patient suffered much in operation afterwards, the wound healed, and a perfect recovery followed. The prosperous event of this case, it seems, was not enough to convince Franco, that wounds of

the bladder were less perilous than he apprehended them to be, and at the same time that he details the particulars of the plan he pursued, he cautions us not to imitate him. See *Traité des Hernies*, Lyon, 1561.

Doubtless, the advice delivered by Franco intimidated his contemporaries; for we find no notice taken of the apparatus altus again till 1597, when this plan of operating was recommended by Rossetti, a well-informed and judicious physician, in a work entitled "*Partus Cæsarius*." This author represents it as the best and safest mode of cutting for the stone, but though he had clear ideas of the possibility of the method, his observations are not supported by any actual experience of his own. Afterwards, the operation was at first reprobated, and then adopted by Fabricius Hildanus, in cases where the stone was of considerable size. It was commended by Riola in his remarks upon the anatomy of Vellingius; and Simon Piètre, a physician at Paris, wrote a memoir in favour of the operation in the year 1635. Since this period, the apparatus altus is mentioned by numerous writers, though few surgeons ventured to perform it. However, it is said to have been practised by Bonnet, an old surgeon of the Hôtel-Dieu. At length the faculty of Paris recommended the parliament to authorise some additional experiments in regard to the apparatus altus, and Francis Collet was appointed to make the requisite trials of the operation. The result was, that, in his opinion, the method was attended with great danger, and, consequently, the practice in France was prohibited.

The apparatus altus, however, was not every where abandoned. Proby, a surgeon at Dublin, practised it for the purpose of extracting from the bladder of a young woman a long pin, covered with a stony incrustation, which he was unable to get out through the urethra. (See *Phil. Trans.* for 1700.) Groenvelt, a Dutchman, who, in 1716, published a treatise on lithotomy in English, says, that he was under the necessity of removing a stone from the bladder by cutting above the os pubis. At length, in 1718, Dr. Douglas wrote a dissertation in praise of this method of operating, which was soon afterwards put to the test of experiment by his brother, the surgeon, who was imitated by several English and German practitioners. In consequence of these proceedings, the operation was again revived in France, and it was practised at St. Germain-en-Laye by Berryer, a surgeon of that town, and by S. F. Morand, at the Hôtel des Invalides. The latter attempt proved unsuccessful. An account of both these cases was published by Morand in 1727. The operation was afterwards much on the decline in France, and probably would have been totally given up, had not a new method of performing it been proposed by Fèvre Côme. See *Nouvelle Méthode d'extraire la Pierre de la Vessie Urinaire par dessus le Pubis*, à Paris, 1779.

In the apparatus altus, the design of the surgeon is to make an opening into the anterior part of the bladder above the os pubis. The patient is to be placed upon a table, or bed of suitable height, with his legs reaching over the edge and resting upon a stool. Two assistants are to keep the patient's body and arms steady, while two others take hold of his thighs. The patient's trunk should be somewhat bent forwards, in order to relax the abdominal muscles; but it is highly necessary for the pelvis to be rather more raised than the chest, so that the intestines may not gravitate towards the bladder, and by depressing this viscus, make it more difficult to be got at. Besides, raising the pelvis above the level of the thorax prevents the stone from falling towards the neck of the bladder, from which situation the extraction would be less easy.

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The operation has been executed in several ways.

The most ancient mode was that of cutting directly upon the stone, which was pushed upwards and forwards, towards the lower and front part of the abdomen, by two fingers introduced into the rectum. Franco operated in this manner, and he was imitated by Bonnet, Heister, &c. While an assistant pushes the stone upward, the surgeon is to make an incision through the skin just above the os pubis, and through the lower portion of the linea alba: he is then to puncture the bladder, enlarge the opening from above downwards with a probe-pointed crooked bistoury, and, lastly, take out the stone with a pair of forceps.

Rosselli was the inventor of a particular method. In the apparatus altus, it is an object of the greatest consequence to make an opening into the bladder without wounding the peritoneum. Hence Rosselli adopted the plan of distending the bladder with warm water, which was injected through a catheter placed in the urethra, and thus made the viscous rise to a convenient height above the pubes. The fluid was injected in the most slow and gradual manner, in order that it might give as little pain and uneasiness as possible. The quantity introduced was, in general, from eight to sixteen ounces. Some authors object to an injection, and recommend the patient to retain his water till the requisite distention of the bladder has taken place. When this receptacle had been filled, the catheter was withdrawn, and the fluid kept from escaping by an assistant, who compressed the urethra. The integuments and linea alba were then cut, as in Franco's method. A puncture was next made in the bladder with a bistoury, having its edge turned towards the pubes; and the surgeon with his left index finger, which was directly passed into the opening, kept the bladder from descending, while he finished the incision of that viscous, by cutting from above downwards below the os pubis. The bladder was still kept up with the index finger, until the stone was extracted with the forceps. In order to be sure of having the bladder distended, and to be able to introduce more injection if necessary, Mr. Middleton used to keep the catheter in the urethra till the incisions were completed. On the other hand, Douglas was in the habit of cutting down to the bladder before he introduced the catheter.

The apparatus altus has been objected to as unadapted to persons who are either inclined to be fat, or whose bladders are not capacious. Unfortunately, in the generality of stone-patients, the bladder is much contracted. The introduction of the injection has likewise been found a painful and uncertain proceeding: for, very often, a sufficient quantity could not be got into the bladder, so that in operating there was some risk of wounding the peritoneum. The method has also been accused of frequently giving rise to an extravasation of urine, and sloughing and abscesses in the pelvis, in consequence of the greater facility with which that fluid escapes through the wound of the bladder than through the urethra. These unpleasant events have been said to take place the more easily, as when the bladder contracts, it descends behind the os pubis, and the wound in it no longer continues opposite to that in the linea alba and integuments. Keeping a catheter in the bladder, or the patient in an horizontal posture, has not, it is said, availed in preventing the frequency or fatality of such mischief.

However, Frère Côme's method of performing the apparatus altus, which we shall hereafter notice, is represented by the French surgeons as being free from the preceding inconveniences. When the account of this form of the apparatus altus has been read, we entertain little doubt that the operation will appear, to all good judges, to have merit. Frère Côme is said to have cut nearly a hundred patients, in the

manner alluded to, with almost uninterrupted success. The plan has the advantage of enabling a surgeon to extract larger stones than can be taken out of the bladder by any other method, as the incision may be enlarged in proportion to their size, and the bladder is here more yielding than in the vicinity of the prostate gland. Nor is the passage of a large stone here resisted by any bony obstacles, as in other modes of operating. See Sabatier's *Médecine Opératoire*, tom. ii. p. 51.

It must be confessed, that some difficulty might arise in case the stone were to break, as the fragments could not be so easily taken out as in other methods. We are to remember, however, that this accident is less likely to happen, because the parts through which the calculus has to pass are all soft and yielding. Were it to take place, the larger pieces of the calculus might be extracted by means of proper forceps, and the smaller ones would be carried out with the urine through the tube in the perineum.

This method, against which the records of surgery appear to adduce no serious objections, founded on as positive experience, has been entirely abandoned. Want of simplicity is alleged against it; but we think without much reason, for the operation, as will be seen from the description, is not difficult; nor is the number of instruments immoderate. If, what Richter mentions be true, that Frère Côme cut nearly a hundred patients in this way with almost invariable success, the justification of further trials cannot be doubted. The method, as modified by Deschamps, who, instead of cutting the perineum, perforated the bladder from the rectum, has received the high sanction of Dr. Thomson of Edinburgh. See *Edinburgh Surg. Journ.* N. 15.

Lateral operation.—Since the ill consequences of the apparatus major were chiefly owing to the distention, contusion, and laceration which the membranous and prostatic portions of the urethra, and the neck of the bladder itself suffered, the idea of preventing such mischief, by cutting these parts to a sufficient extent, seemed almost a certain and natural effect of any reflection bestowed on the subject. The making of such an incision constitutes all the particularity of the lateral operation; but as the lower side of the urethra cannot be divided far enough without the rectum being wounded, the cut is directed sideways, from which circumstance the name of the method is derived.

The lateral operation being that which, under various modifications, has now taken the place of every other method of cutting for the stone, it seems proper to give some account of its origin and progressive improvement, and of the different modes of executing it, with gorgets and a variety of lithotomes and knives.

In September, 1667, a sort of monk, named Frère Jacques de Beaulieu, went to Paris, taking with him numerous certificates of the many cures which he had accomplished in sundry places, and announcing his desire to teach the surgeons of that city a new method of cutting for the stone. He paid his respects to Mareschal, then principal surgeon to La Charité, and requested leave to operate upon some of the patients in that hospital. Mareschal, however, did not think proper to trust the living to a man, of whose qualifications he was entirely ignorant, and all that Frère Jacques could get granted, was permission to exhibit his mode of operating upon a dead body. The result was, that his plan was not considered advantageous, and, dissatisfied with the reception he had experienced, he quitted Paris in October, and repaired to Fontainebleau, the seat of the court. Here he cut for the stone a lad, who, in three weeks after the operation, was seen walking quite well about the streets.

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Frère Jacques put his patients under no preparatory treatment before the operation; he placed them on the edge of a table, with a pillow under their heads, and with their legs and thighs bent and separated from each other, in such a way, that their heels approached their buttocks. He did not bind his patients in this posture; but made some strong assistants hold them. Then, having introduced into the bladder a round, solid, ungrooved staff, he took a long narrow knife, and made an oblique incision in the perineum, along the internal part of the tuberosity and ramus of the ischium, cutting from below upwards. In this way, he cut all the parts which presented themselves, without taking out the staff. He now introduced his finger into the wound, in order to ascertain the situation of the stone, and enlarged the internal opening with an instrument much like a scratching knife, but which only had one cutting edge. On this instrument, which he called his conductor, he passed the forceps into the bladder. The solid staff was then withdrawn from the urethra, and the calculus extracted. Lastly, some linen dipped in a mixture of oil and wine was applied to the wound, and the operator took final leave of his patients, telling them, that the operation was done, and that God would complete the cure.

Frère Jacques' success at Fontainebleau changed the public opinion so much in his favour, that it was determined to let him operate, in the ensuing spring, on the patients in the Hô tel Dieu and La Charité. He was directed, however, to make some previous trials of his method upon the dead subject in the presence of Méry, who was ordered to furnish a report on the matter. Méry's first declaration was quite favourable to Frère Jacques, as it stated, that the neck and body of the bladder were cut instead of being dilated, as they were in the ordinary method at that time; that as the stone was extracted at the widest part of the arch of the pubes, the symptoms were likely to be milder; and, among other circumstances, that the internal parts were less exposed to be torn and bruised. Méry thought Frère Jacques' instruments not so eligible as those in previous use, and particularly objected to the staff, which, having no groove, served as a very indifferent guide to the knife.

Under Méry's inspection, Frère Jacques made further trials of the new method on dead bodies, and a second report, drawn up by the former, was much less propitious than that which had been previously delivered. But neither this circumstance, nor some unfortunate operations which Frère Jacques had lately performed at Versailles and Paris, led to a rejection of the new plan; for forty-two stone patients, in the Hô tel Dieu, and eighteen in La Charité, were now put under his care. Nothing could surpass the general eagerness to see him operate. There was not a physician, nor a surgeon, who was not proud of being his assistant. In short, so vast was the concourse of spectators, or rather, of those who wished to be such, that guards were found necessary to preserve order. Of the above sixty patients, twenty-three died. Only thirteen were perfectly cured, and even in some of these the wound is said to have afterwards broken out again. The other twenty-four remained in the hospitals; some with an incontinence of urine; others with fistule; and all in a reduced state, from which they are said to have never recovered. On examining the bodies of the deceased, it appeared that, in some instances, the fundus of the bladder was wounded, while in others, the neck of this viscus was entirely separated from the urethra; that, in women, the vagina was constantly pierced in two opposite places; that, in both sexes, the rectum was frequently opened; and that, in all cases, the parts were terribly lacerated, in consequence of no

guide for the knife, and no conductor having been employed.

The ill success of Frère Jacques' operations did not produce similar sentiments in every mind. Felix and Fagon, in France, thought that his method had merit, and that, when improved in particular points, which they suggested, it might be made far superior to any other mode of cutting for the stone. Frère Jacques profited so much by their advice, that, in 1699, he operated on about sixty persons, most of whom got quite well. He spent the ensuing winter at Versailles, as an inmate with Fagon, and there repeatedly practised lithotomy on the dead subject. Duverney dissected the bodies, and though he found Frère Jacques' method far preferable to the apparatus major, which was then the only other plan in use, he was of opinion with Méry, "that the staff would be better with a groove, as its round and solid form was ill suited for the guidance of the knife." Frère Jacques, ever ready to receive instruction, lost no time in adopting the improvement. He had new staffs constructed, and continued to employ them the rest of his life.

In the spring of 1701, this celebrated lithotomist cut thirty-eight patients for the stone at Versailles. These all recovered. Fagon, who was afflicted with the disorder, could not resolve to put himself under the care of the new operator; but was operated upon and cured by Maréchal. Frère Jacques, somewhat piqued at this circumstance, quitted Versailles, with the intention of never returning thither; but, in 1702, he was induced to re-visit the place at the instance of the Maréchal de Lorges, who was afflicted with the stone, and under whose roof were lodged twenty-two poor patients with calculi. These were all operated upon with success; but the Maréchal, whose bladder contained fungous excrescences, and seven small stones, the extraction of which was tedious, died the day after submitting to the operation. In consequence of this accident, Frère Jacques determined to go into Holland. Here his success must have been very considerable; for he was thrice engraved; and at Brussels, whither he was sent by the magistrates of Amsterdam, a medal was struck in honour of him, with this inscription: *Pro servatis civibus*. The motto of one of the engravings is the following passage from Cicero: *Ægri, quia non omnes convalescant, non illis ars nulla medicina est*. This alludes to the many hostile criticisms which had been issued against him.

In 1712, Frère Jacques, being sixty years of age, returned to Besançon, his native place, where he soon afterwards died.

While he was at Amsterdam, his mode of operating had been observed by the famous Row, who at once perceived, that the method was infinitely preferable to the apparatus major, and who, after some trials on the dead subject, put it in practice on the living. Row's success exceeded every thing heard of before; besides extracting the stone with the utmost ease, he cured all his patients without exception. His reputation spread every where. Surgeons flocked from all parts to Amsterdam, in order to see him operate and receive his instructions. He cared not how many spectators he had; but no one could prevail on him to divulge the particulars of his plan. To every solicitation on this point, his usual reply was, "*Celsum legitote*," which seems to hint, that he was in the habit of cutting the same parts as were divided in the ancient operation of the apparatus minor. It is asserted, that he cut for the stone 1540 patients, and (what is almost incredible) they are all stated to have recovered, so that there was never any opportunity of dissecting the bodies of any of his patients.

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It was for a long while presumed, that Raw made an opening into the bladder, without touching the neck of this viscus, or cutting the prostate gland. This, at least, was the sentiment of Albinus the father; but, in latter times, the general conclusion has been, that Raw must have divided these parts.

After Raw's death in 1719, experiments were made, in order to ascertain his mode of performing lithotomy. Among others engaged in this object was Cheselden, who, when the bladder was distended with an injection, succeeded in making an opening into this viscus, without injuring its neck. Having tried this plan, however, on some of his patients, he soon found, that it was very liable to be followed by a fatal extravasation of urine in the pelvis, and, consequently, he renounced it for ever. His experiments were still carried on, and at length he was convinced, that in operating with the instruments, and in the manner of Raw, as described by Albinus, it was impossible to make an opening into the bladder, without cutting the membranous part of the urethra, and the prostate gland. Cheselden now stopped his investigations, and directed all his abilities to the easy accomplishment of such an operation. The knife, commonly employed on other occasions, seemed to Cheselden much more convenient than the pointed lithotome used by the Dutch surgeons. Instead of the male and female conductor in use with Raw, Cheselden preferred a blunt gorget for guiding the forceps into the bladder; but he altered the handle, which, instead of representing a sort of cross, was now oval, and made to incline to the left.

Having abandoned the method imputed to Raw by Albinus, Cheselden tried a second plan, which was as follows: the patient being placed in the posture usually chosen for lithotomy by modern operators, a grooved staff was introduced into the bladder. The handle of this instrument was inclined towards the right groin, and firmly held by an assistant with one hand, while, with the other, the scrotum was supported. The skin of the perineum having been made tense with the operator's left thumb, a free oblique incision was made with a convex edged scalpel, much in the same way as is commonly done at the present day. The slit was next deeply cut through. The left index finger was then introduced into the upper angle of the wound, and the groove of the staff being felt through the parietes of the urethra, a cut was made into this canal. The assistant that had the care of the staff, was now directed to draw its concavity upward as closely as possible under the arch of the pubes, away from the rectum. All that remained to be done, was to divide the membranous part of the urethra and the neck of the bladder. This was executed by pulling the point of the knife along the groove of the staff, under the guidance of the left index finger, which, in this step of the operation, was kept on the back of the scalpel. Having reached the prostate gland, the incision was completed by the knife being moved downwards and outwards, with its edge turned towards the tuberosity of the ischium.

The left index finger, remaining in the wound, served to guide the beak of the blunt gorget into the groove of the staff. The operator now took hold of the handle of this last instrument, and, after bringing it downwards and forwards, conducted the gorget into the bladder. The staff was withdrawn, the forceps introduced along the concavity of the gorget, and the stone extracted. Such was Cheselden's second method. It was this operation which Merand gave an account of to the French surgeons, after seeing it performed during his visit to England at the expense of the Royal Academy of Sciences; and it is par-

ticularly worthy of notice, that foreign surgical writers seem unaware, that Cheselden afterwards gave the preference to a third plan of operating, which has been described by Douglas in his second History of the Lateral Operation, published 1731.

We are not very well acquainted with the reasons which led Cheselden to abandon his second method. He had, however, candidly confessed to Merand, that in pushing the knife backwards along the groove of the staff, he had in two instances wounded the rectum. Besides, it is conjectured, that the incision of the prostate gland was often too small for the free transmission of the stone.

Cheselden's third, and what he considered as his best method of cutting for the stone, did not differ in point of principle from his second plan. The same parts were cut, namely, the membranous part of the urethra, and the prostate gland. The change consisted in a different mode of executing the incision, "which was now performed by moving the knife from behind forwards," instead of from before backwards, as in the second method.

The following is the description of Cheselden's last and most improved plan, as given to us by Douglas. "In performing the lateral operation, he makes the first, or outward incision, from above downwards; beginning on the left side of the raphe, or seam, betwixt the scrotum and the verge of the anus, almost as high as where the skin of the perineum begins to dilate and form the bag that contains the testicles, and from thence he continues the wound obliquely outwards, as low down as the middle of the margin of the anus, at about half an inch distant from it near the skin, and, consequently, beyond the great protuberance of the os ischium.

"The first or upper part of this incision is cut superficial; after that, 'he plunges his knife much deeper by the side of the rectum, and finishes it by drawing his knife obliquely towards himself.' These three motions may always be observed in his external incision; but the last is performed pretty much at random; his knife first enters the groove of the 'rostrated or straight part of the catheter, through the side of the bladder, immediately above the prostate;' and afterwards, the point of it continuing to run in the same groove, in a direction downwards and forwards, or towards himself, he divides that part of the sphincter of the bladder that lies upon the gland; and then he cuts the outside of one-half of it obliquely, according to the direction of the whole length of the urethra that runs within it, and finishes his internal incision by dividing the muscular portion of the urethra on the convex part of the staff."

The second and third of Cheselden's methods, then, resembled each other in the parts cut; but the first and third were essentially different, notwithstanding the knife was in each of them plunged at once into the body of the bladder behind the prostate gland. Cheselden, in his first operation, only imitated Frere Jacques and Raw, and passed his knife into the bladder betwixt the vesicula seminales and tubercle ischii. He stopped at the back part of the prostate gland. All his incision lay behind this gland. "He cut the body of the bladder only." But, in his last operation, he cut no part of the body of the bladder; "he introduced his knife close behind the prostate gland, and in drawing it towards him, he of course cut only the neck of the bladder where it is surrounded by that gland." John Bell's Principles, vol. ii. p. 153.

In operating after the manner ascribed to Raw, Cheselden lost four patients out of ten; but in pursuing his own improved method, his success was most brilliant, for, of fifty-two patients whom he successively cut for the stone, all were saved.

saved excepting two; and it is well known, that out of two hundred and thirteen persons, of all ages, constitutions, &c. on whom he operated, only twenty died. What lithotomy of the present day can boast of equal success? We have seen lithotomy performed rather frequently with cutting gorgets of different descriptions, in the manner that has been of late years most prevalent. Out of every seven or eight operations, at least one has had a fatal termination. We make this statement with some degree of confidence, as we know it might be confirmed by the most respectable and impartial evidence. To what then are we to refer the few failures which Cheselden experienced, and the vast number of deaths consequent to the present common plan of cutting for the stone. The reply, in our opinion, is obvious. Cheselden made an ample and direct incision into the bladder with a sharp knife, the instrument, of all others, the best calculated for effecting a clean smooth division of the parts, without any laceration, contusion, or other additional injury. The moderns often make their external incision too small, and too high up, while the internal cut, which is executed with a gorget, is almost always too diminutive for the easy passage of any calculi above a very moderate size. The difficulty of extraction must evidently be increased by the external wound being considerably higher up, than the internal division of the prostate gland and neck of the bladder, since the passage through which the stone must be drawn out, besides being too small, does not lead directly into the cavity of the bladder. Cheselden, in using the knife, had occasion to exert no force nor roughness. The moderns, whose gorgets are sometimes very badly constructed, are often under the necessity of pushing such instruments most forcibly, ere the opening into the bladder can be made. The violence and injury which the parts must thus suffer, in addition to their simple division, require from us no comment. Cheselden, having the advantage of a free and direct opening into the bladder, never bruised and injured the interior of this viscus by tedious searches after the stone with the forceps; nor when he had grasped the foreign body, did he ever bruise and lacerate the parts in drawing it out. His constant plan, on first introducing the forceps, was to search gently for the stone *with their blades shut*. When he had got hold of the stone, he used to extract it "with a very slow motion, in order to let the parts yield as much as possible." On the contrary, the moderns, generally having too small an opening, are often obliged to introduce and withdraw the forceps twenty or thirty times before they can accomplish the extraction of the stone. Desirous of shortening the business, they are guilty of manual roughness and violence; and not only the bladder, but the parts through which the stone has to pass, are dreadfully bruised and injured. Some operations which we have witnessed have been so long, and executed with such awkwardness and want of gentleness, that we cannot help suspecting, that the bladder must actually have been in a state of inflammation before the poor patients were removed from the operating table.

Cheselden undoubtedly was one of the most expert and successful lithotomists that ever lived in any country, and his mode of operating, which is fully explained to us, ought, in our opinion, never to have been abandoned for the employment of cutting gorgets.

Of the best way of executing the lateral operation with cutting gorgets.—We suppose it must have been ignorance of anatomy, joined with timidity and want of judgment, that could induce surgeons to give up so excellent a plan of operating as that which was invented and practised by Cheselden; for admitting that it is somewhat easier to make the lateral incision with a cutting gorget, there is yet a

more interesting and weighty matter for consideration, namely, whether the recoveries after the latter operation are, upon the whole, as numerous as those which followed Cheselden's method. This eminent surgeon, as we have already noticed, cut for the stone fifty-two patients in succession, of whom only two died. No surgeon of the present day, in the habit of using a cutting gorget, can boast of success at all equal to this. Our observation tends to the conclusion, that about one out of every seven or eight patients cut for the stone, with some kind of sharp gorget, falls a victim to the operation. According to our sentiments, a surgeon should not regulate his conduct so much by the facility, as the success of any plan; and a little more trouble and difficulty ought to be no objections, where they serve to give the patient a greater chance of preservation. We know that a man cannot imitate Cheselden, without having a requisite knowledge of the anatomy of the parts in the perineum, and about the neck of the bladder. We can conceive at the same time, that a person might learn to operate mechanically with a gorget, and yet be totally unacquainted with the structure and situation of the parts interested in the operation. It is this removal of all occasion for study and application, that has had more effect, than any thing else, in keeping up the present system of doing the office of the knife, with that very objectionable instrument a cutting gorget.

The patient is to be placed at the edge of a firm table, and the staff is to be introduced into the bladder.

Then two garters, each about two yards long, are to be doubled, and put, by means of a noose, round the patient's wrists. The patient is now to be desired to take hold of the outside of his feet with his hands, in such a manner, that the fingers are applied to the soles, and the palms to the insteps. The two ends of the ligature are then to be carried round the ankle, next over the back of the hand, and under the foot. Lastly, they are to be tied. In this manner, each hand and foot may be securely connected together, and the patient is fixed in the position the best suited for the operation.

The staff, the first instrument with which the surgeon has any concern, is in fact nothing more than a director, adapted in shape to the course of the urethra, and furnished with a groove for guiding a cutting instrument into the bladder. (See *Surgical Plates*.) It is shaped very much like a sound, or catheter. However, it is generally somewhat longer and more curved, and while the handle of a sound is as smooth and highly polished as possible, that of a staff ought to have a rough surface, in order that it may be held with greater steadiness and firmness. Two advantages arise from having the staff sufficiently curved; *viz.* its convexity is more plainly distinguishable in the perineum; and on depressing the handle of the instrument, that part of the groove which is at the neck and within the cavity of the bladder, may be more readily made to assume a direction corresponding to the axis of this viscus. The utility of the length of the instrument is very obvious, as the operator is thereby less liable to suppose the extremity of the staff to be within the bladder, when it is not so; and it is plain, that the groove should always extend beyond the beak of the gorget, even when the latter instrument has been pushed as far as the operator judges requisite.

An assistant is to hold the staff, making its convexity prominent in the perineum, by pressing the whole instrument downwards, and inclining its handle towards the patient's abdomen. The person who has charge of the staff, should also turn the groove a little towards the left side of the perineum,

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neum, and raise the scrotum with his left hand, in order to expose the perineum completely to the surgeon's view.

The next consideration is the manner of making the external incision. A most common error is that of beginning the cut too high up. Nearly all the old surgeons commit this fault, by commencing the incision over the bulb of the urethra. This practice is above all things disadvantageous, especially when the operator makes the outward wound rather too small. Suppose, for instance, that the surgeon begins the incision as high as the bulb of the urethra, and does not carry it sufficiently far downwards; and that he next divides the prostatic gland and neck of the bladder with the gorget. Now, on attempting to take out the stone, the external part of the wound is too high, in regard to the internal portion; and the passage, through which the stone is to be extracted, not being straight and direct, as much impediment to the extraction is thereby occasioned as from the circumstance of the wound being too small. We are decidedly of opinion, that "a free and direct opening for the passage of the stone ought always to be made in the operation of lithotomy;" and that the fatal termination of numerous cases is entirely owing to the wound not being sufficiently ample and direct. The laceration of the parts, which must happen under such circumstances, is too frequently productive of peritoneal inflammation, the most alarming consequence of the operation. Nothing has a greater tendency to render the wound indirect, than making the incision through the skin too high up; or, in other words, so high as to interest the bulb of the urethra.

On the contrary, the wound should commence over the membranous part of the urethra, at the place where the operator means to make his first cut into the groove of the staff; and the incision is to extend about three inches obliquely downwards, to the left of the raphe of the perineum. The point to which it ought to be directed, is the centre of a line drawn from the anus to the tuberosity of the ischium.

The requisite division of the integuments being made, the next object is to divide the transversales perinei muscles, and to make an opening into the membranous part of the urethra, so as to be able to feel distinctly with the finger the groove and edges of the staff.

The operator has now to accomplish a very important object, and one that is for the most part sadly neglected: we allude to cutting the left side of the urethra with the knife, as far as possible along the groove of the staff towards the bladder. In doing this, the point of the scalpel should be placed in the groove of the staff, and the edge be turned to the left, while the operator's left fore-finger, applied to the back of the blade, serves to guide its course with greater steadiness and security. When this part of the operation is carefully done, very little remains to be effected by the gorget.

Were the surgeon, with too much boldness, to lay open the lower part of the urethra upward to the bladder, he would inevitably wound the rectum; "because," as an excellent writer has observed, "the motion being carried on from the urethra, it will necessarily lead to that part of the neck of the bladder that lies upon, and is contiguous to, the rectum." (Sharp in Critical Inquiry, &c. p. 212. edit. 4.) But when the urethra is divided in the manner above recommended, with the edge of the scalpel turned sideways, no risk of cutting the intestine is encountered.

The next important step is to divide the prostatic gland and neck of the bladder; for which purpose, the gorget, that disgraceful instrument, which we should like to see expelled from surgery, is designed.

Mr. Serjeant Hawkins has made his name exceedingly famous, by his having been the inventor of cutting gorgets. We have already related how the ancient surgeons sometimes employed blunt gorgets for dilating the parts, in the performance of the apparatus major. A reference to the surgical plates of this work will more readily convey an idea of what a gorget is, than any verbal description. There we have given representations of the blunt gorget, as well as of sharp gorgets, devised by Hawkins, Cline, and Abernethy. The gorget of Mr. Cline appears to us the most eligible, as it will make the freest opening into the bladder, and cut in the most desirable direction. Its edge, being quite straight, may be readily ground very sharp, and is best suited for making an even clean incision. By cutting laterally, instead of more or less obliquely upwards, a larger incision may be safely made with it than with most other gorgets, which, having their edges turned upwards, cut in a direction where the rami of the ossa ischium converge, and leave insufficient room for the easy passage of a large stone; and where also the trunk of the pudendal artery is liable to be injured, in making a wound even of moderate extent. We are firmly persuaded of the truth of Ponteau's opinion, that the stone ought always to be extracted where the arch of the pubes is widest. Cline's gorget, besides having the material advantages of making the freest opening, and cutting in the most desirable direction, also possesses the excellence of being devoid of that very useless and objectionable part, the blunt prominence on the left hand of the beak, sometimes termed the shoulder of the gorget. This should always be filed away, as it can only serve to render the introduction of the instrument more difficult.

We should like Mr. Abernethy's gorget very well, if its edge were somewhat more extensive, and had a more horizontal direction. But the first improvement would be improper without the last; since a freer cut so much upwards must endanger the pudendal artery.

Every surgeon, before undertaking lithotomy, should be careful that the beak of the gorget and the groove of the staff fit each other with precision. The embarrassment and risk of doing mischief, into which the operator would fall, could he not make the beak slide along the groove, must be plain to every understanding.

Having divided the urethra a considerable way towards the neck of the bladder, in the manner explained above, the operator is to place the beak of the gorget in the groove of the staff; and, being sure that this is accomplished, he is to rise from his chair, and take hold of the handle of the staff with his left hand, while with his right he holds the gorget with its beak carefully maintained in the groove of the staff, along which it is to glide into the bladder. But, before pushing the gorget onward, a most important thing is to be observed: this is "to bring forward the handle of the staff, so as to elevate the extremity of the instrument in the bladder; by which means, the gorget can be introduced along the groove of the staff, in the direction of the axis of the above viscus. In fact, the gorget should always be introduced nearly in a direction corresponding to a line drawn from the os coccygis to the umbilicus." By following this plan, the gorget can hardly ever wound the rectum, or imbricate itself into the cellular substance between this intestine and the bladder. It is evident, however, that there can be no safety, if the beak of the gorget should happen to slip out of the groove, which is designed to guide it.

Immediately the gorget has been introduced, the staff is to be withdrawn, and a suitable pair of forceps is to be passed, along the upper surface of the gorget, into the bladder, for the purpose of seizing and extracting the stone.

While

While the operator is passing the forceps along the gorget, the latter instrument must be kept quite motionless, lest its sharp edge should do mischief; and as soon as the forceps is in the bladder, the cutting gorget is also to be taken away.

Delineations of the forceps, used in lithotomy, will be found in the surgical plates of this work. We shall only observe, respecting this instrument, that the operator should be provided with at least three or four pairs of different sizes; and that they are commonly made of too thick and clumsy a construction, whereby they of themselves almost occupy the whole of the passage through which the stone is to be drawn.

Our description has now advanced to that point of the operation, when the staff and gorget have been withdrawn, leaving the forceps introduced. The next object is to get hold of the stone with the forceps. In doing this, the surgeon will do well to remember the judicious mode pursued by Chefelden, as detailed in our account of this gentleman's improvements. He should not unmeaningly expand the instrument, as soon as it is in the bladder; neither should he awkwardly thrust it about at random, without any determinate scheme. The most advisable method at first is not to open the forceps, but use the instrument as a kind of probe, for ascertaining the exact situation of the stone. If this body should be lodged at the lower part of the bladder, just behind the neck of this viscus, as is mostly the case, and be distinctly felt below the blades of the forceps, the operator is to open the instrument immediately over the stone, and, after depressing the blades a little, is to shut them, so as to grasp it. Great care, however, must be taken not to shut the instrument in any other than a gentle manner, as breaking the stone is an exceedingly unpleasant and troublesome occurrence. Chefelden, we are informed, used, when the stone was found soft, to interpose his finger between the blades of the forceps, in order to keep them from making too much pressure. Certainly it is far more scientific to use the forceps at first, merely to ascertain the position of the stone; for, when this is known, the operator can much more easily grasp the extraneous body in a skilful manner, than if he were to open the blades of the instrument immediately, without knowing where they ought next to be placed, or when shut. No man can doubt, that the injury which the bladder frequently suffers, from reiterated and awkward movements of the forceps, has a considerable share in giving rise to such inflammation of the viscus, as often spreads to the peritoneum and bowels, and occasions death.

When the stone is found to be so large, that it cannot be extracted without violence and laceration, the surgeon may either break the stone with a strong pair of forceps, constructed with teeth for that purpose; or by means of Mr. H. Earle's instrument; or else he may enlarge the wound with a common scalpel, or a probe-pointed bistoury, introduced under the guidance of the fore-finger of the left hand.

To the employment of the knife, in this circumstance, we have to express our decided preference. Breaking the stone in the bladder should always be avoided, if possible; as it creates such a chance of calculous fragments being left behind, and obliges the surgeon to disturb and hurt the bladder too much by the repeated introductions of the forceps. We wish it, however, to be well understood, that when the stone is excessively large, and cannot be brought through as free an opening as can be prudently made, without the employment of unwarrantable force, it is the duty of the operator to try to break it.

When this has been done, and as many of the broken pieces have been taken out as can be discovered with the

forceps, the surgeon should introduce his finger, in order to feel whether any fragments still remain behind. If they should do so, his best plan, provided they are very small, is to inject lukewarm water, with moderate force, through the wound into the bladder, for the purpose of washing them out. A sort of scoop, usually contained in every case of instruments for lithotomy, may sometimes be used in extracting pieces of broken calculi. See the surgical plates.

The operator ought always to examine a stone as soon as it is extracted; if its whole surface be rough, it is a presumptive sign that there is no other calculus present; if its outside should be smooth on one side and rough on the other, it is not improbable that there are other stones. But in every instance, the surgeon should introduce his fore-finger, in order to obtain decisive information on this point; for it would be unpardonable to put the patient to bed while another stone remains in his bladder.

Sometimes stones cannot be grasped with the forceps, unless raised by the index and middle finger of the left hand, introduced into the rectum. First Lines of the Practice of Surgery, p. 532—537. edit. ii.

Of the objections to cutting gorgets.—Mr. John Bell of Edinburgh, in his Principles of Surgery, vol. ii. has freely delivered his sentiments on the dangers and disadvantages of the cutting gorget, and as we think there is much reason and truth in what he has said, his observations appear to us well worthy of the most serious consideration. They tend to shew that there is no method of performing lithotomy so excellent as that with only a staff and a scalpel, and that if surgeons would take the trouble to qualify themselves for this last mode of operating, a thing by no means difficult, all cutting gorgets might be for ever laid aside, to the great benefit of mankind, and the real improvement of surgery. Mr. John Bell reminds us that "*the gorget slips!*" and all the surgeons of Europe confess it! it slips in the hands of the most skilful surgeons, and no one can be responsible for the consequences of a thrust so desperate, and requiring so much force. It slips so frequently, and is avowedly so little under the controul of the operator, that no man ventures to blame his brother for a misfortune which may happen in his own hand. So imperfect is the instrument, and so dangerous this plunge, that to prevent the gorget being driven through the fundus of the bladder, is a point of so much importance as to occupy, to this day, the genius of inventors, who have thought to guard the edge by a double, or hipped gorget! and so far is the incision, after it is safely made, from being adequate to the extraction of the stone, that the size and form of the gorget, and especially the expansion of its blade, and the broadness of its cutting edge, varies every day. The instrument was once conical, but is now cylindrical; it was once narrow, but is now broad; it was once double, with the beak in the centre: it is now single, with the beak on one side; when first sharpened by Mr. Cusar Hawkins, it was round, because it had been immediately before a mere dilator; it is now flat, and entirely resembles a knife.

"It is not without reluctance, (proceeds Mr. John Bell,) that I rank this among the inventions, where mechanism is substituted for skill. If this form of instrument were found safe in practice, I should be as little apt as any man to be infected by speculative fears; but it is a murderous weapon! When the dash is made with the gorget, either it is at once successful, or, if wrong, is irretrievably so; for though in operating with the knife, you can make a second incision, in operating with the gorget, if you fail in the first, you can make no second plunge. The best operators in this country, among whom I have no doubt I may reckon Mr.

Earle, acknowledge the dangers of this operation in the fullest and most unqualified terms: 'I have more than once known a gorget, though passed in the right direction, pushed on so far, and with such violence, as to go through the opposite side of the bladder.' (Earle on the Stone, p. 33.) I have myself, (says Mr. John Bell,) seen it driven, God knows where, deep out of sight, up to the hilt, without one drop of urine issuing, without the operator ever reaching the stone. Observe but the force with which the operator drives in the gorget; mark the struggle with which he disengages the beak of the gorget from the groove of the staff; hearken to the audible clack with which the beak of the gorget shoots off from the groove of the staff; and if this moment of violence do not conspire with the outcries of the unhappy patient to persuade you of the dangers of this operation, you can have but little pretension to either feeling or knowledge. Such is the rude violence with which the gorget is driven inwards, that Bromfield, even when operating with a blunt gorget, a mere dilator burst through the bladder and peritoneum; his gorget went almost beyond his reach into the abdomen, while the bowels of the boy fell down into his hands.

"But, (says Mr. J. Bell,) there is one paramount objection, independent of the many dangers which attend this push of the gorget; 'the instrument, guide it how you will, makes an incision inadequate to the easy extraction of the stone.' I have often compared the incisions I have made with the knife and with the gorget, upon the dead body. I have observed also, in the time of operating, how difficultly the opening of the prostate admits even the forceps, how impossible that such an imperfect incision should easily allow the extraction of the stone. In all cases of particular difficulty, where, using the privilege of an assistant, I have introduced my finger, I have felt distinctly the fracture of the gland, the greater part of it being left entire. The incision in the gland often admits the forceps so difficultly, that I am well assured the gland itself has sometimes, by the mere pushing of the forceps against this firm and narrow opening, been entirely separated from the urethra! and after the forceps are pushed successfully through this narrow opening, and the stone caught betwixt their blades, all that remains of the gland is inevitably lacerated with much danger and pain. But I would more willingly quote any authority than that of my own dissections, or experience. Camper, who has studied this subject, says "*incredibile est, quam parva plaga ab omnibus etiam dextrinis insigatur; nunquam forcipem robustam exciperet nisi dilataretur. Hawkenius solo conductore, ejus margo dexter in aciem assurgit, idem præstat; omnes plagam dilatant, ut calculum extrahant; dilaceretur igitur semper vesica ossium et prolata.*" P. 14.

"But, (continues Mr. J. Bell,) higher and better authority remains behind. Dease was, if I judged rightly of his talents, a stern and rude surgeon, but perfect in all the theory and practice of his art; he was not very explicit in his communications with me, but from the manner and the movement of his hand, in demonstrating to me, rather than from what he said, I conclude that he cut after the manner of Raw, making the incision with the right hand, while he held the staff with his left. "In all the trials, (says Dease,) that I have made with the gorget on the dead subject, I have never found the opening into the bladder sufficiently large for the extraction of a stone of a middling size, without a considerable laceration of the parts. I have frequently taken the largest sized gorget, and could not find, that in the adult subject, I ever entirely divided the prostate gland, if it was any way large; and in the operations that were

performed here on the living subject, the extraction was painfully tedious, and effected with great difficulty, and in some cases not at all." See John Bell's Principles of Surgery, vol. ii. p. 173—176.

We coincide entirely with Mr. J. Bell respecting the dangers and disadvantages of the cutting gorget, and could adduce several cases where operators have committed, with this instrument, the most fatal blunders. It is also our conviction that many deaths, after the operation, are owing to the consequences of the opening being, in general, too small, so that the forceps are sometimes introduced and withdrawn twenty times before the stone can be extracted, and when this is accomplished, it is with immense violence and laceration. The most perfect lithotomy appears to us only to admit of being done with a scalpel and a staff; and the more we reflect on the subject, the more we are convinced of the excellency of Cheselden's practice.

Of some particular methods and instruments.—The subject of lithotomy is almost an endless one, and many sheets of this work would be taken up by a full explanation of all the various methods. Such readers as wish for so minute and long an account, are particularly referred to Sabatier's Médecine Opératoire, tom. ii. and to Mr. John Bell's Principles of Surgery, vol. ii. May it be sufficient in this publication to make mention of some of the most interesting of these numerous proposals, in doing which, we shall avail ourselves of some remarks contained in an instructive paper inserted in the Edinb. Med. and Surg. Journal, vol. iv. by Mr. Allan Burns, lecturer on anatomy and surgery, Glasgow.

Frère Côme's method with the lithotome cachée.—John de Saint Côme, of the order of Feuillans at Paris, was the inventor of a knife, concealed in a sheath, out of which the blade springs, on touching a kind of lever at the side of the handle of the instrument. The distance to which the blade starts out, may be regulated by the surgeon before the operation, according to the extent of the wound that he may be desirous of making. The patient being placed as in the lateral operation with the gorget, and a staff introduced, the surgeon, with a scalpel, is to begin the first incision on the left side of the raphe of the perineum, about ten lines in front of the anus. This cut is to be continued obliquely downwards and outwards, as far as the centre of a line extending from the anus to the inside of the tuberosity of the ischium. The external incision is to divide the integuments of the left side of the perineum, the accelerator urinae, the erector penis, the transversus, and the front fibres of the levator ani. These parts having been cut, the index finger of the left hand is to be introduced into the left angle of the wound, with its radial side downwards. The right edge of the groove of the staff is to be placed between the nail and skin at the end of the finger. The point of the scalpel is to be conducted into the groove of the staff along the nail, which faces the left. The index finger is now to be turned, in order that its extremity may press upon the point of the knife, which all along is to be held with the right hand, like a writing pen. The urethra is thus to be slit open to the extent of five or six lines. The nail of the left index finger is next to be placed in the groove of the staff, and is to serve as a means of guiding the end of the lithotome into that groove. As soon as the latter object has been accomplished, the finger is to be withdrawn; the surgeon, with his left hand, is to take hold of the handle of the staff; and by one simultaneous movement, he is to raise the two ends of the instruments together towards the symphysis of the pubes, by which means the lithotome will be easily conducted into the bladder. The entrance of the lithotome into the cavity of this viscus will be indicated by cessation of resistance, and the freer issue of

the urine. The end of this instrument, being in contact with the cul-de-sac extremity of the groove of the staff, must be disengaged by a slight lateral movement. The staff is now to be withdrawn. The operator, with his left thumb and index finger, is then to take hold of the lithotome, about the place where its sheath and handle meet. He is to conduct the instrument under the symphysis pubis, turning the edge downwards and towards the left side of the perineum, in the direction of the external incision. On pressing a lever, the blade of the lithotome quits the sheath, when the instrument is to be drawn out horizontally. Thus the prostate and neck of the bladder are divided. The forceps are then introduced, and the operation finished in the ordinary way.

The lithotome *caché* of Frère Côme is yet employed at the Westminster Hospital, and has been lately tried by Mr. A. Cooper. It is still more commonly used in France. The objections, however, which have thrown discredit upon it, are, that from its mechanism, and the structure of the parts about the pelvis, it is likely to wound the pudendal artery; that the bladder, if collapsed, may be injured in more than one place; and that if the knife be directed downwards too obliquely, the rectum is apt to be cut.

Apparatus altus as modified by Frère Côme and Deschamps.—Absolute necessity led to the introduction of the high operation by Franco in 1561; and the same cause occasioned its revival, in 1658, by Frère Côme. The operation, as performed by Franco, was defective: a high incision was alone made into the bladder; this viscus was opened above the pubes, below the point where the peritoneum is reflected over the abdominal muscles: the stone was easily extracted; but as there was no dependent opening from the bladder, the urine was apt to insinuate itself into the cellular membrane about the pubes, to irritate and inflame the parts, and to produce either gangrene or suppuration, and the formation of sinuses. These disadvantages led to the disuse of the apparatus altus, till revived and new-modelled by Frère Côme, who proposed to open the bladder in perineo, and then, through an opening made just above the pubes, he introduced a scalpel with a button point, with which he slit up, for an inch or two, the linea alba; the knob on the end of the knife pushing aside the peritoneum. After this, he introduced, by the aperture in perineo, a staff, with which he made the bladder project through the opening between the recti muscles. This done, he cut into the front of the bladder, and either with his finger and thumb, or with a pair of forceps, he took out the stone. In this way he extracted from the bladder a calculus, that weighed twenty-four ounces. On this method Mr. Allan Burns remarks, that it might with propriety be adopted, were it not for the danger attendant on the double incision into the bladder, and the protraction of the operation by the dissection about the perineum. Indeed, as modified by Deschamps, who, in place of the puncture in perineo, perforates the bladder from the rectum, it has met with the approbation of Mr. Thomson of Edinburgh, who considers this, on particular occasions, to be the most advisable method of operating. Mr. A. Burns thinks, however, that if the bladder be thickened and indurated, it will be impossible to raise it with the cannula above the pubes. Hence, this plan is only admissible, when we have reason to suppose that the stone is too large to be removed by the perineum, and that the bladder is healthy. Here the puncture from the rectum is simple, attended with no increase of the danger, allows the bladder to be elevated with the cannula, and secures a dependent outlet for the urine. Thus we avoid the necessity of any discharge by the wound above the pubes; we run no risk of the urine insinuating itself into the cellular

membrane, no inflammation is excited, no sinuses are formed; consequently, the person ought speedily to recover. *Edin. Med. and Surg. Journ.* vol. iv.

Invention of staffs, from which the gorget cannot slip.—The danger of the gorget slipping out of the groove of the staff has been already sufficiently commented on. Le Cat, in 1747, and Sir C. Blicke, more lately, endeavoured to obviate such risk, by proposing to use staffs with contracted grooves. The beak of the gorget is locked and fixed in the groove of the staff, till it has arrived near the end of this latter instrument, where the groove has a wider construction. Notwithstanding the plausibility of this contrivance, there are reasons which have deterred practitioners from employing it. Few surgeons have been inclined to trust to the fort of gorget that must be used; the point of contact of the beak and body of the instrument being necessarily so small, that on the slightest deviation from the direct line, in pushing such a gorget into the bladder, the beak breaks off, the gorget separates from the staff, and the seminal vessels and rectum are exposed to injury. Besides, another objection is, that the gorget is frequently slipped in the groove of this kind of staff, at the most critical period of the operation.

Methods of Le Dran, Deale, and Muir.—Le Dran, in 1741, published his *Operations of Surgery*. In this work, the author describes an operation, the introduction of which has been claimed by several since his time. The principle of the plan alluded to was to reduce the male into the state of the female urethra.

The late Mr. Deale of Dublin, and Mr. Muir of Glasgow, reflecting that the great cause of the gorget slipping from the staff depends upon the former being pushed along a curved surface; and observing, that such an accident seldom or never happens on females; have proposed, like Le Dran, to make the male urethra resemble the female. To accomplish this, they introduce, as usual, a curved grooved staff into the urethra, and make the common incision in perineo: they then open the membranous part of the urethra; but, instead of now introducing the gorget, they conduct along the groove a female staff, and immediately withdraw the curved one. With the left hand they take hold of the handle of the straight staff, and with the right introduce the gorget.

Double staffs.—It is said that some operators have experienced considerable difficulty in finding the groove of the staff in the perineum. To facilitate this business is the principal design of the double staff, an instrument which is now quite laid aside. In fact, the trouble of cutting into the staff is not great enough, to render any invention of this sort at all important.

The first instrument for this purpose we find described by Deschamps, as the invention of Jarda, a surgeon at Montpellier. According to Mr. A. Burns, it resembles Earle's double staff; but is more complex. It consists of a curved staff, intended to be introduced along the urethra into the bladder, and having connected to its handle, by means of a hinge, another staff, shorter than the former, and sharp at its end. When Jarda had applied the short staff to the perineum, he pushed its point through the skin, behind the bulb of the urethra, into the groove of the long staff already passed through this canal. This supplementary staff, in both Jarda and Earle's instrument, is intended to conduct the knife into the groove of the staff. But Jarda aimed at more: he wished to secure the rectum from injury, by introducing into the anus a limb of the instrument, which he expected would push the gut aside. By machinery, he also contrived

contrived to support the scrotum. Edinb. Med. and Surg. Journal, vol. ix.

Mr. Allan Burns' method.—The plan introduced by Cheselden, and revived by Mr. John Bell, is that which Mr. A. Burns would affirm is the basis of the operation; but with the he proposes to blend Mr. Dease's mode.

"For more than twelve months," says Mr. Burns, "I have been in the habit of shewing such an operation, which is as simple in its performance as the one in general use, is attended with less danger to the patient, permits of an incision varying in size according to the wish of the operator, and completely prevents injury of the rectum or pudic artery. To perform this operation, I introduce into the urethra a common curved staff, then make the usual incision into the perineum, divide fully and freely the levator ani, so as to expose the whole extent of the membranous part of the urethra, the complete extent of the prostate gland, and a portion of the side of the neck of the bladder. When this part of the operation is finished, I open the membranous part of the urethra, and introduce, through the slit, a straight or female staff, with which I feel the stone, and then withdraw the curved staff. Next I feel beyond the prostate for the instrument, and then perforate the coats of the bladder with a curved knife, the point of which is to be inserted in the groove of the staff. This done, I grasp the handle of the staff firmly in my left hand, and with the right lay hold of the handle of the knife. Having ascertained that the two instruments are in fair contact, I rest the one hand upon the other, pressing them together, and then, by a steady extraction, I pull out the knife and staff together, which is preferable to drawing the knife along the staff: it prevents the risk of the one slipping from the other; it guards the bulb of the urethra, and every other part from injury; for, between them and the cutting instrument the staff is interposed. In the introduction of the knife, however, some caution is necessary, and a clear knowledge of the relative situation of the parts in the pelvis is requisite; but this information is equally necessary in operating with the gorget. When introducing the knife, the side of the blade must be laid flat along the fore-finger of the right hand, which is to project a little beyond the point. In this state, the finger and knife are to be entered into the wound, opposite the tubercle; but, in proportion as they pass along, they are to be inclined forward, till at last, with the point of the finger, the staff be felt through the coats of the bladder, a little beyond the prostate, and rather higher than the orifice of the urethra. Here the knife is, with the finger, to be pushed through the bladder; and when the point is fairly fixed in the groove of the staff, the operation is to be finished by the steady extraction of both instruments. In operating with the gorget, it is necessary that the bladder be more or less distended; a circumstance, in some cases, with difficulty accomplished, from the irritability of this viscus. In operating with the knife, the parts can be as safely cut when the bladder is empty as when full; indeed, perhaps, with greater safety; for, when not dilated, the shoulder of this viscus can more easily be pushed in, so as to permit the finger to reach the staff. Some have imagined, that the introduction of the point of the knife into the cavity of the bladder must be dangerous, inasmuch as we are liable to wound the sides, in searching for the groove of the staff. This objection is the result of an inaccurate knowledge of the state of the parts: for, in fact, we never grope in the bladder with the point of the knife; but, with the finger, push in the side of this viscus into close contact with the staff, into the groove of which the knife enters, as soon as it has passed through the coats of the bladder. Others again have

objected to this mode of operating, on the idea of its being more tedious in performance than with the gorget. This is also founded on a mistaken notion. True it is, indeed, that were a surgeon, who has been much in the habit of operating with the gorget, to exchange it for the knife, he would undoubtedly be longer of performing the operation in the latter way: but the same does not hold good respecting those who have never before operated in either mode. From all that I have seen, I would say, that the one operation may be as expeditiously performed as the other: but even admitting that the operation with the knife uniformly required a little longer time, still I think that, if safer, it ought to have the preference." Edinb. Med. and Surg. Journal, vol. ix. p. 65—67.

The instruments, used by Mr. Burns, are represented in the surgical plates of this Cyclopædia.

We shall merely say, that we think that the above plan of operating is much better than the common mode of cutting for the stone with a gorget; nor can it be found fault with on the ground of difficulty. Notwithstanding its merit, however, few seem disposed to give it a fair trial; but continue the employment of that dangerous and insufficient instrument, the gorget, as much as ever.

Of lithotomy, as performed each common scalpel, and some other kinds of knives.—The fact of Cheselden having cut for the stone sixty-two patients in succession, of whom all recovered, excepting two, is an invincible argument in favour of his method of operating. It may be expected, that we should describe the mode of executing the operation with a scalpel; but after the full account which we have delivered of Cheselden's plan, this duty in reality becomes superfluous. The few judicious surgeons of the present day, who have given the preference to the common scalpel, have all operated either after Cheselden's second or third manner. The last has been chosen by Mr. John Bell, and is that which was crowned with such matchless success in the practice of its inventor. The lateral operation, as thus executed by Cheselden, was truly once the pride of English surgery, to use an expression of that able professor, Dr. J. Thomson of Edinburgh. Other operators have preferred operating after the manner of Cheselden's second method, viz. by cutting from the urethra towards the bladder.

Mr. Charles Bell has proposed the employment of a staff, the groove of which, towards the extremity of the instrument, runs along its right side or edge. Operative Surgery, vol. i.

It would be a tedious and endless business to describe all the various knives which different surgeons have suggested for lithotomy. The late Mr. Hunter had a particular one. Mr. Astley Cooper has used a knife, much resembling a common dissecting scalpel, but having a beak, by which it may be guided along the groove of the staff. We hear that this distinguished surgeon is now trying Frère Côme's lithotome caché. A much approved knife for lithotomy was some time since invented by Mr. Gibson, and another by Mr. T. Bizard. Engravings of all these will be found in the surgical plates of this work. Our objection to these beaked knives is, that they are in reality gorgets.

Of lithotomy in Women.—Women suffer much less from the stone than men, and far less frequently stand in need of this operation. It is not, however, that their urine will not so easily produce the concretions, which are termed urinary calculi. The reason is altogether owing to the shortness, largeness, and very dilatible nature of the female urethra; circumstances, which in general render the expulsion of the stone with the urine almost a matter of certainty. The records of surgery present us with numerous

instances,

instances, where calculi of vast size have been spontaneously voided through the meatus urinarius, either suddenly without pain, or after more or less time and suffering. Heister mentions several well authenticated examples of this kind. Middleton has also related a case, where a stone, weighing four ounces, was expelled in a fit of coughing, after lodging in the passage a week. Collet speaks of another instance, where a stone, about as large as a goose's egg, after lying in the meatus urinarius seven or eight days, and causing a retention of urine, was voided in a paroxysm of pain. A remarkable case is related by Dr. Molinieux in the early part of the *Philosophical Transactions*: a woman voided a stone, "the circumference of which measured, the longest way, $7\frac{1}{4}$ inches, and round about, where it was thickest, $5\frac{3}{4}$ inches, its weight near $2\frac{1}{2}$ ounces troy."

Sometimes, after the passage of large calculi, the patient has been afflicted with an incontinence of urine; but this grievance, in general, lasts only a short time.

The naturally large size, and dilatable nature of the female urethra, have suggested the plan of endeavouring to expand this passage by various means, so that a stone in the bladder may be taken out with a pair of forceps, without using any cutting instrument at all. This method was proposed by Douglas nearly a century ago, who not only recommended sponge for the purpose, but also dried gentian root, as being more gradual in its expansion, and better adapted to the object.

Mr. Bromfield has given the case of a young girl, where he effected the dilatation by introducing into the meatus urinarius the appendicula cæci of a small animal in a collapsed state, and then filling it with warm water, by means of a syringe. The piece of gut, thus distended, was drawn out, in proportion as the cervix vesicæ opened, and in a few hours the dilatation was so far accomplished, that the calculus had room to pass out. See *Chirurgical Obs. and Cases*, vol. ii. p. 276.

Mr. Thomas lately met with a case, where, after dilating the meatus urinarius with sponge tent, he succeeded in extracting an ear-picker, which lay across the neck of the bladder. The passage was so much enlarged, that the left fore-finger was most easily introduced, and, (says this gentleman,) "I believe, had the case required it, both thumb and finger would have passed into the bladder without the smallest difficulty."

After adverting to this case, and other facts proving the ease with which the female urethra can be dilated, Mr. Thomas remarks; "If these relations can be credited, and there is no reason why they should not, I can hardly conceive any case, in a young and healthy female subject, and where the bladder is free from disease, where a very large stone may not be extracted, without the use of any other instrument than the forceps, the urethra having first been sufficiently dilated by means of the sponge tents. For this purpose, the blades of the forceps need not be so thick and strong as those commonly employed." See *Medico-Chirurgical Transactions*, vol. i. p. 123—129.

Some surgeons have extracted stones from the female bladder as follows: the patient being placed in the position commonly adopted in the lateral operation, a straight staff, with a blunt end, is introduced into the bladder through the meatus urinarius. The surgeon then passes along the groove of the instrument the beak of a blunt gorget, which, becoming wider towards the handle, effects a part of the necessary dilatation. The staff being withdrawn, and the handle of the gorget taken hold of with the left hand, the right fore-finger, with the nail turned downwards, is now introduced slowly along the concavity of the instrument.

When the urethra and neck of the bladder have thus been sufficiently dilated, the finger is withdrawn, and a small pair of forceps passed into the bladder. The gorget is now removed, and the stone taken hold of and extracted. See *Sabatier's Med. Opérateur*, tom. ii. p. 103.

Notwithstanding these favourable accounts of the practice of dilating the female urethra, for the purpose of removing calculi from the bladder, the generality of surgeons prefer an incision. It is certain, that some patients have found the method insufferably painful and tedious. But the strongest objection to the practice has arisen from the incontinence of urine, which occasionally follows any great distension of the urethra and neck of the bladder. Mr. Thomas believes, however, that this unpleasant symptom is quite as often a consequence of the operation of lithotomy, as now usually performed. *Medico-Chirurgical Trans.* vol. i. p. 127.

Lithotomy on females is much more easy of execution, and less dangerous, than the same operation on the male sex. It may be done in various ways; but the surgeons of the present time constantly follow the mode of making the requisite opening by dividing the urethra and neck of the bladder. A straight staff, or director, is introduced through the meatus urinarius; the groove is turned obliquely downwards and outwards, in a direction parallel to the ramus of the left os pubis; and a gorget or knife, is thus conducted into the bladder, and makes the necessary incision. Some operators prefer the lithotome caché, which, after being introduced, is opened as far as is deemed proper, and then drawn out with its edge turned obliquely outwards and downwards.

The French surgeons Louis and Flurant were the inventors of particular bistouries for dividing both sides of the female urethra at once; the instrument of the former effected this purpose, in passing from without inwards; that of the latter in passing from within outwards. Flurant's bistoury bears some resemblance in principle to Frère Côme's lithotome caché, or to the cutting forceps with which Franco used to divide the neck of the bladder. The reason assigned for these bistouries is, that they will serve to make a freer opening for the passage of large stones, than can be safely made by cutting only in one direction. At present, however, they are never used. Were the stone known to be very large, Sabatier seems to prefer the apparatus altus.

A case may present itself, where the posterior part of the bladder, drawn downwards by the weight of the stone, might displace a portion of the vagina, and make it protrude at the vulva, in the form of a swelling. Here, there would be no doubt of the propriety of cutting into the tumour, and taking out the foreign body contained in it. Roussel performed such an operation, and Fabricius Hildanus, in a case where the stone had partly made its way into the vagina by ulceration, enlarged the opening, and successfully extracted the extraneous body.

M. Méry once proposed the method of making an opening into the posterior part of the bladder, through the vagina, after introducing a common curved staff; but the apprehension of urinary fistula made him abandon the project.

The existence of extraordinary circumstances may always render a deviation from the common modes of operating not only justifiable, but absolutely necessary. Thus, Tolet met with a case, where a woman had a prolapsus of the uterus, with which the bladder was also displaced. In the latter viscous, several calculi were perceived. An incision was made into it, and the stones extracted, after which opera-

tion the displaced parts were reduced, and a cure speedily ensued. Sabatier's *Med. Opératoire*, tom. ii. p. 107.

Treatment after the operation.—Whatever method of performing lithotomy has been selected, the great danger afterwards is the access of inflammation of the bladder, peritoneum, and parts within the pelvis and abdomen in general. This alarming disorder is the common cause of the numerous deaths which follow the ordinary modes of operating. The best method of preventing it is, as we have repeatedly explained, to make a free and ample opening for the passage of the stone, and to avoid all manual roughness and violence in the operation. But supposing tenderness and tension to have begun about the hypogastric region, attended with a small frequent pulse, pain over the abdomen, sickness, thirst, &c. not a moment must be lost; as nothing will save the patient but the prompt and decisive employment of antiphlogistic measures.

This much dreaded and fatal disorder is particularly to be expected, when the patient is of a full sanguineous habit, when the operation has been long and difficult, when much violence has been used in drawing out the stone, or when the bladder has been bruised by the reiterated introduction of the forceps, whether for the purpose of taking out one calculus, or several, or the fragment of one that has been broken. The perilous inflammation within the abdomen, however, may come on, even when the operation has been executed in the most expert and easy manner. The most effectual means against the complaint, are copious venesection, and placing the patient for some hours in a warm bath. These measures should be taken immediately when the complaint is indicated by the least pain and tension about the lower part of the abdomen. But, besides bleeding and the warm bath, an endeavour should be made to procure stools by giving the oleum ricini. When the patient is removed from the bath, a blister, or else leeches and fomentations, may be applied to the hypogastric region.

Were we to judge from the observations derived from the practice which it has fallen to our lot to see, we should suppose, that the danger of hemorrhage after lithotomy has been generally exaggerated; for out of a vast many operations which we have been spectators of, there has not been one death from loss of blood. But as wounding the pudendal artery may happen more frequently with some operators, whom we have had no opportunities of noticing, we are inclined to believe, not that the danger is unjustly magnified, but that the particular surgeons whom we have seen operate have generally eluded it.

In order to stop the bleeding from the trunk of the pudendal or pudic artery, authors advise us to introduce into the wound a cannula wrapt round with lint, for the purpose of making pressure on the wounded part of the vessel. Boyer is said to have suppressed the hemorrhage in several instances, by introducing deeply into the wound a large doasil, round which is tied a ligature, the ends of which, being separated, are to be forcibly tied over a second doasil. The constriction tends to draw outwards the first doasil, at the same time that it propels inwards that which is more external. Richerand, *Nosographie Chir.* t. iii. p. 533, edit. 2.

Secondary hemorrhages sometimes occur in old debilitated subjects several days after the operation, and may prove fatal. They require the same treatment as the foregoing bleeding, though, notwithstanding the most skilful compression, the blood will often continue to ooze from day to day, till the patient falls a victim.

Were a patient to bleed profusely from a wound of the pudendal artery, the vessel might be taken up and tied by a

good surgeon, which would be a much safer method than compression. It seems, that in one example, Mr. Abernethy tied the trunk of this artery, where it passes along the inner surface of the tuberosity and ramus of the ischium. See *Medical and Physical Journal*, vol. ix. p. 393.

The dressings after the lateral operation are superficial, and kept on with a T bandage. As separating the thighs pulls asunder the edges of the wound in the perineum, it is also customary to confine them together, when the patient is put to bed by means of a garter applied just above the knees.

LITHOXOS. See COLAFICE.

LITHOXYLON, in *Minerology*, *Woodstone*, *Holzstein* of Werner, a species of siliceous genus in the arrangement of Kirwan. Its colour is generally blackish, or bluish-grey; the former frequently passing into the greyish-black, and the latter into the greyish white; and this from the light reddish-grey, into the blood or cochineal red. Seldom ochre yellow or mountain green; sometimes reddish or yellowish-brown. These colours commonly appear together in spots, blotches, or stripes, in the same specimen. It always manifests its pristine state, either by its branchy form, or its knots or roots. Its surface, like that of the wood from which it originates, is sometimes rough, sometimes uneven, sometimes coarsely streaked in the direction of its length. Its internal lustre, 1; its transparency, 1.2. Its fracture conchoidal; sometimes imperfectly, or approaching to the fine splintery, sometimes flaty; and generally, by its interlaced fibrous structure, discovers its origin. Its fragments 3. Often splintery; its hardness, 10; the specific gravity of different specimens extended, upon Mr. Kirwan's trials, from 2.045 to 2.675. It is commonly, but not always, the substance of petrified wood. It often withers by exposure to the atmosphere. Its transitions are into quartz, calcedony, and, as some say, into pitch stone or opal. Kirwan's *El. of Min.* vol. i.

LITHOXYLUM, in *Botany*, a term used by Linnæus to express a heterogeneous substance on marine productions, which has fructifications in impressed points. See GORGONIA.

LITHOZUGIA, in *Natural History*, the name of a genus of fossils, of the class of the icrupi, composed of a crystalline matter a little debased, and containing within them various extraneous bodies, as pebbles, &c.

Dr Woodward has ranked this genus among the pebbles, because of the pebbles they contain; which is by no means a sufficient reason for confounding two such different fossils: the lithozugia approaching to the nature of flint.

Mercatus and other naturalists have called the lithozugia, *aculati lapides*; and among English lapidaries they are known by the name of *pebbly-stones*; which see.

LITHUANIA, in *Geography*, a country of Europe of considerable extent, anciently a separate duchy, and afterwards united to Poland. Its capital was Vilna or Wilna, but its principal town was Grodno. When it was governed by its own sovereigns under the title of Great Dukes, a rivalry subsisted between this duchy and the contiguous states of Russia and Poland, which was the occasion of frequent contests. At so early a period as the 11th century, the Lithuanians, descended from the ancient stock of the *Slavonians* (see the article LETTIS,) are enumerated by Nestor in his chronicle, under the appellation Litva, among the nations tributary to the Russian monarchy; nor could they find means to render themselves an independent nation, till the time when dangerous intestine divisions sprang up in Russia, under the successors of Vladimir the Great, who died in the year 1015. At this time they were freed from the

the Russian supremacy, enlarged their borders at the expense of their former masters, and at length grew to be formidable to all their neighbours. In the year 1386, the great duke Ladislaus Jaghelson, or Yaghello, having espoused the Polish queen Hadevige, and embraced the Christian religion, was raised to the Polish throne, and reigned over both Poland and Lithuania. In consequence of the union of the two countries, the conquered Russian provinces devolved to this united kingdom. Ladislaus manifested the reality of his conversion, by endeavouring to propagate the Christian doctrines among his idolatrous subjects in Lithuania; accordingly he cut down the hollowed groves, destroyed the oracular shrine, extinguished the sacred fire, and slew the serpents that were worshipped as gods by his superstitious subjects. A belief universally prevailed among the people, that whoever profanely attempted to destroy these objects of their worship, would be struck with instantaneous death; but the fallacy of this tradition was evinced by the impunity of those who were concerned in the supposed sacrilege. The Lithuanians flocked in such crowds to be converted, that the priests could only confer separate baptism on persons of distinction; but distributed the multitude in ranks, and sprinkling them with water, gave one Christian name to each rank without distinction of sex. Ladislaus, having thus introduced the Christian religion into Lithuania, nominated his brother Casimir Skargello governor of the duchy, and returned to Poland; but a civil war being excited by the ambition of Alexander, surnamed Vitoldus, and by the discontents of the people, still attached to their Pagan rites, Lithuania was for some time a scene of tumult and hostility. At length, by a compromise in 1392, Vitoldus was appointed great duke, and Ladislaus contented himself with a nominal sovereignty. In 1401 the nobles of Lithuania assembled at Vilna, and entered into an offensive and defensive alliance with the king and republic of Poland. In 1413, it was stipulated in a diet of Poles and Lithuanians, held in the town of Hrodlo, that, upon the demise of Vitoldus, the Lithuanians should acknowledge no other great duke but the person who should be appointed by the king, and with the agreement of the two nations; that if Ladislaus died without issue, the Poles should elect no king without the consent of Vitoldus and the Lithuanians, and that a diet, composed of representatives from both nations, should meet at Lublin or Panzow. From the demise of Vitoldus, who expired in 1430, in the 80th year of his age, the great dukes were sometimes, in conformity to this compact, nominated by the kings of Poland, at other times in violation of it by the Lithuanians. At length Sigismund I. fortunately united in his person the two sovereignties, and was succeeded in both by his son Sigismund Augustus. The connection between the two nations was, however, more an alliance than an union; but Sigismund Augustus having no children, and being the only surviving male heir of the Jaghelson family, planned the union of Poland and Lithuania, lest upon his decease the two nations should again be governed by different princes. For this purpose a general diet was held at Lublin in 1569; and upon the ratification of the union, Sigismund Augustus renounced all hereditary right to Lithuania. From this time the same person was uniformly elected king of Poland and great duke of Lithuania, and the two nations were incorporated into one republic. Since this period, Lithuania has shared the fortunes of Poland; and with the gradual extinction of it, has likewise fallen a prey to her stronger and more powerful neighbours. At the partition of the year 1773, Lithuania furnished the whole share which Russia at that time obtained, and out of which the present vice-royalties of Mohilef and Polotzk are formed.

In the subsequent partition of the year 1793, this grand duchy again lost 1731 square miles, and 850,000 souls, which now belong to the vice-royalty of Minsk; and in the final partition of the year 1795, the last remains of Lithuania also fell to the Russian empire, of which at present the vice-royalties of Vilna and Slonimsk are formed. These provinces of the Russian empire are therefore those in which Lithuanians reside; but the number of people of which this nation consists, can hardly be given with any degree of accuracy, as they are every where mingled with Russians and Poles.

Lithuania was formerly a very woody country, but the greatest part of it was uncultivated. However, under the tranquil reigns of Sigismund I. and his successors, the woods were cleared in a great degree, and agriculture was encouraged. Potatoes and wood-ashes are made here in great abundance, and the country produces much corn. It also yields a great quantity of honey, from which are made the liquors called Lippitz, Mallinbeck, and Mead. Its meadows and pastures are fertile, and supply food for numerous flocks and herds. The wool is very fine. The lakes abound with fish; and the forests are the haunts of bears, wolves, wild boars, buffaloes, deer, and large flights of woodcocks. All sorts of provisions are cheap, but cash is so scarce, that 10 *per cent.* is the common interest for money. The common people are generally vassals, and the nobility are numerous, but poor; some of the principal of them excepted, who possess princely revenues, occupy the chief posts in the country, and live in great pomp and splendour.

LITHUANIA, *Little, or Prussian*, a province of Prussia, about 100 miles in length and half as much in breadth. This country was anciently over-run with thickets and woods; and in the year 1710, it was almost depopulated by a pestilence. In 1720, Frederick William, at a great expense, induced many Switzers, French Protestants, Palatines and Franconians to settle here, and in 1732, 350,000 dollars were distributed among a fresh colony of 12,500 Saltzburghers. These emigrants changed the face of the almost desolated country, and its fertility appeared in the multitude and variety of its productions; such as corn, horned cattle, numerous flocks of sheep, excellent horses, butter, cheese, &c. It afforded likewise plenty of fish and game. Several manufactures are also established here, for coarse and fine cloth, leather, &c. The ancient inhabitants of this country have a language peculiar to themselves, into which the bible and some religious books have been lately translated. The colonists of this country are engaged in various employments, to which their disposition and habits incline them; and with respect to religion, the Switzers, French, and Franconians, are Calvinists; so that there are 10 German and French reformed parishes, as they are denominated, in Little Lithuania. The rest are Lutherans, intermixed with a few Papists. The principal towns are Memel, Tilt, Ragnit, and Ilberburg.

LIPPITZ, or LIPPITZ, a town, or rather village, of America, in Lancaster county, Pennsylvania; situated in the township of Warwick, containing about 50 houses, and an elegant church with a steeple and bell, settled in 1757, and inhabited by the United Brethren, amounting, in 1787, to upwards of 300; eight miles N. of Lancaster.

LITMUS, or LACMUS, in the *Arts*, is a blue pigment, or violet red paste, formed from *Lithm*, which see. It is brought from Holland at a cheap rate; but may be prepared by adding quick-lime, and purified urine, or spirit of urine distilled from lime, to the archil previously bruised by grinding. The mixture, having cooled, and the fluid suffered to evaporate, becomes a mass of the consistence of a paste.

a paste, which is laid on boards to dry, in square lumps. The following is given as the exact process for preparing it. (Nicholson's Journal, 4to. vol. ii.) The lichen is first dried, cleansed, and pulverised, in a mill like the oil-mill. The powder is then thrown into a trough, with one-half its weight of pearl-ash, and moistened with a little human urine, and allowed to ferment. This fermentation is kept up for some time, by successive additions of urine, till the colour of the materials changes first to red, then to blue. In this state it is mixed with a third its weight of very good potash, and spread upon deep wooden trays till dry. A quantity of chalk is added at last, apparently for the mere purpose of increasing the weight. It is only used in miniature paintings, and cannot be well depended on, because the least approach of acid changes it instantly from blue to red. This property renders the colour a valuable tint to the chemist, in detecting the presence of uncombined acids. But when redened by an acid, the blue is restored by an alkali: so that litmus may thus become a test both of acid and of alkali. The best litmus is very apt to change and fly. It is much employed for the purpose of giving a gloss or finish to the more deep and permanent colours, by the dyers of silk, fluffs, and ribbons. Marble soaked with litmus-liquor imbibes it in some days, and becomes beautifully tinged with a colour, which will remain for a considerable time unimpaired.

LITOTES, Διότης, in *Rhetoric*. See LIPTOTES.

LITOWISCH, in *Geography*, a town of Poland, in Vohynia; 56 miles S.W. of Lucko.

LITRA, in *Ancient Coinage*. See LIBRA.

LITRE, or *Cubie Daboire*, a French measure of capacity, equal to 60,52800 English cubic inches, or nearly 2½ wine pints. See MEASURE.

LITRON, a measure for corn and dry commodities, in the old system of France; 16 litrons being equal to a boisseau, each boisseau being = 730 English cubic inches, and 11 boisseaux = 4 English bushels.

LIEROFOND, in *Geography*, a town of Asiatic Turkey, on the south-west coast of Anatolia. N. lat. 36° 51'. E. long. 37° 35'.

LITSCHAU, a town of Austria; 70 miles N.W. of Vienna. N. lat. 49° 48'. E. long. 14° 55'.

LITTAU, a town of Moravia, in the circle of Olmutz; 8 miles N.N.E. of Olmutz. N. lat. 49° 28'. E. long. 16° 59'.

LITTER, LECTICA, a kind of vehicle borne upon staves, anciently esteemed the most easy and genteel way of carriage.

Du Cange derives the word from the barbarous Latin, *lecteria, strata* or *bedding for beasts*. Others will rather have it come from *lectus, bed*, there being ordinarily a quilt and a pillow to a litter; in the same manner as to a bed.

Pliny calls the litter the traveller's chamber; it was much in use among the the Romans, among whom it was borne by slaves kept for that purpose; as it still continues to be in the East, where it is called a *palanquin*.

The Roman *lectica*, made to be borne by four men, was called *tetratherum*; that borne by six, *hexaphorum*; and that borne by eight, *octophorum*.

The invention of litters, according to Cicero, was owing to the kings of Bithynia; in the time of Tiberius they were become very frequent at Rome, as appears from Seneca; and even slaves themselves were borne in them, though never by more than two persons, whereas men of quality had six or eight.

LITTER, in *Agriculture*, a name applied to straw, fern, or other dry substances, that are placed under horses, cattle,

&c. in the stables, cow-houses, farm-yards, or other places for the purpose of keeping the animals clean, and the providing a large supply of manure. In this last view, all sorts of dry materials should be carefully collected, and stacked up for winter use. And it is of vast importance, in different views, to have it properly employed in foddering the cattle, as well as in littering them down in the stall and yards; as, without proper economy, much disadvantage may arise to the farmer in the way of converting it into manure. See SOILING and FARM-YARD.

Merely as litter, wheat-straw is always to be preferred for horses; but for cattle and other animals, the other sort of straw, fern, &c. may answer equally well.

LITTERMORE, in *Geography*, an island on the coast of the county of Galway, Ireland. It is on the south-east of Kilkerran bay, and is about four miles long by two wide. N. lat. 53° 17'. W. long. 9° 40'.

LITTLE ALGONQUINS, Indians who inhabit near the Three Rivers, and can raise about 100 warriors.

LITTLE Bairam. See BAIKAM.

LITTLE Britain, a post-town of America, in Orange county, New York; 29½ miles from Washington.—Also, a township in Lancaster county, Pennsylvania, containing 1365 inhabitants.—Also, a township in Chester county, in the same state,

LITTLE Calfan. See CAPTAN.

LITTLE Compton, in *Geography*, a township in Newport county, Rhode island, containing 1577 inhabitants, and affording greater quantities of meat, butter, cheese, vegetables, &c. than any other town of its size. The inhabitants, who are industrious, manufacture linen and tow cloth, flannels, &c. of an excellent quality, and in considerable quantities for sale.

LITTLE Creek, a town of America, in Kent county, Delaware, containing 1908 inhabitants.—Also, a town in Sussex county, Delaware, containing 2164 inhabitants.

LITTLE Harbour. See PISCATAQUA.—Also, a bay in the straits of Magellan, on the coast of Patagonia; 5 miles N.W. of Bachelor's river.

LITTLE Island, or *Little Salvador*, one of the smaller Bahama islands. N. lat. 23° 46'. W. long. 75° 16'.—Also, an island in the river Lee, in Ireland, about three miles in circumference; 6 miles E. of Cork.

LITTLE Mays. See MAYS.

LITTLE River, in *Geography*, a beautiful and rapid river of America, in Georgia, when, at its confluence with Savannah river, it is about 50 yards wide.—Also, a river which partly separates North and South Carolina.—Also, a plantation in Kennebeck county, Maine.

LITTLE Sodus, a harbour of lake Ontario; 15 miles S. of Oswego.

LITTLEBOROUGH, a town on the west coast of the island of Nevis; 2 miles N. of Charles town.

LITTLETON, ADAM, in *Biography*, a learned philologist, was born in 1617 at Hales-Owen, in Shropshire, of which place his father was vicar. He was educated at Westminster, under Dr. Busby; and in 1642 was admitted a student of Christ's college, Oxford. He was, on account of his principles, ejected by the parliamentary visitors in 1648, and was under the necessity of obtaining a living as usher at different schools. At the restoration, he was appointed second master of Westminster school, king's chaplain in ordinary; and in 1674, having already obtained his doctor's degree, he was hurried to the rectory of Chelsea. This preferment was followed by being appointed a prebendary of Westminster, and afterwards sub-dean. He died on the 30th of June 1694, leaving behind him the character

acter of an amiable man, and very considerable scholar. He was conversant in the Hebrew, Chaldaic, and Arabic languages; and was conversant with the higher parts of mathematics. He published many works in divinity and philology, but is chiefly known for his "Latin Dictionary," which was in general use in our schools till that of Ainsworth was published. He had received a grant of king Charles II. to succeed Dr. Busby, as head master of Westminster school; but death prevented the execution of the king's intention.

LITTLETON, Sir THOMAS, an English lawyer and judge, who flourished in the fifteenth century, was eldest son of Thomas Westcote, esq. of Devonshire, by the heiress of Littleton, of Frankley in Worcestershire, whose name he assumed. He was regularly educated for the law; and, in the reign of Henry VI., he was made judge of the marshalsea court and king's serjeant, and in 1475 went the northern circuit as judge of the assize. In 1466 he was appointed one of the judges of the common pleas, and, a short time after, was created a knight of the Bath. He died in 1481, leaving three sons, from whom many considerable families are descended. He was author of a valuable work, entitled "Tenures and Tides by which Estates were anciently held in England." It was written in French, and a translation of it, with a commentary, forms the first book of Coke's "Institutes." Sir Thomas, during the troubles and confusions of the times, so comported himself, as to enjoy the favour of both the contending sovereigns; and, at the same time, acquired the esteem of all, for his great skill in the laws of England.

LITTLETON, EDWARD, distinguished for his great knowledge in the common law, son of Sir Edward, a Welsh judge, was born in 1589, and pursued his college exercises in Christ church, Oxford, from whence he removed to the Inner Temple, to pursue the study of the law. He was an active member of parliament in the year 1628, and, together with Sir Edward Coke and Sir Dudley Digges, carried up the Petition of Right from the Commons to the Lords. He was also a leading manager in the accusation against the duke of Buckingham, in which his judicious conduct obtained for him the good opinion of the prince and people. He succeeded his father as Welsh judge, and was chosen recorder of London. In 1634 he was made by Charles I. solicitor-general, and knighted; in 1639 he was sworn lord chief justice of the common pleas; and, in the following year, he was advanced to be lord keeper of the great seal of England, and called to the house of peers by the title of lord Littleton. He afterwards lost the favour of the king, though it is believed without reason, which he could never after regain. He died in August 1645, at Oxford, where he was buried on the north side of the choir in the cathedral of Christ church, and had a funeral oration pronounced over him by Dr. Henry Hammond. He published a book of Reports of Cases in the Courts of Common Pleas and Exchequer, from the second to the eighth of Charles I.; some speeches in parliament, several arguments and discourses. Biog. Brit.

LITTLETON, in Geography, a post-town of America, in Middlesex county, Massachusetts, 28 miles N.W. of Boston; containing 924 inhabitants.—Also, a post-town in Grafton county, New Hampshire, incorporated in 1784, and containing 381 inhabitants.—Also, a township, now called *Waterford*, in Caledonia county, Vermont, on the west side of Connecticut river, containing 565 inhabitants.

LITTLETON'S *Island*, a small island in the Florida stream. N. lat. 24° 42'. W. long. 81° 40'.

LITTORAL SHELLS, among writers of *Natural His-*

tory, are such sea-shells as are always found near the shores, and never far off in the deep.

Those which are found in the bottom of the sea, remote from the shore, are called *pelagian*.

LITTORELLA, in *Botany*, the diminutive of *Litus*, a shore, this plant being generally found in the neighbourhood of lakes or pools. Indeed its English name, Shore-weed, is also expressive of its place of growth. Linn. Mant. 160. Schreb. 629. Willd. Sp. Pl. v. 4. 330. Mart. Mill. Diet. v. 3. Sm. Fl. Brit. 1511. Ait. Hort. Kew. ed. 1. v. 3. 335. Juss. 60. Lamarek Illustr. t. 758.—Class and order, *Monocotyledonæ*. Nat. Ord. *Plantaginæ*, Juss.

Gen. Ch. Male. Cal. Perianth of four leaves, erect. Cor. of one petal: tube the length of the calyx; limb four-cleft, erect, permanent. Stam. Filaments four, thread-shaped, very long, inserted into the receptacle; anthers heart-shaped.

Female on the same plant. Cal. none. Cor. of one petal, conical, permanent, its mouth unequally three-cleft. Pist. Germen oblong; style thread-shaped, very long; stigma acute. Peric. none, except the permanent corolla. Seed a nut of one cell.

Eff. Ch. Male. Calyx four-leaved. Corolla of one petal, four-cleft. Stamens very long.

Female. Calyx none. Corolla of one petal, unequally three-cleft. Style thread-like, very long. Nut of one cell.

1. *L. lacustris*. Plantain Shore-weed. Linn. Mant. 295. Sm. Fl. Brit. 1511. Engl. Bot. t. 468. (Plantago uniflora; Linn. Sp. Pl. 167. Fl. Dan. t. 170.)—A native of the shores of lakes in various parts of Europe, and of marshy sandy spots in Great Britain, but not very common. It flowers in June. Root perennial, spindle-shaped. Herb smooth, stemless. Leaves linear, entire, convex underneath. Male flowers on stalks, solitary, erect, whitish, resembling those of Plantain: female ones radical, sessile, having an erect, prominent, thread-shaped style.

The whole habit of this curious genus is that of a *Plantago*, from which however it is sufficiently distinct on account of its fruit being a single seed or nut. It was originally separated from that genus, by Bergius, in the Stockholm Transactions for 1768. The Rev. Mr. Williams of Shropshire has found this plant occasionally to vary with hairy leaves.

LITURGY, denotes all the ceremonies in general belonging to divine service.

The word comes from the Greek *λειτουργία*, service, public ministry, formed of *λαός*, public, and *εργον*, work.

In a more restrained signification, liturgy is used among the Romans to signify the mass; and among us the common-prayer.

All who have written on liturgies agree, that in the primitive days, divine service was extremely simple, only clogged with very few ceremonies, and consisting of but a small number of prayers; but, by degrees, they increased the number of external ceremonies, and added new prayers, to make the office look more awful and venerable to the people. At length things were carried to such a pitch, that regulation became necessary; and it was found proper to put the service, and the manner of performing it, into writing; and this was what they called a liturgy.

Liturgies have been different at different times, and in different countries. We have the liturgy of St. Chrysostom, that of St. Peter, of St. James, the liturgy of St. Basil, the Armenian liturgy, the liturgy of the Maronites, of the Coptæ, the Roman liturgy, the Gallican liturgy, the English

English liturgy, the Ambrosian liturgy, the Spanish and African liturgies, &c.

In the more early ages of the church, every bishop had a power to form a liturgy for his own diocese; and if he kept to the analogy of faith and doctrine, all circumstances were left to his own discretion. Afterwards the practice was for the whole province to follow the service of the metropolitan church, which also became the general rule of the church: and this Lindwood acknowledges to be the common law of the church; intimating, that the use of several services in the same province, which was the case in England, was not to be warranted but by long custom. Gibb. 259.

The liturgy of the church of England was composed in the year 1547, and established in the 2d year of king Edward VI. by stat. 2 & 3 Edw. VI. cap. 1.

In the fifth year of this king it was reviewed; because some things were contained in that liturgy, which shewed a compliance with the superstition of those times, and some exceptions were taken against it by some learned men at home, and by Calvin abroad. Martin Bucer was consulted, and some alterations were made in it, which consisted in adding the general confession and absolution, and the communion to begin with the ten commandments. The use of oil in confirmation, and extreme unction were left out, and also prayers for souls departed, and what tended to a belief of Christ's real presence in the eucharist. This liturgy, so reformed, was established by the act of 5 & 6 Edw. VI. cap. 1. However, it was abolished by queen Mary, who enacted that the service should stand as it was most commonly used in the last year of the reign of king Henry VIII. The liturgy of 5 & 6 Edw. VI. was re-established with some few alterations and additions, by 1 Eliz. cap. 2. All the bishops present dissented both in this and the former acts; and, therefore, the expression "lords spiritual" doth not occur in either of them. (Gibb. 268.) Some farther alterations were introduced, in consequence of the review of the Common Prayer Book, by order of king James, in the first year of his reign; particularly in the office of private baptism, in several rubrics and other passages, with the addition of five or six new prayers and thanksgivings, and all that part of the catechism which contains the doctrine of the sacraments. The book of Common Prayer, so altered, remained in force from the first year of king James to the fourteenth of Charles II. But the last review of the liturgy was in the year 1661, and the last act of uniformity enjoining the observance of it, is 13 & 14 Car. II. cap. 4. (*See Common Prayer.*) Many applications have been since made for a review, but hitherto without success. See Free and Candid Disquisitions relating to the Church of England, &c. 8vo. Lond. 1749.

We shall here subjoin some pertinent remarks on liturgies by archdeacon Paley, together with some additional reflections. Liturgies, or preconcerted forms of public devotion, being neither enjoined in scripture, nor forbidden, there can be no good reason for receiving or rejecting them, but that of expediency; which expediency is to be deduced from a comparison of the advantages and disadvantages attending this mode of worship with those which usually accompany extemporary prayer. The advantages of a liturgy are these: 1. That it prevents absurd, extravagant, or impious addresses to God, which, in an order of men so numerous as the sacerdotal, the folly and enthusiasm of many must always be in danger of producing, where the conduct of the public worship is entrusted, without restraint or assistance, to the discretion and abilities of the officiating minister. On the other hand, the advocate for free prayer might allege, that the cases to which the ingenious author refers are of the extreme kind, that are

not likely often to occur; that a minister who is capable of addressing a congregation acceptably and usefully, would not be in danger of offending in the manner here proposed, when he conducted their social devotion, more especially as he would conceive it to be his duty to make previous preparation for the one service as well as the other; that the mode of performing public worship must be left to the choice and approbation of those who concur in it; that the occasional perversion and abuse of a privilege cannot be justly pleaded against the use of it; and that if the evil were greater than it is, there is no method of avoiding it, but by the imposition of preconcerted liturgies, which would encroach on liberty in the province of religion. Established liturgies, it might be said, are not easily accommodated to the sentiments of the worshipper, who disbelieves the creed on which they are founded; and they must lead him to the avowal of principles, and to the use of language, which his judgment disapproves. If every officiating minister be allowed to adopt his own mode of conducting social worship, whether it be by extemporary prayer, or by forms, for each of which he has made previous preparation, he is not likely to give offence to those who are with him.

Our author farther observes, 2. That a liturgy prevents the confusion of extemporary prayer, in which the congregation being ignorant of each petition before they hear it, and having little or no time to join in it after they have heard it, are confounded by their attention to the minister, and to their own devotion. The devotion of the hearer is necessarily suspended, until a petition be concluded; and before he can assent to it, or properly adopt it, that is, before he can address the same request to God for himself, and from himself, his attention is called off to keep pace with what succeeds. But the advocate for free prayer will naturally enquire, if this be not the case, in a greater or less degree, in every continued service? If he has the words before him, which he uses in his devotion does he dwell on a single sentence as soon as the officiating minister utters it? Is not his attention drawn on to succeeding parts of the prayer that is pronounced, as soon as they are delivered? But in neither case is his mind kept long in a state of suspension; and he has this advantage, that whilst he is joining in exercises of devotion with the minister of his choice, he is not likely to hesitate in concurring with him. As to the novelty with which he expects to be gratified, this may probably be more likely to excite his attention and interest his heart, than a recurrence of sentiments and expressions that are familiar to him, and which long-continued use will prevent from interesting and fixing the (perhaps) wandering mind. *Joint prayer*, it is further said by the learned archdeacon, which, among all denominations of Christians, is the declared design of "coming together," is prayer in which all join; and not that which one alone, as the congregation conceives and delivers, and of which the rest are merely hearers. This objection, says our author, seems fundamental, and holds even where the minister's office is discharged with every possible advantage and accomplishment. But in the use of preconcerted and established liturgies, are not all besides the officiating minister hearers, unless they concur in those responses, which have been observed in many instances to produce confusion, and to render devotion a kind of mechanical business? The advocate for extemporary prayer will allege, that he is not less capable of joining in a worship, conducted by a minister who uses words, suggested at the moment, than in that which is performed by a recital of words previously written or printed. The objection to this mode of public worship, founded on the labouring recollection, and embarrassed or tumultuous d-

livery of many extempore speakers, evinces the necessity of talents for the discharge of this part of public duty, and of previous preparation; but does not prove that the adoption of a liturgy is either most expedient or most useful when extempore prayer is properly performed; and it is presumed, that persons who are accustomed to exercises of devotion will acquire a facility in the performance of them, which will, in a great degree, obviate the objection now stated, and prevent the pain that would be given to the serious part of a congregation, or the profane diversion which might be occasioned by the levity of the other part.

The advantages of a liturgy, our author candidly allows, are connected with two principal inconveniences; *first*, that forms of prayer composed in one age become unfit for another by the unavoidable change of language, circumstances and opinions; *secondly*, that the perpetual repetition of the same form of words produces weariness and inattentiveness in the congregation. Both these inconveniences, however, are in their nature vincible. Occasional revisions of a liturgy may obviate the first, and devotion will supply a remedy for the second; or, as our author thinks, they may both subsist in a considerable degree, and yet be outweighed by the objections which are inseparable from extempore prayer. Nevertheless, this is a concession, which will not be admitted by the advocates of the latter mode of worship; nor adverting to past experience, since the year 1061, will they lay much stress on occasional reviews of the liturgy.

How far the Lord's prayer is a precedent, as well as a pattern, for forms of prayer, is a question, concerning which writers, who have directed their attention to this subject, are not agreed.

Archdeacon Paley specifies the following properties as requisite in a public liturgy; *viz.* that it be compendious; that it express just conceptions of the divine attributes; that it rectify such wants as a congregation are likely to feel, and no other; and that it contain as few controverted propositions as possible. As to the first property, he observes, that it would be no difficult task to contract the liturgies of most churches into half their present compass; and yet retain every distinct petition, as well as the substance of every sentiment, which can be found in them. Although our author does not admit the propriety of studying brevity too much, he is of opinion, that the too great length of church services is unfavourable to piety. It begets in many an early and unconquerable dislike to the public worship of their country or communion. They come to church seldom; and enter the doors when they do come under the apprehension of a tedious attendance, which they prepare for at first, or soon after relieve, by composing themselves to a drowsy forgetfulness of the place and duty, or by sending abroad their thoughts in search of more amusing occupation. Although there may be some few of a disposition not to be wearied with religious exercises, yet, where a ritual is prolix, and the celebration of divine service long, no effect is in general to be looked for, but that indolence will find in it an excuse, and piety be disconcerted by impatience. It might further be observed, that the extent of our established liturgy does not leave time sufficient for public instruction; that the attention is fatigued before this part of our public service commences; and that excess in our public discourses, which admit of variety, is more excusable than the same fault in our devotional exercises, during which the attention ought to be kept alive, and the understanding and heart properly engaged. Our author remarks, that the length and repetitions complained of in our liturgy are not so much the fault of the compilers, as the effect of uniting

into one service, what was originally, but with very little regard to the convenience of the people, distributed into *three*. Accordingly we observe, with the authors of the "Free and candid Disquisitions," that the Lord's prayer in particular is enjoined to be publicly used every Lord's day in our ordinary service, when there is no communion, no less than seven times, *viz.* five times in the morning and twice in the afternoon: and when there is a communion, and also afternoon sermon or lecture, then nine times: and if the office of infant baptism (to say nothing of that of adults), and the other of churching of women, happen to come in, as they may and do sometimes, both morning and afternoon, then thirteen times. The "Gloria Patri" is introduced commonly, and most usually, seven or eight times; not unfrequently nine or ten; and may also occur eleven times, in the course of our morning service only. Notwithstanding that dread of innovation, in religion, which, says archdeacon Paley, seems to have become the *panic* of the age, few, as he supposes, would be displeased with such omissions, abridgments, or change in the arrangement, as the combination of separate services must necessarily require, even supposing each to have been faultless in itself. If, together with these alterations, the epistles and gospels, and collects which precede them, were composed and selected with more regard to unity of subject and design; and the psalms and lessons either left to the choice of the minister, or better accommodated to the capacity of the audience, and the edification of modern life; the church of England would be in possession of a liturgy, in which those who assent to her doctrines would have little to blame, and the dissatisfied must acknowledge many beauties. The style throughout is excellent; calm, without coldness; and, though every where sedate, oftentimes affecting. The pauses in the service are disposed at proper intervals; the transitions from one office of devotion to another, from confession to prayer, from prayer to thanksgiving, from thanksgiving to "hearing of the word," are contrived, like scenes in the drama, to supply the mind with a succession of diversified engagements. As much variety is introduced also in the form of praying as this kind of composition seems capable of admitting.

The *second* property of a liturgy, *viz.* that it should express just conceptions of the divine attributes, is an article deserving particular care. The popular notions of God are formed, in a great measure, from the accounts which the people receive of his nature and character in their religious assemblies. An error here becomes the error of multitudes: and as it is a subject in which almost every opinion leads the way to some practical consequence, the purity or depravation of public manners will be affected, among other causes, by the truth or corruption of the public forms of worship. The *third* requisite of a liturgy is that it rectify such wants as the congregation are likely to feel, and no other. It were therefore to be wished that every part of a liturgy were personally applicable to every individual in the congregation; and that nothing were introduced to interrupt the passion, or damp a flame which it is not easy to rekindle. Upon this principle, the *state-prayers* in our liturgy should be fewer and shorter. The *state-style* likewise seems unseasonably introduced into these prayers, as ill according with the annihilation of human greatness, of which every act that carries the mind to God presents the idea. It is required, *fourthly*, that a liturgy contain as few controverted propositions as possible. Why, says our author, should every position which a church maintains be woven with so much industry into her forms of public worship? Some are offended, and some are excluded; this is an evil in itself, at least to *them*: and

what advantage or satisfaction can be derived to the *myl* from the separation of their brethren, it is difficult to imagine: unless it were a duty to publish our system of polemic divinity, under the name of making confession of our faith every time we worship God; or a sin, to agree in religious exercises with those from whom we differ in some religious opinions: indeed, where one man thinks it his duty constantly to worship a being whom another cannot, with the assent of his conscience, permit himself to worship at all, there seems to be no place for comprehension, nor any expedient left but a quiet secession. All other differences may be compromised by silence. If sects and schisms be an evil, they are as much to be avoided by one side as the other. If sectaries are blamed for taking unnecessary offence, established churches are no less culpable for unnecessarily giving it: they are bound at least to produce a command, or a reason of equivalent utility, for shutting out any from their communion, by mixing with divine worship, doctrines which, whether true or false, are unconnected, in their nature, with devotion. Paley's *Principles of Moral and Political Philosophy*, vol. ii. chap. 5. See PRAYER.

Of all the forms which Christianity has taken in different parts of the world, of all the sects which refuse communion with regular establishments, music, or rather chanting, has been the language of devotion. It has been sarcastically asked, whence this impulse to *cry aloud* originated; was it from the thundering music of the fingers of Joshua round Jericho, the sweet strains of the harp of David, the pompous and proud clangor and vociferating of the myriads of musicians at the temple of Solomon, or the pious chant of the canticle which Jesus Christ and his apostles sung at the first institution of prayer, that we derive our choirs, hymns, psalms, and spiritual songs, which in every communion of Christians constitute, and always have constituted, a considerable part of the public worship regulated by liturgies? We have no doubt but that the primitive Christians, when their religion was founded on that of the Jews, (at least as far as the belief and worship of one God,) in opposition to Paganism and idolatry, sung the Psalms of David, which they had adopted, in imitation of the royal psalmist and his nation.

But there was no Pagan temple, or sacrifice at an altar, without music, and at present, even the savages of America honour their divinities with singing. Indeed songs, of which the subject and poetry correspond with the rites and ceremonies of the Pagans, constituted all their liturgies, to the exact celebration of which it is well known they were scrupulously attached. It is true that the Christians differ very much in their musical tastes. The Quakers have no liturgy: they wait till the spirit moves them to speak, and never sing; they only sigh and groan. Calvin stripped music of harmony and measure, and allowed of nothing but unisonous and syllabic singing in the conventicles, without the assistance of that *vox of whistles*, as the Scotch reformers used to style the organ. The modern methodists like light, airy, and familiar music so much better than solemn strains of supplication, that they admit ballad and barrel-organ tunes out of the street to be adapted to their hymns. The music *a cappella*, in the cathedral service of the Roman Catholics, and Protestants of the sixteenth and seventeenth centuries, seems the most solemn and revered species of music with which to address the divinity; at least it is the most grateful to cultivated ears. In parish churches, under the guidance of a powerful organ, or a judicious chanter, psalmody in parts, provided some respect were paid to accent, and distinction were made between long and short syllables, as in the 104th psalm and other melodies in triple-time, would

cease to be absurd and ridiculous to lovers of music, and rendered a gratification, instead of a torture, to cultivated ears.

LITVINTZOVA, in *Geography*, a town of Russia, in the government of Irkutsk; 36 miles S. of Ilimsk.

LITUS, in the *Materia Medica*, the same as *lithum*; which see.

LITUUS, among *Medicists*, the staff or wand twisted round at the top, used by the augurs, made in the form of a crozier, and the badge of the augurship.

We frequently see it on medals, along with other pontifical instruments. Aulus Gellius says, it was bigger in the place where it was crooked than elsewhere. In some coins of Nero the lituus appears at his breast; and from badly preserved coins has been taken by some medallist writers for a serpent.

LITUS, in *Natural History*, a name given to a genus of shells of the class of the polythalamii, or those which consist of several concavations or chambers, parted from one another by shelly diaphragms, and communicating with one another by means of a siphonculus, which runs through the whole length of the shell. To this general character of the class, it is to be added, that the litus is always a conic shell, running in a straight line from the mouth, through a great part of the length, and from the end of this straight part to the extremity, twisting into the shape of a cornu ammonis, or spiral shell of that kind.

It is thus named from its resembling the instrument called lituus among the ancients. The stony matter often found cast in this shell, and resembling all its lineaments, is called by authors *lituitis*, as those stones formed in the peccen, peccinites, and those in the echini marini echinitæ. See CONCHOLOGY.

LITUS, in *Roman Antiquity*. The Romans had a crooked military musical instrument called a *lituus*, in the form of the augural staff, whence it had its name. It was a species of clarion, or octave trumpet, made of metal, and extremely loud and shrill, used for the cavalry, as the straight trumpet was for the foot. Horace distinguishes it from the *tuba*, or trumpet.

"Multos castra juvant, et lituo tubæ
Permissus sonitus, ———— Od. i. 23.

as Claudian does from the flute:

"Tibia pro lituis, et pro clangore tubarum
Molle lyre, fustumque canant."

On our music plates are engraved a double lituus and a straight trumpet, from an ancient bas-relief in the Vitaleschi palace at Rome, representing a sacrifice: as is a genuine ancient metalline lituus, now in the possession of the right honourable sir Joseph Banks, K. B. and president of the Royal Society. It was found with many other antiquities, both Roman and Anglo-Saxon, in clearing the bed of the river Witham, near Tatterhall, in Lincolnshire, 1761, and is perhaps the only instrument of the kind that is now extant. It is a long narrow tube, with a swelling curve at the end, like the double lituus, but resembling still more an instrument sculptured on the base of Trajan's pillar at Rome. It is neatly made of very thin brass, with three joints or pieces, like German flutes, and has been well gilt. Its length is upwards of four feet, though the upper end has been evidently broken off.

An instrument of this kind, made of cast brass, was found in digging a well, near Battle in Sussex, and was then filled with small shells. We have an engraving of it in Grose's

Military Antiquities, vol. ii. A similar trumpet is engraved in Montfaucon's Roman Antiquities.

This instrument frequently appears on ancient medals as a symbol of war, and is terminated with the head of a boar, and sometimes with that of a snake, as on an ancient family medal of Albinnus, struck during the time of the republic, between the first Punic war and the reign of Augustus.

LITYEREA, the song of the reaper, in the *Ancient Music*. Theocritus, Apollodorus, Juvenal, Pollux, &c., and others, mention this song, and call it *Lityeris*, from *Lytus*, the natural son of Midas; a rude and ferocious prince, who obliged strangers to work with him in the fields at harvest-time, and those who were too feeble and unable to work, he put to death. Midas killed him in the life time of his father.

Julius Pollux says that this song was a funeral, and sang round the sheaves, to console Midas for the death of his son.

LITZENDORF, in *Geography*, a town of Bavaria, in the bishopric of Bamberg; 6 miles E.N.E. of Bamberg.

LIVADIA, a province of European Turkey, bounded on the N. by Thessaly, on the E. by the Archipelago, on the S. by the gulf of Lepanto, which separates it from the Morea, and the gulf of Egina, and on the W. by the Mediterranean; 180 miles long from N.W. to S.E., and about 35 miles in its medial breadth. This province comprehends what was properly called Greece (see *Greece, Fregia*); and the mountains, so much celebrated by the ancients, viz. Parnassus, Helicon, and Cythæron. The places that are now most noted in it are Lepanto, Livadia, and Athens.

LIVADIA is also a large, populous, commercial town, in the province of the same name, situated near the gulf of Lepanto, and built round a mountain terminating in a peak, and on which is a castle; 28 miles N. of Corinth. N. lat. $38^{\circ} 37'$. E. long. $23^{\circ} 54'$.

LIVADOSTA, a town of Livadia, on the E. extremity of the gulf of Lepanto; 20 miles S.E. of Livadia.

LIVAROT, a town of France, in the department of the Calvados, and chief place of a canton, in the district of Lisieux; 8 miles S.S.W. of Lisieux. The place contains 1210, and the canton 11,279 inhabitants, on a territory of 195 kilometres, in 20 communes.

LIUBIM, a town of Russia, in the government of Jaroslavl; 40 miles N.E. of Jaroslavl. N. lat. $58^{\circ} 55'$. E. long. $40^{\circ} 50'$.

LIUBITCH, a town of Russia, in the government of Tchernigov, on the Dniéper; 20 miles W. of Tchernigov. N. lat. $51^{\circ} 22'$. E. long. $25^{\circ} 44'$.

LIUDER, a town of Sweden, in the province of Smaland; 31 miles W. of Calmar.

LIVE CAVES, in *Mining*, a phrase used by many people to express such caverns in the earth as have but little communication with the external air, and are found to abound with mineral productions. The workers in the lead-mines on islands thus distinguish the numerous caverns in those places into the *live* or *quick* caves, and the *dead* caves; the latter are such as admit the air into them two or three ways, and are barren of any thing valuable; the others have only one passage, and that but narrow and winding, and generally lie at great depths. These abound in numerous elegant productions. They almost always contain ore in some form or other, and usually abound in elegant spar. Mr. Beaumont mentions one of these in the Philosophical Transactions, which lay at thirty-five fathoms perpendicular depth, in which there was found a fine liver-coloured earth, of the nature of bole arménia, which in many places shoot

up in a wonderful manner in a sort of spires of the height of three or four inches, formed with ridges and furrows, and usually covered with spar at the top; sometimes all the way down, to the bed of earth. Phil. Trans. N^o 129.

LIVE EVER, in *Botany*. See ORPINE.

LIVEN in *Idleness*. See VIOLET.

LIVE HEDGES, in *Rural Economy*, such as are constituted of living materials, such as white-thorn plants, &c. See TERN.

LIVE-STOCK, in *Agriculture*, is a term which signifies all that sort of animal flock which is raised or kept upon a farm, either for the purpose of use or profit. It comprehends all sorts of domestic animals, whether those of the cattle, horse, and swine kind; or those of the rabbit and poultry descriptions. In one of the reports of the state of agriculture, drawn up for the board, it is stated that this is a subject which "is, perhaps, the most important in the whole range of rural economies. The poorest and most backward nations contrive to raise bread for their consumption, equal to the demand; and to increase the quantity with the increase of their mouths. Their wheat, in the most miserable husbandry, is nearly equal, and much of it superior, to that of our highly cultivated fields; and we feel constantly in our markets the effect of their competition: but with all that concerns live-stock the case is abundantly different; it is by great exertions only that a people can be well supplied, and for want of such exertions, many nations are forced to content themselves with such meat as others would not touch. Look at a sample of French and Swiss wheat, no difference is found; but examine the cows of Switzerland and Lorraine, what a difference! Compare the mares of Flanders with the ponies of Bretagne, the sheep of England and of France: nay, let us come nearer home, and reflect on the wool in competition; examine the fleeces of Segovia and of Italy, in the same parallel of latitude." And it is added that, "next to the cultivation of waste lands (which by the way much depends on the well ordering of live-stock), this, it is conceived, is the greatest desideratum in the agriculture of Britain."

And it has been remarked by the author of "Practical Agriculture," that there is scarcely any branch of husbandry that is of more consequence to the farmer, or which, of late, has been more attended to and improved. He supposes, indeed, that it might easily be imagined that, as the means of supporting domestic animals become more perfectly known, and more extensively provided, great and beneficial changes would take place in the nature, form, and other properties of the animals that were to be kept for the purposes of the farmer, and consequently advantages to be derived both in the amelioration of the land and the improvement of the live-stock, which it supported. It is also conceived, that the greatly increased demand for this sort of flock, either for the purposes of food or labour, may have likewise had much effect in promoting and forwarding their improvement; but that, though much has lately been accomplished in this department of rural economy, much still remains to be done, which may in some measure be effected by the judicious combination of proper improved breeds of animals of different kinds, with the various improvements in the cultivation and management of herbage or other sorts of green food by which they are to be supported.

Mr. Middleton likewise contends that, where it is intended "to attempt any considerable improvement in the nature of the live-stock of a farm, care should be previously taken that there is a sufficient degree of shelter, shade, and warmth, as well as a high degree of fertility of the land, and a suitable

able state of drainage, as it is only by the richness and abundance of food that such changes can be effected in the most advantageous way, or the flock be brought to any high degree of perfection." The circumstances which are to be more particularly considered, in undertaking improvements in the nature of live-stock, especially in what relates to themselves, are those of the shape, the size, the disposition, the hardiness, the arriving quickly at maturity, the peculiar nature of the flesh, the property of fattening with expedition, the affording milk in sufficient plenty, the quality of the hide, the fitness for performing labour, and the particular quality or nature of the breed, of whatever sort of animal it may be. All of which are particularly considered in explaining the nature and methods of management that are the most proper to be adopted in breeding, rearing, and bringing to perfection different sorts of animals of the domestic kind for the uses of the farmer. See BREEDING.

In respect to the introduction of all sorts of live-stock upon a farm, the cultivator should constantly and carefully consider the nature and extent of his keep, or the means which he has of providing them with proper supplies of proper kind of food, as on this, the size and other properties of the animals must in a great measure depend. The idea of good keep is constantly necessary to be kept in view, as without it, little can be effected in this part of husbandry. It has been forcibly remarked by the writer of the Staffordshire Agricultural Report; that "all good stock must be both bred with attention and well fed; and that it is necessary, that these two essentials in this species of improvement should always accompany each other; for without good resources for keeping it would be in vain to attempt supporting a capital flock, and with such resources, it would be absurd not to aim at a breed somewhat decent in quality." This sort of improvement must, however, be much regulated by the circumstances of the farmer, and be often only gradually effected on account of the want of money for the purpose of making a more full change in the flock of the farm.

In the Agricultural Report for Perth, it is stated, that, "there is one circumstance, relative to the introduction of all new breeds, which must not be passed over in silence, because no farmer can neglect it without a certain loss. Every kind of pasture is fitted to raise animals to a particular size. When beasts of a larger size are brought in, than the quality of the food is calculated to support, these animals, whether cows, or horses, or sheep, or any other kind, will degenerate apace, and never prove useful, until they come down to that standard or size adapted to their situation and suited to their food." And that, "on the other hand, when a smaller breed than ordinary is brought in, they continue to increase in bulk, until they come up to the pitch which is suited to their nourishment. But there is this remarkable difference betwixt these two progressions, in respect to profit, that in the retrograde progress, when animals are brought from rich pasture and a comfortable situation to the reverse, they are in every instance worse than the indigenous breed; whereas the animals, which are brought from worse to better, continue to improve, till they arrive at that perfection, which the change in their situation is calculated to produce. These changes may not immediately have their full effect; but in a few years they certainly and evidently will. He makes, for this reason, a much safer experiment, who brings cattle from worse to better, than he who brings them from better to worse. This reasoning applies to all plants, as well as animals. Highland cattle rise to a great size, not only by the keeping in South Britain, but in rich pastures at home." And

he adds, that it is "in vain to attempt to improve a breed of animals beyond the circumstances of the country as to climate and pasture; while, at the same time, it is no easy matter to discern, without proper trials, how far these circumstances can support a better flock. There is great room, he supposes, for the ingenious to exercise their judgment in improving the breeds of different animals. One species has evidently degenerated in this country, by a change in their situation to the worse. The red or forest-deer is but a puny animal in comparison of those of former times. This will be apparent to any person, who compares the horns of a deer that is killed at present to those of the same species, which are in different places dug out of the mosses. The cause is obvious." It is therefore conceived, that "the improvement of the soil ought to go hand in hand with the introduction of a larger breed of cattle; and a large breed ought, for the same reason, to be introduced, in that degree, in which the style of agriculture is improved."

In support of this, Mr. Middleton, in the Agricultural Report of Middlesex states, that "the richest grazing land, and the most nourishing artificial food, will certainly pay more in feeding large bullocks, sheep, and swine, than it would do in feeding the smaller sizes of the same species," and that "it is equally obvious that the smaller breeds will answer better on the poor pasture than the large."

Further, the particular qualities which the farmer has in contemplation, is likewise a point which must be attended to in fixing upon breeds of domestic animals for particular farms. Considering the various breeds of domestic animals, as the machines by which the farmer is enabled to send his herbage and other sorts of food to market, Mr. Donaldson thinks he ought, by the study of every proper mean, to advance their improvement, in respect to form as well as the disposition to fatten, that the produce of his farm may be disposed of in the most advantageous manner; and that besides the benefit he would derive individually, from their being thus rendered less tedious in the process of fattening, and less productive of offal, the community would gain vast advantage in the great increase of animal food.

As soon as proper sorts of live-stock have been introduced according to the particular circumstances of the land, the farmer should be extremely careful in the management of them, whether they be of the cattle, sheep, or other kinds, in the providing them with due and full supplies of food, whether in the changes of pasture during the summer season, or in that of other sorts in the winter, so as to keep them constantly in a proper thriving condition; in affording them suitable degrees of shelter and warmth, and in having them properly littered down, when confined to the yards or stalls; and under all circumstances well supplied with good water; as all these have much effect in promoting the improvement of the stock, and, of course, that of the advantage of the farmer: different methods are pursued in different districts, with this view, in animals of different kinds, which will be particularly noticed under the heads to which they belong. See CATTLE, SHEEP, HORSE, SWINE, &c.

In many parts of the island, great advances have been made to a more perfect state in the nature of different sorts of live-stock, by selecting and employing the best and most perfectly formed animals, both male and female, but especially the former, as stock to breed from; and in the midland, as well as some other counties, vast advantage has been gained in the same view, by the practice of the large and more opulent breeders and graziers letting their superior male stock of different kinds of animals; and it would probably still further promote this material object, if the more extensive proprietors

proprietors of lands were attentive to the circumstance, by either providing such male flock themselves, or enabling their tenants effectually to do it, where their situations render it impossible. By some well concerted plan of this nature, a great and general change, fous to render the different sorts of domestic animals much more perfect than they are at present, as well as better adapted to their situations, might be effected. But without some sort of aid of this kind it does not seem probable, from the great expence attending the business, that any general improvement of them can take place, though it may be carried to a considerable extent in particular cases and circumstances.

LIVENSK, in *Geography*, a town of Russia, in the government of Voronez; 36 miles W.S.W. of Voronez. N. lat. 51° S. E. long. 38° 14'.

LIVER, in *Anatomy* and *Physiology*, is the largest gland in the body, and performs the secretion of the bile. That fluid is conveyed from the liver by its excretory duct, called the hepatic; which sometimes transmits it to the duodenum, and sometimes, through a second tube called the cystic duct, into the membranous bag connected to the liver, and named the gall-bladder. The anatomical description of these organs, and the explanation of their functions are, the objects of this article.

The liver is a single organ, like the others of the organic life, not symmetrical in its figure, yet tolerably constant in its peculiar shape; occupying the upper part of the cavity of the abdomen, where it is placed obliquely from right to left, the thickest portion filling up the right hypochondrium, or space included by the false ribs of the right side, and the thinner part extending across the middle of the body in the epigastric region to the left hypochondrium. It is more deeply covered by the ribs in the male than in the female sex. In general it is smaller in proportion as the individual is more healthy: it generally becomes enlarged in size when diseased.

It is situated immediately under the diaphragm, of which the tendon intervenes between it and the pericardium; and above the stomach, arch of the colon, duodenum, little omentum, gall bladder, and right kidney. Behind, it lies against the vertebral column, the crura of the diaphragm, the œsophagus, the aorta and the inferior vena cava: and it is bounded in front by the cartilaginous edge of the chest. The right false ribs are on its right, and the spleen on its left.

The pressure of the surrounding organs just enumerated, the connection which the inferior vena cava has to it, but more particularly certain folds of peritoneum, called its ligaments, retain it in its situation, leaving it however a considerable power of changing its relative position. Anatomists enumerate four or five ligaments, all of which connect the liver to the surface of the diaphragm; but they seem to be merely so many parts of one and the same production. From the middle of the diaphragm, beginning at the apex of the ensiform cartilage, and extending backwards with a little obliquity to the right, and from the aponeurosis of the transversus abdominis, almost as low as the navel, a fold of peritoneum, consisting of two laminae, a right and left, passes to the convex surface of the liver, and is attached to it from the fossa umbilicalis to the notch that receives the vena cava. This, which is called the ligamentum latum, or suspensorium hepatis, is narrow below and in front, grows broader in the middle, where it arrives at the diaphragm, and then becomes again very narrow behind: it possesses in fact a falciform shape, the convex margin being turned upwards, the concave downwards, and the apex backwards. The front and lower edge of the ligament is

thick and rounded, and contains the remains of the umbilical vein of the fetus, surrounded by more or less fat; this part, which is implanted in the front notch of the liver, is called the ligamentum teres hepatis. The two sides of the ligament consist of broad and smooth surfaces; of which one is turned forwards and in contact with the parietes of the abdomen below, and the diaphragm above; the other, turned backwards, lies against the liver above and the abdominal viscera below. Besides the umbilical vein, the two layers of this ligament include several lymphatic trunks proceeding from the liver to the chest. Its laminae are continuous on one side with the peritoneum lining the abdominal cavity, and on the other with the external peritoneal covering of the liver. Its functions seem rather connected with the transmission of the umbilical vein, than with any confinement of the liver to a particular situation: for all the broad anterior portion is so loose, that it does not at all limit the motions of the organ: where it is narrower, it may perform this office. It will confine the liver principally in its lateral motions. It is said to have been sometimes deficient; but the observation appears doubtful.

The two laminae composing the broad ligament separate from each other towards the posterior part of the organ, and, as they proceed towards the right and left sides, take the names of right and left or lateral ligaments of the liver. These connect the respective lobes to the diaphragm; they have a triangular form; one side is loose, one connected to the liver, and the third to the diaphragm. They consist, like the broad ligament, of two layers of peritoneum, including a small quantity of cellular substance, and some lymphatic vessels. The left is commonly rather larger than the right.

The coronary ligament of the liver is a broad adhesion between the posterior part of the organ and the surface of the diaphragm: the two parts are united by a close cellular tissue through a surface of considerable extent. The boundaries of this union are formed by a very short reflexion of peritoneum, by the broad ligament in front, and by the lateral ligaments at the sides. The nature of the connection between the liver and diaphragm, will be best understood by observing the surface of the former after it has been removed from its situation. We then see the two laminae of the broad ligament separating from each other behind, and departing towards each side to form the lateral ligaments, which are also connected in a straight line along the back edge of the liver. The broad space, included between all these parts, and forming a surface of adhesion between the liver and diaphragm, is the coronary ligament. This connection acts very powerfully in maintaining the organ in its proper position, and preventing it from moving loosely in the abdomen.

We should also enumerate, among the connections of the liver, a portion of peritoneum passing from it to the right kidney; and the little omentum which joins it to the stomach. (See *EPITOMON*.) It must be remembered, that the connections just enumerated do not support the weight of the liver in the living subject, as they appear to do after death, when the abdomen has been laid open. In that case the liver sinks downwards from the diaphragm, becomes separated from it by a considerable interval, and is supported in a great measure by the broad ligament. During life the surrounding organs maintain the liver in its place, and these are all supported and held in their respective situations by the action of the respiratory muscles. Hence the organ is liable to changes of position according as these parts are moved, and it may be very variously affected in this way, as there are so many organs in contact with it. Whenever the diaphragm

diaphragm descends, the liver is carried downwards; and it moves in the contrary direction again when this muscle passes towards the chest. In the latter state, the thin edge of the liver is completely covered by the margin of the chest; hence, when we wish to press on the liver, we direct the patient to inspire strongly, that its edge may be thrust below the ribs. Effusion into the chest drives downwards both the diaphragm and liver: dropsy, pregnancy, or any other swellings in the abdomen, push them up towards the chest. When the stomach and intestines are empty, the liver descends: in the opposite state of these parts it is pushed upwards: hence the descent of the diaphragm is performed less easily after a full meal. In any erect posture of the trunk, the liver descends about two finger's breadths, and is higher in about the same proportion in the recumbent posture. When we lie on the right side, the liver is supported in the concavity of the corresponding false ribs, and presses on none of the surrounding organs; hence we commonly sleep in that attitude. In lying on the other side, the weight of the liver comes upon the stomach, which produces unpleasant feelings after a meal. Besides these changes of position, which may happen generally in any subjects, there are others of a more peculiar and individual nature, arising from different size of the organ, greater or less concavity of the diaphragm, &c. However the position may be altered, the relations to surrounding parts are the same.

The volume of the organ varies according to age, regimen, and disease. The former varieties will be considered in speaking of its development. In general, it is the largest and heaviest viscus in the abdomen. It has been observed to be largest in those who lead an inactive life, and who indulge in the pleasures of the table: the ancient epicures used to produce an inordinate growth of the liver in geese by particular diet and management. But the most remarkable variations in the size of the liver are those which occur in chronic diseases: sometimes it is diminished and very manifestly indurated; much more frequently it is enlarged, sometimes so much as to weigh ten or twelve or even more pounds. When it increases in this way, it usually takes up a proportionally greater room in the abdomen. Byer, however, saw it weighing eleven pounds, without having passed beyond the edge of the chest: it had driven the diaphragm upwards, almost to the first rib, and had reduced the right lung to a very small volume. The subject was exceedingly fat. (*Traité d'Anatomie*, tom. iv. p. 393.) The ordinary weight of the liver in a healthy adult is about three pounds: Sæmmering says it may vary from two to five pounds. Its specific gravity is to that of water as 15.03 to 10000.

The colour is a brownish-red, often inclining towards yellow. It is influenced very considerably by the quantity of blood in the vessels, and consequently is different in different modes of death. The organ is very pale in death from hemorrhage, and of a deep colour in cases where its venous system is much dilated. Its derivations from the brown-red, which constitutes the proper liver colour, are generally into lighter and particularly yellow tints. The edges and inferior surface are often quite livid. The colour on the whole is clearer the younger the individual.

The figure of the liver is so irregular, that it is not easy to describe it with clearness: we may state generally that it is thick towards the right and back part, thin towards the left and front, flattened from above downwards, and elongated rather obliquely from the right and below, towards the left and upwards. We distinguish in it a superior and inferior surface, an anterior and a posterior edge, a right and a left extremity.

The superior or convex surface, is convex, and adapted every where to the hollow of the diaphragm, to which it is contiguous throughout, except at the back part, in the situation of the coronary ligament, where it adheres firmly to the organ. The convexity is much greater behind and towards the right, than in front and on the left. Its particular direction is such, that on the left it is turned upwards and rather forwards; in the middle upwards and rather more forwards; and on the right, backwards, upwards and outwards. It is divided into two parts, called lobes, by the broad ligament; the right division, which is very much the largest, forms the right or great lobe; and the left the left or small lobe.

The inferior or concave surface is a little inclined backwards, rather less extensive than the preceding, and slightly and unequally concave. It exhibits eminences and depressions, arising apparently from the relations of the organ to the surrounding parts, and deep notches giving passage to blood-vessels, which, as in all important viscera, are formed in the most concealed situation about the organ. The following are the objects which this surface presents in succession from left to right. In their figure and arrangement they are subject to such numerous varieties, that hardly any two livers agree together in this respect.

1. A broad superficial depression corresponding to the superior surface of the stomach, and belonging to the left lobe.

2. The horizontal fissure or longitudinal groove (*fossa umbilicalis* or *longitudinalis*, or *sinistra*) divides all the inferior surface from before backwards; from the anterior edge to the left side of the passage of the inferior vena cava, and thus marks the separation of the right and left lobes on their surface. The sides are sometimes partially united by a small portion of liver, so as to form a canal. Its anterior part lodges the umbilical vein, and the posterior narrower portion (*fossa ductum venosi*) contains the *canalis venosus*, which, like that vein, is changed in the adult into a kind of ligament.

3. The great transverse fissure (*fossa transversa*, or *vena portarum*,) is placed nearer to the posterior than to the anterior edge, and runs from right to left in the direction of the great diameter of the inferior surface, of which it occupies about the middle third portion. It intersects the horizontal fissure at right angles. Its depth is considerable, particularly in the middle, and it is never covered by these transverse bridge-like portions, which have been mentioned in the former fissure. It is occupied by the trunk and first division of the *vena portarum*, by the primary ramifications of the hepatic artery, and by the biliary tubes, which unite at their departure from the liver into a single duct. The lymphatics and nerves of the liver are seen also in this situation. These parts are all united by a tolerably close cellular tissue.

4. Two eminences, sometimes called *portæ*, of which one is placed before and the other behind the middle of the great transverse fissure. The former (*lobulus quadratus* or *anonymus*) is broad and slightly elevated, resembles a more or less regular parallelogram, and varies in size, according as the gall-bladder and transverse fissure, which bound it, are more or less approximated. It extends even to the front edge, and separates the anterior half of the horizontal fissure from the gall-bladder. The other eminence has been called the small lobe of the liver, (*lobulus Spigelii* or *papillatus*.) It is sometimes triangular and sometimes quadrilateral in its figure. It is more prominent than the preceding, and placed at the posterior edge of the liver, under the trunk of the *vena portarum*. It is single in this situation, and rests on the ver-

tebra,

between the vena cava and œsophagus; thence it ascends towards the front on the inferior surface of the liver, and is immediately divided into two other small eminences. One of these is superior and posterior (lobulus caudatus), connects the small lobe to the rest of the liver, and passes obliquely towards the right, separating the vena portarum from the vena cava. It then becomes broader, and forms a short superficial groove, continuous with the right extremity of the transverse fissure, and on which the vena portarum rests as it enters that fissure. The other eminence is more considerable, and forms a kind of obtuse papilla directed forwards and downwards: this is the part properly called lobulus Spigelii. Separated from the rest of the liver in front by the transverse fissure, behind by the vena cava, on the left by the horizontal fissure, and the canalis venosus contained in it, on the right by the vena portarum before its entrance into the transverse fissure, this eminence appears to be connected to the organ only by the kind of rib just described, and which passes under the right lobes, between the vena cava and vena portarum. But behind it is farther connected by a small elongation, formed sometimes by the substance of the liver, sometimes by a fold of peritonæum, which serves to complete a very short canal traversed by the vena cava. This lobulus Spigelii is placed between the two orifices of the stomach: it corresponds below to the pancreas, above to the right and left lobes: in front of it is the falciform omentum.

5. In the right lobe, in the front of the right extremity of the transverse fissure, and on the right of the lobulus quadratus, appears the excavation that lodges the gall-bladder. This is of an oval figure, superficial, more or less distant from the longitudinal fissure, not covered by peritonæum, and lined only by the proper membrane of the liver, and by cellular tissue, which connects it strongly to the gall-bladder.

6. Two still more superficial excavations are found quite to the right. The anterior corresponds to the hepatic flexure of the colon, and the posterior to the right kidney and renal capsule.

The anterior or thin edge of the liver is thin, and inclined downwards. In the natural situation of the organ it corresponds nearly to the level of the basis of the chest, being sometimes a little above, but seldom below it. Its direction may be easily conceived from the general description we have given of the organ. It is turned almost directly downwards on the right, and becomes more directly anterior towards the left. A notch is always seen in it towards the left, and forms the commencement of the horizontal fissure: to the right of this there is a broader superficial excavation accommodated to the fundus of the gall-bladder.

The posterior or thick margin is inclined upwards, not so long as the anterior, very thick on the right, and grows gradually thinner towards the left. Its middle is closely connected to the diaphragm by the coronary ligament; and the extremities are more loosely attached to the same organ by the lateral ligaments. Two excavations may be observed on this edge: a very deep and narrow one at the posterior edge of the horizontal fissure, between the great lobe and the lobulus Spigelii, for the passage of the inferior vena cava; in this the orifices of the hepatic veins are seen. It is very slightly oblique from the left and below to the right and upwards, and covers about three-fourth of the circumference of the vein, sometimes indeed the whole of it, forming a complete canal in the substance of the liver. The second hollow, much broader and more superficial, formed in the left lobe, corresponds to the vertebral column, the aorta, and œsophagus.

The right extremity of the liver is situated much lower than the left, and is the most bulky part of the organ. The left is very thin, extends more or less into the left hypochondrium, reaching above the spleen in some subjects.

Organization of the liver.—This is very complicated; besides its peculiar tissue or parenchyma, the nature of which is perhaps more obscure than that of other glands, it receives a larger number of vessels. The greater part of the blood, brought from the placenta to the fœtus by the umbilical vein, circulates through this organ; in the adult we find only some impervious traces of this vessel. A peculiar venous system, that of the vena portarum, is at all ages entirely distributed in the liver. To these two orders of vessels, which are not found in other situations, we must add the ramifications of the hepatic artery and veins, the nerves, which are small for the organ, the lymphatic vessels, the excretory tubes, and the peculiar tissue inclosed by a double membrane; all of which must be separately considered.

Of the umbilical venous system, which is so remarkable in the fœtus, nothing more can be discerned in the adult than the fibrous remains of the umbilical vein and canalis venosus in the horizontal fissure of the liver.

The general arrangement and the organization of the vena portarum are described in the article HEART, under the head of *Arterial System of the Blood*. We have to add here only a few details belonging to their description.

1. A number of veins varying from three or four to seven or eight, of considerable size, come out of the spleen, and run tortuously in the field of peritonæum, which fixes that organ to the stomach. After a short course, in which they receive branches from the latter, they unite near the pancreas into a single trunk, called the splenic vein.

2. The pancreas produces a considerable number of small irregular branches, joining indifferently either of the principal trunks of the vena portarum, but more particularly the splenic vein.

3. Five orders of venous branches come from the stomach, and end either in the trunk or in the large branches, which make up the vena portarum.

1. Several go from the great extremity to the constituent branches, or to the trunk of the splenic vein. 2. The pyloric vein, belonging to the small curvature, opens into the trunk of the vena portarum. 3. The superior gastric or coronary stomachic vein, following the artery of the same name, joins the splenic trunk.

4. 5. The right and left inferior gastric veins run along the great curvature, and join respectively the trunk of the vena portarum, and the splenic vein.

3. The duodenal veins join either the right inferior gastric, the superior mesenteric, or vena portarum.

5. The veins of the small intestine anastomose, like the arteries, and form a most extensive net-work between the two laminae of the mesentery. The communications become fewer and the trunks larger, in proportion as they are more distant from the intestine: they form at last 15 or 20 veins, which join successively the large trunk of the superior mesenteric vein accompanying the artery of the same name.

6. The veins of the cæcum, right portion of the colon, and right side of the arch, follow the course of the arteries, and end, under the names of ileo-cæcal, right colic, and middle colic, in the trunk of the superior mesenteric.

7. The veins, which return the blood from the left side of the arch of the colon, from the descending colon, the sigmoid flexure and rectum, form as many principal branches as there are chief divisions of the inferior mesenteric artery: a large trunk, accompanying that artery, is formed by their union,

union, and is called the inferior mesenteric vein. From the rectum, of which the veins are often called the hæmorrhoidal, the inferior mesenteric trunk ascends parallel to the intestine, goes behind the transverse mesocolon, and terminates behind the pancreas, at a right angle, in the splenic vein. This vein is very small at its origin, where it anastomoses with those of the hypogastric plexus: it grows larger as it ascends, and is nearly equal in diameter to the superior mesenteric vein at its termination.

Thus we observe, that there are two principal trunks forming the vena portarum, and receiving nearly all the veins of the organs, from which this peculiar venous system derives its origin; these are the superior mesenteric and the splenic; some branches, however, directly join the trunk. The splenic, formed in the manner already specified, is not tortuous like the artery, runs in company with, but below it, along the upper edge of the pancreas, in an horizontal direction from left to right. In front of the vertebral column it ends, at nearly a right angle, in the vena portarum. In this course it receives veins from the great end of the stomach, the left inferior gastric vein, the inferior mesenteric, the superior gastric, and several pancreatic veins. The superior mesenteric vein, in the greatest part of its course, accompanies the artery of the same name, being placed to the right, and a little in front of it. It arises where the artery ends, that is, near the cæcum and the right side of the colon; it ascends, following the same course with the artery, between the two layers of the mesentery, and becomes larger as it receives new branches. At the posterior edge of the mesocolon it goes behind the pancreas, and joins at a somewhat obtuse angle the splenic vein, to form the trunk of the vena portarum, or the ventral or abdominal vena p., as it is sometimes called, to distinguish it from that end which ramifies in the liver, and which is called the hepatic vena p. In this situation it is more than an inch distant from the end of the inferior mesenteric vein. It receives, on the concave side of its curve, the three veins from the right portion of the large intestine; on the convex or left side the numerous veins of the small intestine. Several duodenal and pancreatic veins join it where it passes between the duodenum and pancreas.

The trunk of the vena portarum, the diameter of which is much less than the united diameters of the two preceding veins, goes obliquely upwards to the right, and a little backwards, and passes through a space of about four or five inches in the adult, from the vertebral column to the great transverse fissure of the liver. At first it is situated behind the right extremity of the pancreas, and the second portion of the duodenum; it then forms a part of the fasciculus of biliary vessels contained in the capsula Glissoni (see EPIPLOON), where the biliary ducts and the hepatic artery cover it in front. Like the last mentioned parts, it is surrounded by numerous nerves, lymphatic vessels and glands; and these organs are all connected by a tolerably dense and copious cellular tissue. When the trunk has arrived at the notch of the liver, it is bifurcated, and each branch forms with it nearly a right angle; so that the two taken together represent a horizontal canal lying in the notch of the liver, connected closely on each side to the corresponding divisions of the hepatic artery, and having the trunk of the vena portarum opening perpendicularly into its middle. This canal, sometimes called by anatomists the sinus of the vena portarum, does not immediately touch the substance of the liver; a thick layer of dense cellular tissue separates it, and is continuous with the general external covering of the divisions of the vein in the organ. The right branch, shorter, but much larger than the left,

enters the great lobe by the corresponding extremity of the transverse notch, and divides into an uncertain number of branches. The other passes horizontally towards the left, as far as the notch containing the umbilical vein, of which the remaining fibrous cord is firmly attached to it, and splits into branches distributed through the left lobe. The primary and secondary divisions generally pursue a horizontal course; they then divide into an infinite number of ramifications, the distribution of which we cannot regularly follow, and which end at last in a capillary system extending throughout the substance of the organ. Each of the ramifications, which we can easily trace in the liver, is accompanied by a branch of the hepatic artery, by one or more biliary ducts, some nervous filaments, and lymphatic vessels. These parts are connected and surrounded by a fine layer of cellular tissue, which adheres closely to the substance of the liver, and is often described by the name of capsule of Glisson; it seems to insulate the parts which it surrounds, as it separates them from the proper tissue of the liver. It has no connection with the peritoneum, and the suppositions of its muscularity and its propelling the blood by that power are supported by no proofs whatever. Boyer regards it as a prolongation of the proper membrane of the liver, which, he says, is reflected over all the vessels that enter or quit the organ. As the parts contained in these capsules are connected to each other by loose cellular tissue, which enters the liver with them, the orifices of the vena portarum, on a section of the organ, have a loose plaited appearance, distinguishing them from those of the hepatic veins, which, as they are intimately connected to the proper tissue of the liver, preserve their circular area, and present a much cleaner cut.

The hepatic artery is a branch of the celiac trunk, and has been described in the article ARTERY. Its branches enter at the great notch, and every where accompany the ramifications of the vena portarum.

The description of the hepatic veins is given in the article VEIN. We have to notice here only the circumstances that deserve attention, concerning their distribution in the liver. They return, to the general venous system, the blood which is brought into the liver both by the hepatic artery and the vena portarum. They arise, therefore, out of the capillary system, in which the two orders of vessels, just named, terminate. They unite successively into larger and larger branches, which form ultimately three principal and some smaller trunks, opening into the inferior vena cava, just under the diaphragm. This proximity to the heart accounts for their being so often distended with blood in the dead body. Besides the direction, in which the blood passes through them, the hepatic veins are distinguished by two principal circumstances. Their sides are rather thinner than those of the vena portarum; and they have no trace of the cellular covering, described above, as belonging to the ramifications of the latter vessel, but adhere immediately to the tissue of the liver, so as to present a perfectly circular area on a section.

The nerves, which are small in comparison to the bulk of the organ, come chiefly from the plexus of celiac ganglia; but several filaments from the eighth pair join these. See NERVE.

The lymphatic vessels of the liver are very numerous, inasmuch that no other organ seems to be more abundantly supplied with them. They are distinguished into two orders, the superficial and the deeper seated. The former cover the whole external surface, and are easily distinguished by the contrast of their colour with that of the tissue of the liver. The latter, arising in the substance of the organ, follow the

the ramifications of the vena portarum and the hepatic artery. They communicate frequently together, and end by numerous trunks in the thoracic duct, after passing through different glands.

The biliary ducts arise in all parts of the liver by capillary extremities, which are too minute for our most delicate means of research. They unite together, in the manner of veins, into larger and larger trunks, which at last end in producing two or three principal ones, quitting the liver at the transverse notch, and then united into a single tube, of about a line and a half in diameter, called the hepatic duct.

All the branches of the hepatic duct in the liver, accompany the divisions of the vena portarum, and are inclosed with them in the cellular covering already described. They are easily distinguished, on a section, by the yellow tint which they acquire from the transudation of the bile, and the orifices are then called *pori biliarii*. Indeed, we may easily distinguish, on a cut piece of liver, all the vessels belonging to it. The yellow colour and greater thickness mark the biliary tubes; the coats of the arteries are not quite so thick, and not coloured; the branches of the vena portarum are next in order of thickness, and are remarkable for their cellular covering; the hepatic veins are the thinnest.

Whether the capillary beginnings of the biliary ducts come from the acini of the liver, and concur with the capillary blood-vessels in forming those acini, is a point which we really cannot determine.

Of the peculiar tissue or parenchyma of the liver.—The substance of the organ is next, in point of density, to that of the kidney; yet it yields with tolerable facility to the pressure of the finger.

When we cut into its substance, we observe the colour distinguished from that of the exterior by a slight yellowish tint. It is porous from the great number of vessels distributed through it, and several yellow points are distinguished, which are the small biliary tubes. The different orders of vessels may be recognized by the characters already explained; the veins contain more or less blood, which may be easily squeezed out. The cut surface is smooth, and made up of small points alternately of a reddish-brown and an obscure yellow. The substance of the organ may be easily torn; the surface is then unequal and granular, composed indeed entirely of small granular bodies with every variety of figure, about the size of millet seeds, of an obscure red colour, and soft consistence. These are the acini of anatomists, and are united together, as well as all the vessels that ramify in the organ, by a fine cellular tissue. Long controversies have existed concerning their nature; but we have nothing to add on this subject to what we have stated in the article *Gland*.

In fact, we are entirely ignorant of the nature of these small bodies, which compose the proper tissue of the liver, and we know no more concerning its minute organization than about that of other parts. We see blood-vessels both of the arterial and venous kind, a peculiar order of veins not found in other organs, lymphatics, excretory tubes, nerves, small soft and reddish granular bodies, cellular tissue to connect all these together, and common coverings to insulate the organ; such is the account of our knowledge concerning the organization of this part. Chemistry does not disclose to us any thing more satisfactory; we know that it is the slowest of all parenchymatous organs in putrefaction, after the kidney; that it loses much of its weight, and acquires something of a fatty nature by drying; that it is softened by ebullition; dissolved in sulphuric acid, which it tinges of a deep violet colour; and rendered coriaceous and greyish in

nitrous acid. But these facts do not much illustrate its organization. We find, lastly, that disease produces in its structure changes as numerous as they are difficult of explanation.

The liver is covered by two membranes, a serous and a cellular one, which are very differently arranged.

The external is formed of peritoneum, and covers the whole surface, except the posterior edge, in the situation of the coronary ligament, the excavation for the inferior vena cava, that for the gall-bladder, and the two fissures of the inferior surface. It resembles the peritoneum in general; is smooth and polished on the external surface, and connected very closely by the internal to the proper membrane of the liver, except in the situations already specified.

The other membrane, called by Soemmerring *membrana cellulosa hepatis*, has been most minutely described by the French anatomist, who assign the discovery of it to M. Laennec. Boyer describes it as covering the external surface of the organ, and moreover reflected over the vessels that enter it. Its internal surface corresponds to the tissue of the liver, to which it adheres very closely. It sends sheaths over the vessels; the most conspicuous of these is the capsula Glissoni, already described; but the hepatic vessels have one closely connected to them and to the surrounding substance of the liver, and the umbilical vein in the fœtus is furnished with a similar covering. This proper membrane of the liver is thin, transparent, and of a slightly yellow tint. It is stronger than the peritoneum; hardly admits of extension, and exhibits nothing fibrous in its texture. It may be best shown in the situations where it is not covered by peritoneum: by making an incision, and introducing the handle of a scalpel, it may be easily separated from the substance of the organ.

If the hepatic artery be injected, in a healthy liver, with any fluid kind of injection, as size coloured with vermilion, no point can be discerned in the whole organ, more particularly if the microscope be employed, in which branches of this vessel are not visible. The same observation may be made concerning the vena portarum, the hepatic veins, and the hepatic duct. If the injection be pushed farther, it will pass out of one of these vessels into the others; that is, it will pass from the hepatic artery into the vein of the same name, into the vena portarum, and into the biliary duct; or, *vice versa*, from either of these into the artery, &c. Injections do not pass from the artery into the absorbents, unless when there has been an effusion into the substance of the organ. It is said that the absorbents have been filled with liquors thrown into the vena portarum; and that the same circumstance readily takes place where mercury is introduced into the hepatic duct.

These facts concur with the result of the most careful inspection, aided even by the microscope, in proving that there is an uninterrupted passage from one order of vessels into the other, and nothing of a cellular or vesicular nature interposed between them.

Of the apparatus connected with the excretion of the bile.—The tube, which we have already described, as being formed by the union of all the excretory canals in the liver, under the name of the hepatic duct, passes from the great notch of the liver towards the left, being at the same time inclined slightly downwards and forwards, and is continued to the duodenum, in which it opens. It runs between the two laminae of the little omentum, surrounded by fat and cellular tissue, which is generally dyed of a yellow colour by the transudation of the bile. It lies on the anterior edge of this omentum, in front and rather to the right of the vena portarum, with which it is extensively in contact, and to the right of the

hepatic artery. Its size is about that of a large writing quill, its figure cylindrical, and its length from four to six inches. At about an inch or an inch and a half from the liver, we observe in it the simple round opening of the cystic duct. From this part to its termination it generally goes by the name of ductus communis choledochus; but the distinction is quite an artificial one. When it arrives near the duodenum, it becomes covered by the pancreas, which adheres closely to it, and advances along the posterior and inferior portion of the second flexure of the duodenum. It penetrates the muscular coat and that intestine, and receives the termination of the pancreatic duct. Having passed obliquely between the muscular and mucous coats, for the space of an inch nearly, it penetrates the latter, and opens into the intestine by a small orifice on one of its folds. The mucous coat of the latter, and the internal surface of the duct, are here continuous. When we examine the opening of the canal, we see a small eminence, nearly of the size of a pea, rounded, rather oblong, and divided in the middle; there is no valve, nor any muscular fibres arranged like a sphincter. The oblique course of the canal between the intestinal coats prevents the passage of the contents of the intestine into the duct, even when the intestine is the most fully distended. The duct is compressed whenever the gut is filled, and more powerfully in proportion as the distention is greater. If the duodenum be inflated, and the duct cut through, no air escapes. Ordinarily, too, we cannot doubt that the particular sensibility of the canal enables it to reject matters that are extraneous to it.

Sometimes this duct does not receive the pancreatic. Observations are recorded, in which it is said to have opened into the stomach, and close to the pylorus; but their correctness is doubtful.

The cystic duct, of which we have mentioned the opening into the hepatic, is a short canal, leading from the latter tube into the gall-bladder, and conveying into that receptacle a portion of the bile, before it goes to the duodenum.

The gall-bladder.—This bag does not exist in several genera of the mammalia; it has sometimes, but very rarely, been deficient in the human subject, without causing any sensible derangement of functions. Sometimes also there have been two gall-bladders.

It is placed obliquely, under the front of the great lobe of the liver, in the excavation already described, above the colon and duodenum, to the right of the horizontal fissure and the lobulus quadratus, and in front of the right end of the transverse notch. Its most usual figure is pyriform; sometimes it is rather oval, or cylindrical. We remark in it an external and an internal surface, an anterior extremity called the fundus, a posterior named the neck, and a middle portion or body. The fundus, or large extremity of the gall-bladder, is directed forwards, a little to the right and downwards, and the small end backwards, to the left and upwards. But the direction varies considerably according to the attitude of the body. In the supine posture the fundus is higher than the neck; the contrary is the case in lying on the right side.

The external surface of the gall-bladder corresponds above to the excavation in the right lobe of the liver; this part has been called the hepatic surface. Here it is not covered by peritoneum, but adheres immediately to the proper membrane of the liver, by means of a copious cellular substance, containing numerous blood-vessels. Sometimes it has been connected to the liver by a small kind of mesentery, and covered universally by peritoneum. The inferior part is smooth, covered by peritoneum, and contiguous to the colon

and first portion of the duodenum; it is called the loose or abdominal surface.

The anterior extremity, or fundus, turned forwards, downwards and to the right, is rounded, smooth, and covered partially or entirely by peritoneum. It corresponds to an excavation in the anterior edge of the liver, and protrudes more or less beyond this according to the quantity of bile it contains. When it is empty, its fundus does not extend beyond this edge; but, in the distended state, it projects from the liver, and is applied against the abdominal parietes, below the middle of the cartilage of the second false rib.

The neck, or posterior extremity, which is directed rather upwards and to the left, is bent upon itself, the convexity of the curve looking upwards, and the concavity downwards. It is terminated by the cystic duct, which, after a course of about an inch and a half, unites with the hepatic duct at a very acute angle. The internal surface of the gall-bladder presents a deep yellow or greenish tint, according to the colour of the bile; indeed, all this excretory apparatus is tinged after death in the same manner, but not so deeply as the surface of the gall-bladder. This effect takes place very quickly after death: when the coats of the parts, that immediately contain the bile, are coloured, the continuance of the transudation affects all the neighbouring organs to a greater or less degree. This internal surface of the gall-bladder is extremely irregular: it is universally covered with rising lines, decussating each other, and intercepting small arcuæ of various figures. These are again covered by other more minute lines, which divide the surface into very small spaces. Similar rising lines, but more elevated, are found towards the neck of the gall-bladder, and throughout the cystic duct. The whole surface of these parts, in consequence of this structure, exhibits a very beautiful rugous and cellular appearance. Besides these rugæ of the internal coat, the neck of the gall-bladder exhibits four or five transverse semilunar folds, projecting into the cavity, and formed by duplicatures of the mucous coat.

The capacity of the gall-bladder may be estimated at about one ounce.

The cystic duct is a contracted continuation of the neck of the gall-bladder, about equal to a large crow-quill in diameter. It forms at its commencement a remarkable turn, of which the convexity is towards the liver and the concavity downward. From the gall-bladder it first ascends, then makes this turn, and afterwards passes downwards, between the laminae of the little omentum, parallel and close to the hepatic duct. After a course of about an inch and a half it opens into that duct at a very acute angle. The cystic duct has an irregular knotted appearance on its external surface, which arises from numerous semilunar folds, analogous to those at the neck of the gall-bladder, projecting into its cavity, and very much narrowing its dimensions.

Two coats, a serous and a mucous, compose the gall-bladder. The former, derived from the peritoneum, gives only a partial covering to the organ. This membrane is raised from the liver, at the circumference of the depression lodging the gall-bladder, and covers this viscous every where, except at its adhesion to the surface of the liver. It is continuous below with the superior layer of the little omentum. The peritoneal coat is connected to the mucous by a tolerably thick and uniform layer of cellular tissue, the cellular coat of some writers. Some firm and rather shining threads, mostly of a longitudinal direction, are observed in this tissue, and have been often considered of a muscular nature. The blood-vessels and absorbents form a net-work in this cellular substance, which sometimes contains a little fat. The internal

nal, mucous, or villous coat, as it is frequently called, is connected below and at the sides to the peritoneal covering; above to the proper membrane of the liver. The inner surface presents the rugæ already noticed. It is of considerable thickness, and has a kind of spongy texture. During life it is white; the tint of the bile never being communicated until after death. Several anatomists have described mucous glands and follicles in this membrane; but they cannot be satisfactorily ascertained. Soemmerring, however, describes glands near the neck as large as millet seeds. On account of the folds and rugæ of the internal surface, its extent is much increased when the cellular substance is removed from the outside. After a successful injection of the blood-vessels, this coat appears to consist entirely of a vascular net-work.

The artery of the gall-bladder is a branch of the hepatic; the veins join the vena portarum. The lymphatics, which are numerous and large, join those of the inferior surface of the liver. The nerves come from the hepatic plexus.

Anatomists formerly admitted the existence of vessels passing directly from the liver into the gall-bladder, under the name of hepatico-cystic ducts. Such vessels exist in birds, but they certainly do not belong to the human subject; the only connection between the liver and gall-bladder being through the medium of the hepatic and cystic ducts.

The organisation of the hepatic and cystic ducts is essentially the same. They have two coats, an external fibrous one, and a mucous or internal lining. The former is thick, dense, and strong, and composed apparently of whitish longitudinal fibres, which have nothing muscular in their appearance, and the nature of which is not well understood. The mucous coat is thin and soft, and presents in some parts the same areolated texture as on the internal surface of the gall-bladder: the whole of the cystic duct has this peculiar arrangement, and its internal membrane forms the transverse folds already mentioned. The hepatic duct, from the liver to near the point at which it enters the intestine, is smooth: it has some longitudinal folds about its middle, and is reticulated near the duodenum.

These ducts possess very great extensibility: they are sometimes dilated, by the passage of calculi, to the size of a thumb. They, as well as the gall-bladder, act on their contents by the insensible organic contractility, or tonic power. They are never seen to contract sensibly in any observations of living animals, nor do the stimuli, which excite contractions in the muscles, produce the same effect on them. Probably the passage of the food over the orifice of the duct in the duodenum is the exciting cause of their actions. Although they are not sensible in the natural state, disease develops this property in them to a remarkable degree. No pain is more acute than that produced by calculi in these ducts.

Development of the liver.—This organ is discerned in the embryo before any of the other viscera; and it is proportionally larger in the early months of conception, than at any future time. Wrisberg saw it in a fœtus of ten weeks to large, that it occupied nearly the whole abdomen. Walter says that it can be seen at twenty-two days. At these periods it appears to be not much less than half the weight of the body. This great bulk of the organ does not last through the whole of gestation; after the fourth month, it does not proceed so rapidly in its growth, although it maintains a remarkable predominance over the other viscera till the time of birth. As a general observation we may assert, that it is larger in proportion as the animal is nearer to the time of its first formation.

During fetal existence, the blood of the umbilical vein circulates through the liver, on its way to the heart: but the whole of this blood is sent to the left lobe. (See the description of the umbilical vessels in the article EMBRYO, and the article CIRCULATION.) Hence that lobe is quite as large, if not larger, than the right. From this great bulk of the organ, as well as from the breadth of the basis of the chest, and the small concavity of the diaphragm, the relations of the liver to the surrounding parts are very different from what we observe in the adult. It not only fills both hypochondria and the epigastric region, but descends below the ribs, as far as the umbilicus, and fills half the abdomen: It is placed at this time more perpendicularly in the body, so that the convex and concave surfaces, which are superior and inferior in the adult, are nearly anterior and posterior in the fœtus. The anterior surface is extensively in contact with the abdominal parietes: the posterior covers the stomach, spleen, and even omentum. Its tissue at this time is soft and spongy, and contains a large quantity of blood: the latter circumstance gives to the organ a darker colour than it has in the adult.

We are entirely ignorant of the functions performed by the liver during fetal existence, of the relation between its size and any of the processes of the animal economy, and whether any changes are produced in the blood as it passes through the organ.

The excretory part of the hepatic system is not proportioned in its development to the size of the liver in the fœtus: for the latter circumstance is connected with the circulation, and not with the biliary secretion. The internal surface of the gall-bladder is at first smooth, and does not exhibit the areolated structure until the latter months of gestation. According to different authors this bag contains no bile, but merely a reddish mucus, until the 4th, 5th, or 6th month: its fundus is completely concealed behind the edge of the liver. At the time of birth it is always full of bile; but the fluid is still reddish and mucous, and possesses but little taste.

The sudden revolution that occurs in the circulating system at birth, produces a remarkable change in the liver. The interception of the blood, which was conveyed to the organ by the umbilical vein, is followed by a very marked reduction in its size affecting particularly the left lobe. The tissue of the organ is rendered more dense, and its colour acquires a brighter red tint, or becomes pale. After a certain time the organ participates in the progress of the other parts of the body. The excretory apparatus undergoes no remarkable change: it is not so readily tinged with bile, as at a more advanced age, probably from some change in the nature and properties of that fluid. In the old subject the organ sometimes is reduced in size, and frequently becomes more soft. On the whole, however, after the changes consequent on birth have been completely effected, and the liver has acquired its permanent relation to the other organs, very little change takes place in it.

The secretion and course of the bile.—That this fluid is separated in the liver, and conveyed from that organ by the hepatic duct, are points so clear, that they do not require any express proof. From which order of vessels in the liver this secretion takes place, is a question not so easily answered. Physiologists have generally ascribed this office to the vena portarum, and have considered the hepatic artery to be the nutrient vessel of the organ, as the bronchial arteries are of the lungs. They give the following reasons for this opinion. 1. The excretory duct is larger than the artery, a circumstance which does not occur in any other gland: its size how-

ever

ever is suitable to that of the vena portarum. 2. The agreement of the properties of the bile, particularly its thick oily nature, acrid taste, and dark colour, with the supposed peculiar nature of the blood returned by the vena portarum. This blood, it is said, is brought from very warm and moist parts, loaded with fatty matter from the omentum mesentericum, &c. and with alkaline and acrimonious particles from the intestines, particularly the large ones. Its supposed stagnation in the cells of the spleen has been conceived to impart to it some further peculiar properties, favourable to the formation of the bile. 3. Experiments on living animals, in which the secretion has been stopped by tying the vena portarum, and not interrupted by tying the hepatic artery. 4. The peculiar distribution of the vein, after the manner of an artery, in the liver, combined with the particular qualities of the blood circulating in it. 5. The artery is larger in size in the fœtus, in proportion to the greater bulk of the organ, although the secretion of bile is very small in quantity at a time when digestion has not begun.

As a proof that bile may be secreted from arterial blood a fact may be adduced, that occurred to Mr. Abernethy, and is recorded in the Philosophical Transactions. In a well-formed and nourished child, whose gall-bladder contained bile, the vena portarum terminated in the inferior vena cava near the renal veins.

There are several other considerations tending to weaken our confidence in the received opinion. Much reliance cannot be placed on the relative diameters of the artery and duct: if the latter be too large for the former, it must be regarded as too small in proportion to the vena portarum. According to Bichat there is the same relation between them as between the renal artery and ureter.

We know of no comparative analysis of the blood, contained in the vena portarum and the hepatic artery, that warrants us in ascribing to the former qualities particularly suited to the secretion of bile. Certainly we do not see in it those properties which are said to characterise it: we do not discover oily particles in it, and we believe the supposition of its imbibing any thing from the excrement to be perfectly gratuitous. Indeed Haller expressly acknowledges that the properties, which the blood of the vena portarum may necessarily acquire in its circulation, cannot be discovered by chemical analysis. Why is venous blood so particularly suited to the secretion of an oily fluid? are not fat, the medulla of bones, and cerumen formed from materials conveyed in the arteries? That any thing acquired by the blood in the spleen cannot be essential, is proved by the fact, that extirpation of that organ does not injure the hepatic functions. We do not understand clearly how the retarded motion of the blood in this vein (if in reality it be retarded) assists the formation of bile? How happens it that slowness of motion is more favourable to this than to any other secretion? We cannot reasonably apply inferences drawn from what takes place in an animal after such a serious injury as the ligation of the vena portarum or hepatic artery, to the natural functions of the organ. How long did the animals live after these experiments? and in what way were the facts of the secretion or non-secretion of the bile ascertained? "These different reflections," says Bichat, "may convince us, that our proofs are not as yet sufficient to decide whether the bile is secreted from arterial or from the abdominal system of venous blood. I do not attribute the function to one rather than to the other: but merely endeavour to shew that a fresh examination of the question is necessary, and to prove by this example that the most generally received physiological opinions, such as seem to be placed beyond all doubt by the concurring assent of the most celebrated men, often rest on very uncertain foundations. We are yet far

from the time when this science shall consist only of a series of facts rigorously deduced one from the other." *Anatomie Generale*, tom. i. p. 457.

The great size of the liver, the number and magnitude of the parts which compose its complicated vascular machinery, its enormous magnitude in the early stages of fetal existence, and its especial connection with the circulating organs at that period, all lead us to conclude that it answers some other purpose in the economy besides the secretion of the bile. This probability, and the reasons on which it is grounded, are so well stated by Bichat, in his *Anatomie Generale*, that we shall avail ourselves of his labours on this point.

"From serving as the point of termination for the abdominal system of black blood, as the lungs do for the general system of the same description, the liver derives a degree of importance, which does not belong to any other secretory organ. The disproportion between the size of the organ and the quantity of fluid it secretes, has led some authors to suspect that the organ must have a further office: and this suspicion seems to be almost a certainty. Compare its excretory tubes and reservoir to the analogous parts in the kidneys, the salivary glands, the pancreas: you will find them inferior to the first, and hardly superior in size to the others. Yet the mass of the liver at least equals all the other glands in the body put together. This great size of the organ contrasts remarkably with the small quantity of its secretion: calculate how much is consumed in colouring the feces, open the intestines to see how much they contain at different times, and you will be convinced that the quantity of the bile is much less than that of the urine, not to mention the other secreted fluids, such as the saliva, pancreatic liquor, semen, mucous fluids, &c.

"We are altogether ignorant what the other use of the bile may be. Probably it is connected with the abdominal system of black blood. The following considerations prove that it must be a very important one. The organ exists in almost all classes of animals, even where some other important viscera are very imperfect. Many of the passions affect it: some of them have an exclusive effect on it. It performs in disease as prominent a part as any of the important viscera of the economy. In hypochondria, melancholia, &c. its influence is very considerable. We know how easily its functions are disturbed. If it be unconnected with many affections called bilious, and which have their seat in the stomach, it is certainly essentially concerned in the greater part. The yellowish tint of the face in many of these affections must be produced by the same cause, which, in a higher degree, produces jaundice. The affections of this organ, observed after death, are more numerous than those of any similar part. It is a matter of common observation, that this organ has a great influence on the temperament. Its predominance communicates to the external habit of the body, to the functions, to the passions, even to the character, a peculiar tint, which was observed by the ancients, and the reality of which has been confirmed by modern observation. Nothing like this can be observed of the other glands. With the heart and brain this is the part first formed: its development precedes that of all other organs, and is incomparably superior to that of other glands. It has been latterly supposed that the liver assists the lungs in removing from the blood hydrogen and carbon. I know not on what proofs this assertion may rest: but the colour of the fluid is certainly not affected by its passage through the liver: neither is it altered in consistence, nor in any way that can be recognized by the touch."

Course of the bile.—There are two kinds of this fluid, differing

differing considerably in their properties, and distinguished by the names of hepatic and cystic. The former, which is contained in the hepatic duct, and in the branches of that tube distributed through the liver, approaches in fluidity to water, is of a bright orange colour, and not bitter: so far, indeed, is it from containing any qualities offensive to the taste, that the livers of animals, which must always contain much of it, are commonly employed for food. The latter, or bile of the gall bladder, is a thick ropy fluid, of a deep orange brown, or even green tint, and most intensely bitter. Both these kinds are secreted in the liver, and originally are not different. The gall-bladder receives what it contains through the cystic duct, and produces in it the changes just described while it remains in this reservoir. A copious mucous secretion takes place from its lining, and the aqueous parts of the bile are removed by the numerous and large absorbents of the receptacle. The cystic bile is, therefore, nothing more than hepatic bile in a concentrated state. It is easy to prove that the gall-bladder can receive bile only through the cystic duct: we have already observed, that the hepatico-cystic ducts are imaginary; we may add, that if the bladder be removed with its contents, the cystic duct tied, and pressure then applied to the part in every direction, not a particle of the fluid escapes. If the cystic duct be obstructed by a calculus, or obliterated by disease, no bile is contained in the gall-bladder, which, on the contrary, is filled with a colourless mucus. If we evacuate the receptacle in a living animal, and tie its duct, it will be found under the same circumstances; and the cystic duct, from its opening into the hepatic to the ligature, will be distended.

The gall-bladder, from the view of its functions, does not seem to be a very important organ in the economy. Several animals, among the mammalia, do not possess it, as the horse, stag, elephant. No ill effects have been observed, where the cystic duct has been obliterated; nor where there has been a natural deficiency of the organ.

That the fluid secreted in the liver flows in part directly into the intestine, would be naturally inferred from observing the size and favourable direction of the hepatic duct for this course, and the comparatively unfavourable direction, tortuous course, and small diameter of the passage leading into the gall-bladder. These circumstances, indeed, would lead us to expect that the bile would enter the gall-bladder in very sparing quantity. If an animal be opened, when the intestinal functions are not going on, the hepatic duct, and the ductus choledochus, contain hepatic bile; the surface of the duodenum and jejunum is tinged with the same kind of fluid; and the gall-bladder is distended with cystic bile, of which the properties are the more strongly marked in proportion to the length of the previous abstinence. While the stomach is exerting its action on the food, the same appearances are exhibited. When the aliment has passed into the duodenum, the ductus choledochus contains dark-coloured cystic bile, and the gall-bladder is less full. At the end of digestion, and a little after, the hepatic and common ducts, and the gall-bladder, all contain a light-coloured bile; which is observed also in the duodenum. The gall-bladder is flaccid. These observations are deduced from experiments made by Bichat, and recorded in his *Anatomic Generale*, p. 459. "They were repeated," says he, "a great number of times, and shew clearly, that the secretion goes on to a certain amount at all times, but that this quantity is increased during digestion. The bile furnished when the action of the intestine is not going on, is divided between the intestine, which is always coloured by it, and the gall-bladder, which retains it without pouring out any through the cystic duct: while it is thus retained, it acquires its acrid character, deep tint, and

the properties which seem to be required for the purposes of the digestion that is to ensue. When the food, after undergoing the action of the stomach, enters the duodenum, all the hepatic bile flows into the intestine, and even in greater quantity than before. The gall-bladder at the same time pours out its contents. When the action of the intestine is concluded, the quantity of fluid secreted by the liver is diminished, and it flows partly into the duodenum, and partly into the gall-bladder, where it is then seen in small quantity, and of a bright colour, because there has not yet been sufficient time for it to be collected more abundantly, nor to acquire a deeper colour." Bichat is of opinion that the stomach always contains a certain quantity of bile. "In its empty state," says he, "we always find in it more or less mucous fluid, sometimes mixed with small globules of hydrogen gas, and almost always tinged of a yellowish colour by bile, which has entered through the pylorus. Haller says, that this reflux does not always take place; but it is constant, according to Morgagni. I have opened no dog where it could not be manifestly discerned in the empty stomach, particularly when it had been long empty. The bodies of persons, who die of disease, are not fit for deciding this question, as the disease may alter the course, nature, and colour of the bile. When the stomach was full, I could not sometimes ascertain the presence of bile: in other instances I observed a yellowish fluid between the alimentary mass and the coats of the stomach. The bile entering the stomach has always appeared to me, from its colour, to be hepatic; I have never seen that dark fluid which is contained in the gall-bladder, and which is vomited in some diseases. This accords with the observation made above, that hepatic bile only enters the duodenum during abstinence. It is evident that the passage of the food from the stomach, at the commencement of intestinal digestion, at which time cystic bile certainly flows into the duodenum, must prevent that bile from going through the pylorus."

We have mentioned, in the article *DIGESTION*, the effects produced on the contents of the intestine by the admixture of the biliary fluid. On this subject, indeed, the amount of our knowledge is very trifling: that the presence of the fluid is essential to the right performance of the intestinal functions, and that the colour of the feces is derived from its admixture, are obvious facts, and they include nearly all that is hitherto proved.

The chemical composition of the fluid is considered under the article *BILE*.

The sympathies of the liver, with other organs, are very numerous and important; and render its physiology very interesting to the physician. It is connected primarily or secondarily, as cause or effect, with various disorders of the head, chest, and abdomen.

LIVER, Chromatic diseases of the, in Medicine.—Having already treated of the acute inflammatory affections of the liver (see *HEPATITIS*), and of the various obstructions to the exit of the bile into the intestines, which give rise to *Jaundice* (see that article); it remains for us to describe, in this place, the other morbid changes to which this organ is liable, and which are of a slow or *chronic* kind. These are, principally, the slow inflammation of the liver, or chronic hepatitis, as it has been called; induration, or a ferruginous state of the organ; softness of it; enlargement, or diminution of its bulk; the formation of tubercles in it; adhesions of it to the contiguous parts, &c. The formation of those vesicular cysts, which are denominated *hydatids*, in the liver, has been already discussed under the general head. See *HYDATIDS*.

The chronic inflammation of the liver is a disease, which is

is more common in this country than the acute; and is often so insidious in its progress, and accompanied by so few symptoms of serious indisposition, as to have advanced to a complete suppuration, before its existence was suspected. In some measure, indeed, a similar observation applies to all the chronic derangements of the substance of the liver, which often excite no alarm, by the symptoms which might be expected to accompany them, until they are fully formed. The slight indisposition that occurs is attributed to indigestion, flatulence, or some other affection of the stomach; the pain of which the patient occasionally complains is falsely referred to that organ; and its continuance is so short, and the degree of it frequently so inconsiderable, as to demand but a slight attention. The relief obtained by eructation and the discharge of air also tends to confirm the opinion, that the seat of the disease is in the stomach: but this relief may be explained on the principle of removing the distention of the stomach, and so taking off the pressure of this organ from the liver.

Where this slow inflammation and gradual obstruction is going on in the liver, the patient is subject to occasional pain in the right hypochondrium, extending to the *scapula*, or to the top of the shoulder, a quick pulse, an increase of heat, alternating with chilly sensations, difficult breathing on quick motion, some difficulty of lying on the left side, flatulence, indigestion, acidity, costiveness; and, together with a gradual diminution of strength and flesh, he has a pale or fallow complexion. The complexion, indeed, of a person affected with chronic obstruction in the liver, although often not wearing the appearance of jaundice, yet has frequently a peculiar sallowness, or a dirty-greenish hue, which Dr. Darwin, from its resemblance to the colour of a full-grown silk-worm, has aptly enough denominated *bombycinus*. The extent and duration of pains, Dr. Saunders observes, arising from disease of the liver, are so various, as frequently to deceive both the physician and patient; they extend to the shoulder, *scapula*, muscles of the neck, along the arm, even to the joints of the wrist. Every change of posture either relieves an old pain, or induces a new one, as does the mere bending of the body in any direction, or even extending the arms. The pains are greater in a supine, than in an erect posture.

These symptoms, and some others which make their appearance in the more advanced stages, are sufficient to point out the existence of chronic disease in the liver: but it is to be regretted, that they are not peculiar to chronic inflammation of the organ; and that the varieties of hepatic obstruction are not distinguished from each other by any particular combinations of symptoms; for it must be obvious, that the same remedies cannot be administered with advantage in diseases, which are essentially so different in their nature, as those which we are about to describe.

The term *schirrus*, when applied to the liver, has been employed in two acceptations, or at least to denote two different stages of a disease, if not two different diseases: namely, an induration of the substance of the liver generally, and the formation of the common tubercle in it; the former of which is, in the opinion of Dr. Baillie, the first step towards the latter. When an indurated liver is examined by dissection, no peculiar alteration of structure is observed; only the substance of the gland is found uniformly of a more compact and solid consistence, or less soft and porous, it is somewhat diminished in bulk, and the lower edge is bent a little inwards; the colour, too, is somewhat paler, in consequence of a diminished secretion of the bile, or of a less free admission of blood into the substance of the organ. Upon the surface of such a liver, Dr. Baillie remarks,

"there is not uncommonly a thready appearance of membrane, disposed somewhat in a radiated form. This, I believe to be the first step in the progress towards the formation of the common tuberculated liver. I have sometimes seen small tubercles formed upon a part of the surface of such a liver, which were exactly of the common sort, &c. This hardened state of the liver is sometimes accompanied with a beginning ascites, and sometimes is without it." Loc. cit.

Dr. Saunders observes, that in these cases of induration of the liver, there is, together with a diminution of bulk, also some degree of loss of weight. This, however, he believes, occurs only in the latter stages of the disease, when it is usually seen by the anatomist. For, considering that the disease is commonly the result of one of the two following causes, *viz.* a long residence in a hot climate, or the immoderate use of spirituous liquors, both of which tend to produce an over-excitement of the circulation, and a hurried secretion, he deems it most probable, nay he is persuaded, that in the more early stages of *schirrosis*, the liver is not only not sensibly diminished in bulk, but that there is at that period an increase both of bulk and weight, which is followed by a gradual diminution of both. "To produce an increased secretion of bile," he argues, "it is plain that there must be an increased action of the branches of the vena portarum, and an acceleration of fluids through those branches: hence a condition of vessels is induced, approaching in some respects to that of inflammation; with this difference, that it is an inflammation in which the vein, or secreting vessel, is more concerned, than the artery or nutrient vessel. The effect of this action, especially when protracted for a considerable time, must necessarily be that of inducing an alteration in the structure of the part: an alteration similar to what obtains in other organs, labouring under indolent and chronic inflammation. This change of structure, from its solidity and compactness, seems to depend on the effusion of the coagulable lymph into the parenchymatous substance of the liver; with this peculiarity, that while it is, in active inflammations, deposited by arteries, it is, in the chronic kind, effused by the veins, &c." This effusion, however, he adds, impedes the secretion of bile; and, where a part has lost the power of performing its functions, the absorbents often become active, and remove it: whence the diminution of weight as the disease advances. (Saunders's Treatise on Structure and Dis. of the Liver, 3d edit. p. 282, et seq.) At all events, the view of the disease, which ascribes the effusion of the interstitial matter, and the consequent induration, to a previous excitement of the vessels and hurried secretion, accord both with the general laws of the animal economy, and with the known ordinary causes of this disease.

With respect to the other modification of *schirrous* liver, which is one of the most common of its diseases, we cannot do better than repeat Dr. Baillie's accurate description. "This disease," he says, "is hardly ever met with in a very young person, but frequently takes place in persons of middle or advanced age: it is likewise more common in men than in women. This seems to depend upon the habit of drinking being more common in the one sex than in the other; for this disease is most frequently found in hard drinkers, although we cannot see any necessary connection between that mode of life and this particular disease in the liver. It happens, however, very commonly, that we can see little connection between cause and effect in changes which are going on in every other part of the body.

"The tubercles, which are formed in this disease, occupy generally the whole mass of the liver, are placed very

near each other, and are of a rounded shape. They give an appearance every where of irregularity to its surface. When cut into, they are found to consist of a brownish or yellowish-white solid matter. They are sometimes of a very small size, so as not to be larger than the heads of large pins; but most frequently they are as large as small hazel nuts, and many of them are sometimes larger. When the liver is thus tuberculated, it feels much harder to the touch than natural, and not uncommonly its lower edge is bent a little forwards. Its size, however, is generally not larger than in a healthy state, and I think it is often smaller. If a section of the liver be made in this state, its vessels seem to have a smaller diameter than they have naturally. It very frequently happens that in this state the liver is of a yellow colour, arising from the bile accumulated in its substance; and there is also water in the cavity of the abdomen, which is yellow, from the mixture of bile. The gall-bladder is generally much contracted, and of a white colour, from its being empty. The bile, from the pressure of the hard liver upon the *pori bilarii*, does not reach the *ductus hepaticus*, and therefore cannot pass into the gall-bladder. The colour of the skin in such cases is jaundiced, and it remains permanently so, as it depends on a state of liver not liable to change. This is the common appearance of what is generally called a scirrhus liver; but it bears only a remote resemblance to *scirrhus*, as it shews itself in other parts of the body. I should therefore be disposed to consider it as a peculiar disease affecting this *viscus*." Morbid An. chap ix.

This account of the state of the indurated and tuberculated liver renders it unnecessary to explain, at any length, the origin of the dropsy, jaundice, &c. which accompany these diseases, when inveterate. It must be obvious to those who understand the structure of the parts, that if some bile is secreted in the liver, but, from the compressed state of the ducts, it cannot pass into the intestines, it will be absorbed into the circulating blood, and produce jaundice. (See JAUNDICE.) And dropsy will ensue, in consequence of the impermeability of many of the blood-vessels of the liver, which are compressed by the surrounding tubercles; whence, as in all cases of such obstruction to the circulation, the thinner parts of the blood will exude from the exhalant extremities of the over-distended vessels behind. (See DROPSY, *causes of*.) From the same obstruction, and the over-dilatation of the venous system, these vessels are liable to give way; whence hemorrhages, or discharges of dark blood, are liable to occur, under such morbid states of the liver from the stomach, intestines, nose, and other internal passages; but especially from the two former, since the blood which circulates through them, as well as through the *spleen*, *pancreas*, and *omentum*, must pass through the liver to reach the heart; the circulation, therefore, must be particularly impeded in the organs just mentioned, when that of the liver is obstructed; and the blood will force its way through other passages, if the vessels are not strong enough to resist any extraordinary distending force.

The liver is liable to be affected with other varieties of tubercle, of a larger size than those above described; Dr. Baillie has mentioned three varieties of these, which he calls the large white tubercle, soft brown tubercle, and serous tubercle. The first of these, which is by no means so frequently met with as the common tubercle, resembles more nearly the ordinary appearance of scirrhus in other parts of the body. These tubercles are hard whitish masses, of a lobular form, and firm opaque substance, often as large as a chestnut, and sometimes much larger, or on the other hand, considerably smaller. "They

are to be found near the surface of the liver," Dr. Baillie observes, "in greater number, than near the middle of its substance: two or three frequently lie contiguous to each other, with a considerable portion of the liver, in a healthy state, interposed between them and a cluster of similar tubercles. The liver in this disease is frequently a good deal enlarged beyond its natural size." Dr. Baillie adds, that "these tubercles appear to be first formed round the blood-vessels of the liver, as is seen in making sections of a liver in this state. While the liver is under such circumstances of disease, there is sometimes water in the cavity of the abdomen, and sometimes none; the liver is sometimes tinged in its colour, from the accumulation of bile, and sometimes the colour of its substance, between the tubercles, is perfectly natural." (Loc. cit.) The two other species of tubercle are very rare; the one consists of a smooth, soft, brownish matter, the nature of which is not thoroughly known; the other bears a strong resemblance to the tubercle of the lungs. See CONSUMPTION.

There are no peculiar symptoms, by which the existence of these different tubercles can be discriminated in the living body. When the parietes of the abdomen are thin, and there is little dropsy, and especially when the liver is enlarged, the tubercles can sometimes be distinctly felt by the fingers, upon an attentive examination, along the lower edge of the viscus. Dr. Baillie correctly states, that the large white tubercle is not so often attended with jaundice and ascites as the common tubercle. We witnessed the exemplification of these observations, in a striking instance, some years ago; in which a woman, addicted to spirit-drinking, had been affected with the large tubercle of the liver for several years, but had complained only of loss of appetite, and occasional sickness and pains in the side, had been pregnant and brought forth twins, and never had any appearance of dropsy to the last, nor of a jaundiced complexion, until within eight days of her death. Yet in this person, the liver was not only found about three times its natural bulk, (filling half the cavity of the belly, and being distinctly felt, before death, extending down the *umbilicus*, and thence to the spine of the *pelvis*;) but appeared, on making a section, to consist of a mere mass of tubercles, with some loose interstitial matter, but without any semblance of the natural substance of the viscus. The section presented an appearance not unlike the pudding-stone of mineralogists. It would seem that, from the luxury of the intervening substance between the tubercles, the circulation through the branches of the *vena portæ* was not materially impeded; and hence no dropsical effusion took place from the vessels of the peritoneal viscera. The patient was confined to bed only eight days, and was apparently cut off by an incessant agonising pain in the diseased organ, which first induced delirium, and afterwards wore out the powers of life.

The liver is not unusually found softer and much more flaccid in its substance than natural, without any other appearance of disease. It feels, in such instances, nearly as soft as the spleen, and is commonly of a leaden colour. This state of liver is seldom, if ever, found in young persons; most commonly in persons advanced in life. Some other rare morbid changes have also been seen in the liver; such as the conversion of part of its coats into cartilage, and the formation of cartilaginous cysts in its substance, containing an earthy matter of a soft smooth quality, and brownish-white colour.

It is not unusual, on dissection, to see adhesions formed between the liver and the contiguous parts, which are the consequence of a previous inflammation in the membrane covering

covering the liver. These adhesions are formed from the coagulable lymph of the blood, which undergoes a gradual process of elongation from the motion of the parts, so as to produce little inconvenience, and in some circumstances of disease much advantage. They consist very commonly of a thin transparent membrane, which joins the surface of the liver to the neighbouring parts. This junction may either be general over one extended surface of the liver, or it may consist of a number of processes of adhesion: the adhesion is sometimes by a membrane of considerable length; and sometimes it is very close, the surface of the liver being immediately applied to the neighbouring parts. These adhesions are most commonly found on the anterior surface of the liver, by which it is joined to the *peritoneum* lining the muscles at the upper part of the cavity of the abdomen. When an abscess is formed in the substance of the liver, and points externally, these adhesions are of great use in preventing the pus from escaping into the general cavity of the abdomen. Adhesions are also frequently found connecting the posterior surface of the liver to the stomach and the *duodenum*: and these may also be useful in abscesses of the liver, near its posterior surface, by preventing the matter from passing into the general cavity of the abdomen, and conducting it either into the stomach, or the upper part of the intestinal canal. See HEPATITIS.

Professor Portal of Paris, an able and sedulous cultivator of morbid anatomy and medicine, has pointed out some difficulties in forming an accurate diagnosis, between diseases of the liver and of some of the neighbouring organs, especially of the lungs. On the one hand, he observes, that obstructions and congestions in the right lobe of the lungs, and the right cavity of the chest, sometimes occasion such an alteration in the situation of the liver, by pressing down the diaphragm, as to produce a suspicion of disease in it, by occasioning the appearance of a tumour in the right hypochondrium. He relates a case of this sort, in which he was deceived, by this apparent tumour, in a patient who died of pulmonary consumption, where little or no expectoration took place: and he cautions practitioners not to be misled by such an appearance, which is common in all congestions of the chest. He affirms, too, that a degree of jaundice is occasionally produced, where the bile has free passage into the intestines, but is there detained, in consequence of mechanical impediments, as *volvulus*, strangulated *hernia*, accumulations of hardened faeces, &c. when it is taken up by the lacteals, and enters the blood-vessels. On the other hand, he remarks, if we sometimes attribute diseases to the liver, which have their seat elsewhere, there are other maladies, actually seated in the liver, which are frequently ascribed to other organs. Thus the contiguous *viscera*, such as the right kidney, the diaphragm, the lungs, the stomach, and the colon, are sometimes supposed to be affected with disease, which is seated exclusively in the liver. Many examples of this are to be found in the writings of Morgagni and Lieutaud. Mr. Portal relates two cases of severe and continued vomiting, connected with diseased liver, the first of which proved fatal; and the other was cured, in consequence of the lesson taught by the previous dissection. An enlargement of the liver was felt externally, with great tenderness in the epigastrium. See *Mem. de l'Acad. des Sciences*, Ann. 1777; or *Mem. sur plusieurs Maladies*, par Ant. Portal, tom. i. p. 228.

Where there is evidence of the existence of a considerable degree of disease in the liver, the prognostic must be always unfavourable, on the whole: for, in the first place, it is extremely difficult to ascertain the exact state of the organ; and, secondly, if we actually knew it, the most judicious

application of the most powerful remedies would be unequal sometimes to remove the disease. The most favourable symptoms are, an improvement in the complexion, the strength remaining unimpaired by the action of the medicines, and a return of appetite. Dr. Pemberton thinks that if the patient decidedly gains bulk in the solids of the body, you may safely pronounce that he will recover. The most unfavourable symptoms are, the colour of the skin remaining the same, or becoming more fallow, the general strength being much diminished, the abdomen beginning to swell, and the patient losing bulk in the upper extremities, while the lower become more enlarged. Pemberton on Dis. of the Abdom. Viscera, p. 43.

When the liver is so far diseased as to have become scirrhus, tubercular, or in any other way much altered in its structure, it must be obvious that medicine cannot effect any essential change. The treatment, therefore, which is to be recommended must be considered as applying to that stage of disease, which precedes any extensive organic alteration. It is not improbable, as Dr. Saunders suggests, that the original mischief is commonly in the stomach and bowels, and that the liver becomes diseased by sympathy: for dyspeptic complaints generally precede the chronic affections of the liver; and they are induced by intemperance in eating or drinking, but particularly by the abuse of vinous and spirituous liquors, by long fasting, by a sedentary mode of life, by grief and anxiety of mind, &c. (See DYSPEPSIA.) Whatever weakens the digestive powers of the stomach, Dr. Saunders maintains, ultimately weakens also the power of the liver, and diminishes the secretion of bile. (Saunders on the Liver, p. 192.) And again, he considers the diminished secretion of bile, or its diminished protrusion into the *duodenum*, (which he ascribes to an hypothetical constriction of the bile-ducts,) as reciprocally acting upon the stomach, and weakening its tone. One proof of the existence of the supposed spasmodic constriction of the orifice of the common duct he deduces from an observation, that, in a fit of sick head-ache, if bile is brought into the stomach, and thence ejected, by the violent straining to vomit, the termination of the fit is much more speedy and complete than when this does not happen.

When the diminished or altered secretion of the bile, then, is preceded by affections of the stomach, such as loss of appetite, indigestion, and flatulent eructations, the diet of the patient should be attentively regulated, the art of cookery should be rendered merely subservient to digestion, and the preparation of healthy chyle; and the general regimen should be such as has been already recommended in disorders of the digestive organs. (See INDIGESTION.) The quantity of food taken at one time should be moderate, and water should be the only liquid drunk with the meals, as more effectually promoting digestion than fermented liquors of any kind. All raw or unboiled vegetables should be avoided; but ripe fruits may be moderately taken, and almost all boiled vegetables admitted. Animal food should be well boiled, or moderately roasted, and taken with its own gravy. Pye-crust, every thing fried, butter rendered rancid by being melted, &c. should be cautiously avoided. The patient should use regular and moderate exercise.

It is of the highest importance, in order to keep up a due secretion of the bile, to administer a succession of gently purgative medicines. Upon this principle, the benefits arising from the waters of Cheltenham (which cannot be too highly recommended in these complaints) are obviously to be explained. Nevertheless, so far as the mere operation of these waters is concerned, no good reason can be assigned for any superior efficacy to be expected from them, rather

than from the administration of an equally active dose of the sulphate of magnesia, or other saline laxatives, dissolved in a proper quantity of water. Three drams of this salt in half a pint of fluid, as in the Seidlitz water prepared by N. Paul and Co., may be taken every morning, or every other morning, according to the strength and state of bowels of the patient. The regularity, temperance, and exercise, and likewise the absence of the anxieties of business, which contribute materially to assist the beneficial influence of those waters, when drunk at the springs, should, however, be conjoined with the employment of these substitutes at home.

In the chronic derangements of the liver, producing a diminished secretion of bile, and particularly when such affections have arisen from inflammation, mercury has been found one of the most effectual remedies. It is only, however, in the chronic state of inflammation that this remedy is administered with advantage. But the success of it, in these cases, has led perhaps to an empirical practice, of exhibiting it without sufficient discrimination between inflammations of a more indolent, and those of a more active nature, on the one hand, and between inflammation and the tuberculated state, &c. on the other. But, as Dr. Saunders remarks, to exhibit a medicine without due discrimination, is to abuse it, and at length to bring it into contempt and neglect. And this fate may perhaps await the use of mercury in complaints of the liver, if, by a blind empirical administration of it, it be incautiously employed in the *active* periods of inflammation, when, from its stimulant properties, it appears better calculated to accelerate than to retard the suppurative process. But upon this point we have enlarged, when treating of the cure of HEPATITIS; and shall now only repeat, that it is in the chronic state of inflammation alone, that the exhibition of mercury can be resorted to with benefit; for it now acts as a spur upon the vascular system of the liver, and, by its moderately stimulating effects, occasions at length a degree of action, by which the bile is properly elaborated, and health gradually restored.

That a great variety of complaints, both local and general, which have been comprehended under the terms nervous, hypochondriacal, bilious diseases, &c. originate from diminished secretion of bile, which, under such diminution in quantity, is also liable to be vitiated in quality, practitioners are again coming to admit. By observing physicians of all times, indeed, this general fact had been noticed; and upon it, a principal part of the ancient humoral pathology, which ascribed those diseases to the prevalence of *bile* and *black bile*, was founded. We cannot now, with all the additional lights afforded by a better cultivation of anatomy, physiology, and the collateral sciences, lay down a perfect theory of the subject. A learned and ingenious physician to Guy's Hospital has long investigated the point, and has long been pledged to lay the result of his practical inquiries before the public. They have not, however, yet appeared. But from the publication of a small pamphlet, as the precursor of his volume, it would appear that he has satisfied himself, both with respect to certain means of practical discrimination, and as to the mode of operation of the mercurial remedies. It would seem, from this pamphlet, that the author considers most of these diseases as dependent on a constricted or obstructed state of the hepatic ducts, and mercury, administered in small doses, and in its milder forms, as possessing the property of "emulging" the ducts, especially when irritation about the parts is soothed by opiates: in other words, that these mercurials are, in the strict sense of the word, *abolagogues*. After having described the case of a delicate female, affected with great irregularity of bowels, termi-

nating in dysentery, and accompanied with paleness, languor, dejection of spirits, loss of appetite, quick small pulse, &c. which had been rather augmented than relieved, by repeated doses of calomel and rhubarb, alternated with opiates, and which yielded to small doses of the *pilula hydragryi*, preceded by an opiate, and followed by a dose of castor-oil;—he thus states his view of the disease, and of the *modus operandi* of these remedies. "The depressed action of the brain which anxiety occasions, produced a corresponding defect of action in the liver; whence the intestines, from not being supplied with bile in sufficient quantity, or healthy in quality, became irritated by the food passing through them in an undigested state. The purgatives, astringents and opiates, which were first employed, gave temporary relief, but left the *source* of the disorder as it was; whilst the calomel, acting merely as a simple evacuant, carried off nothing but the exilting contents of the intestines, and still farther weakened their tone. But, by allaying intestinal irritation by opiates, then relaxing the hepatic ducts by the *pil. hydragryi*, and lastly, emulging them by the aid of a mild cathartic, the order of nature was restored, and that harmony of function between these parts which is necessary to health, completely established." (See An Examination of the Prejudices commonly entertained against Mercury, &c. by James Curry, M.D., &c. 2d edit. p. 20, note. Lond. 1810.) This explanation of the alleviation of the disease is sufficiently plausible; it is, however, but an hypothesis; for the previous *constriction*, the subsequent *relaxation*, and the ultimate *emulging* of the biliary ducts, are incapable of demonstration; neither is the first assumed circumstance adequate to explain the altered quality of the bile, nor the two latter its changes to the healthy state. It is sufficient, however, if it be practically ascertained, that this mode of mercurials, preceded or combined with anodynes, and followed by gentle cathartics, is an efficient mode of treatment in these cases of diminished or vitiated secretion of bile.

In those cases of diseased liver, which have been sometimes denominated scirrhus, when, either from previous acute inflammation, or from frequent accelerated secretion of bile, during a long residence in a warm climate, the vessels of the liver have poured out, into the parenchymatous substance, so much coagulable lymph, as to render it firm and indurated,—then it is often necessary to push the use of mercury farther, so as to produce a gentle salivation, which, when kept up for a length of time, often effects a cure, by promoting absorption. In the exhibition of mercury for this purpose, a preference has been given to its introduction by friction on the skin, through the cutaneous absorbents; and the part on which the mercurial ointment has been rubbed is the right *hypochondrium*, from a notion of its efficacy being greater when applied to the vicinity of the diseased organ. But it is pretty obvious, that, except in so far as friction may serve the purpose of gentle exercise to the part, and thus assist in emulging the biliary ducts, there is no material advantage derived from this; and that it is of little importance what part is made choice of, provided the effects produced on the general system be equally strong. The knowledge derived from anatomy respecting the structure, origin, and direction of the absorbent vessels, sufficiently proves that, whether used internally, or introduced by external friction, none of the mercury can be made to pass through the liver in its way into the constitution: it cannot, therefore, act on the liver, but by being first introduced into the blood-vessels. Such parts of the body as have the finest cuticle, as in the inside of the thighs, between the fingers, in the groin, &c. which afford the best absorbing surface, should be chosen for the purpose of the friction.

On the other hand, the tuberculated state of the liver is perhaps always beyond the power of mercury to alleviate, and often it would seem even aggravated by its exhibition. Medicine may contribute greatly to relieve distressing symptoms, in such cases, but cannot be expected to change the morbid structure. Flatulence, pains in the sides, stomach, and belly, indigestion, &c. may be greatly diminished by laxatives, absorbents, gentle tonics, and occasional antispasmodics; and the digestion may be favoured by the choice of light diet, taken in moderate quantities. But it cannot be expected that the system shall be put under the stimulus of a mercurial course with impunity, much less with advantage, under such circumstances.

LIVER, *Infarctions of the*. See HEPATITIS *Infarctio*.

LIVER, in *Antiquity*, was much used in divination. See HEPATOSCOPIA.

LIVER of Antimony, in *Chemistry*, results from the detonation of antimony with an equal weight of nitre. These two matters reduced into powder are to be mixed together, and put into a large crucible. The mass is then to be kindled, and the detonation to be made. When it has detonated it is to be kept in fusion, and then cooled. When the crucible is broken, at the bottom two distinct matters are found, which may be separated from each other by the stroke of a hammer. The upper matter is a saline scoria, nearly of the same nature as the scoria of the regulus of antimony. This is a true antimonial liver of sulphur, mixed with a certain quantity of vitriolated tartar. The lower matter is heavier. It is opaque, compact, red, and brittle. This is the liver of antimony. Its colour and appearances have been supposed similar to those of the livers of animals, whence its name. It is principally composed of the metallic part of antimony, half deprived of its sulphur, and dephlogisticated by nitre. This substance is of no use in chemistry, nor in medicine, since the kermes mineral and emetic tartar have been introduced. Macquer's Chem. Dict. See ANTIMONY.

LIVER of Arsenic, is a combination of white arsenic with liquid fixed vegetable alkali, or by the humid way. The operation for making liver of arsenic is easy and simple: to strong and concentrated liquid fixed alkali, previously heated, fine powder of white arsenic must be added, till the alkali is saturated, or has lost its alkaline properties. While the alkali dissolves the arsenic, it acquires a brownish colour, and a singularly disagreeable smell; and the mixture gradually thickens into a gluey consistence. Chem. Dict. See ARSENIC.

LIVER of Sulphur is the combination of sulphur with alkaline matters: and this combination may be made either in the dry or humid way. In the dry way, or by fusion, a mixture of equal parts of fixed alkali and sulphur is put into a crucible, and quickly fused. The melted mass is then poured on a greased stone, and then the liver of sulphur congeals and acquires a brown colour. If it be required to be kept dry, it must be soon broken to pieces, and put, while it is hot, in a bottle well corked, because it readily imbibes moisture from the air. In the humid way, which is less common, concentrated liquid fixed alkali, and fine powder of sulphur, are to be boiled together, till the alkali has dissolved as much as it can: the liquor is then to be filtrated and evaporated.

Liver of sulphur is an important combination in chemistry, because it is in general a very powerful solvent of metallic matters; to all which, excepting zinc, it attaches, particularly in fusion. It seems to dissolve gold more effectually than other metals. It dissolves all vegetable coals even by the humid way: and the solution is of a green colour. Partic-

ular kinds of livers of sulphur may be formed by the combination of volatile alkali, of quick-lime, or of absorbent earths, all which attack sulphur more or less. Chem. Dict. See SULPHUR.

M. Navier has lately discovered, that the liver of sulphur, and particularly of liver of sulphur of Mars, hath the most salutary effects as an antidote against arsenic, corrosive sublimite, verdigris, and lead. Nav. Contre Poisons de l'Arsenic, &c. 1777. See LEAD.

LIVER-stone See LAPIS *Hepaticus*.

LIVER-wort, in *Botany*. See LICHEN.

LIVER-wort, *Noble*, *Hepatica*, a species of the anemone.

LIVERMORE, in *Geography*, a town of America, in Cumberland county, Maine, situated on both sides of Androscoggin river; 19 miles N.W. of Hallowell, and containing 863 inhabitants.

LIVERNON, a town of France, in the department of the Lot, and chief place of a canton, in the district of Figeac; eight miles W.N.W. of Figeac. The place contains 713, and the canton 7786 inhabitants, on a territory of 285 kilometres, in 17 communes.

LIVERPOOL, a market town, borough, and sea-port, in the county palatine of Lancaster, England. It is placed on the eastern bank of the river Mersey, which flows into the Irish sea, not far north of Liverpool. The population of this town, according to the parliamentary returns of 1800, amounted to 77,653 persons, who occupied 11,446 houses.

The etymology of the word Liverpool is much involved in obscurity, though many ingenious antiquaries have endeavoured to ascertain it. The most general opinion is, that it owes its origin to a species of bird called the *lever*, great flocks of which are said to have frequented a pool in this neighbourhood, during their wanderings from their native climes. Accordingly a bird has, from time immemorial, been the impression on the corporation seal. The early history of this town is equally as unknown as the derivation of its name. Fortunately, however, the deficiency of records concerning it cannot be felt as a great loss, as there seems little reason to suppose it was of any importance, either commercially or politically, previous to the commencement of the last century; hence it may be called a modern town.

"Yet scarce an hundred annual rounds have run,
Since first the fabric of this power begun;
His noble waves inglorious, Mersey roll'd,
Nor felt his waves by labouring art control'd.
Along his sides a few small cots were spread,
His finny brood their humble tenants fed."

Mount-Pleasant, a poem by Roscoe.

To the active, persevering, and liberal conduct of the author of these lines, Liverpool is materially indebted for its present increase of buildings, commerce, &c. and it would have reflected credit on the free burghers of the town, had they continued to elect him their member.

In the Conqueror's survey, it is stated, that all the land between the rivers Ribble and Mersey belonged to Roger de Poitiers; but there is no mention either of a town or village. Hence it may be reasonably supposed none existed at this time. A castle, however, is noticed by Camden, as having been built shortly after the conquest, the command of which was bestowed on Vivian de Molyneux, a Frenchman, in whose family it continued till the 30th year of the reign of queen Elizabeth.

Neither history nor tradition determine any thing certain, either concerning its founder or the period of its erection.

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The tower, which forms part of a prison in Water-street, is the only building of antiquity which Liverpool can now boast of possessing. The original founder of this tower we are as ignorant of as we are of the founder of the castle. Seacombe, in his *Memoirs of the Stanley family*, is the first author who mentions it. He tells us, that it was the property of sir Thomas Latham, in the reign of Edward III., whose daughter and heirs married sir John Stanley; but says nothing of its erection. The cross which formerly stood at the corner of Pinfold lane, opposite the Flashes, has been long demolished. This tradition reports to have been placed there in commemoration of St. Patrick, who, it is said, rested in this neighbourhood on his way from England to Ireland.

The first charter in favour of Liverpool, according to Enfield, who published a history of Liverpool, was executed in the reign of Henry I., but the accuracy of this statement is extremely doubtful. It is certain, however, that in the charter granted by king John in 1203, nearly a century afterwards, this town is called a borough by prescription. Henry III. confirmed the privileges of the corporation in the year 1227. From this period to 1555, we are totally in the dark as to its history or condition; nor is there any thing worth remarking for the 16 years following, when the inhabitants sent a memorial to queen Elizabeth, praying relief from a subsidy which her ministers had imposed upon them. In this petition they style themselves "her majesty's poor decayed town of Liverpool." How the town became so "decayed," it is now difficult to comprehend, as, from the records several years previous, it does not seem to have been any better than a fishing hamlet, containing about 138 householders and cottagers, and possessing 12 barks, navigated by 75 men. Camden, however, who wrote in 1586, considered it in his time as more famous for its beauty and populousness than for its antiquities. To reconcile these opposite statements, it is only necessary to admit, that a very trifling village may arrive at considerable opulence in the short period of 21 years; and who will deny the possibility of such an event at the present day? From Camden's time nothing is recorded of Liverpool deserving of notice till the year 1644; when the town and its castle were possessed by the parliamentary troops, under colonel Moore. It was fortified and secured on the land side by a high mud wall, and a ditch twelve yards wide and three deep. Batteries were erected at different points, and the ends of the streets were defended by artillery. The garrison was numerous, and being well stored with provisions, made a most vigorous defence for the space of a month. At last, however, the king's army, under the orders of prince Rupert, succeeded in taking the town, when the castle surrendered without further resistance. Some traces of this siege can yet be discovered at different points. When the foundation of the present infirmary was sunk, the marks of trenches were distinctly visible, and many articles of modern warfare were found within their scope. A few years ago, as some workmen were removing the earth in a field where Gloucester-street now stands, they laid open the foundation of a battery, and discovered military utensils of different kinds. From the time of the siege till 1680, we have a tolerable account of the progress of the town in extent and population. After this period, however, we are again left in obscurity, and receive no authentic information on that head till the year 1765, when we find a plan of the town made by Mr. John Lyes. About this time, says Enfield, Liverpool contained about 4200 houses, and 25,000 inhabitants. It had, in the interval last-mentioned, been constituted a distinct parish from that of Walton, to which its

church had formerly been only a dependent chapel. This event took place in 1698, when the inhabitants were likewise authorized to build a second church. Thus emancipated from parochial subservience, Liverpool began to display its energies. In the short space of little more than half a century, this town, aided by a few favourable circumstances, has risen to great commercial importance, and may be considered to be next to the metropolis itself. She first rivalled, and latterly surpassed, Bristol, which had long been considered as the western emporium of trade.

The following table exhibits the progressive increase of the dock duties for several years, and serves to display the vast and rapid increase of the commerce of the town. It shews the number of vessels that have been affixed in each year, with the aggregate sum paid to the dock companies.

Years.	Ships.	£.	s.	d.
1760	1245	2,330	6	7
1765	1930	3,455	8	4
1770	2 73	4,142	17	2
1775	2291	5,384	4	9
1780	2261	3,528	7	9
1785	3429	8,411	5	3
1790	4223	10,037	6	2
1795	3948	19,368	16	4
1800	4746	23,337	13	6
1802	4781	28,192	9	10
1805	4618	33,364	13	1
1807	5791	62,831	5	10
1809	6023	97,580	19	3

The boundaries of Liverpool extend considerably beyond the town in different directions. These are marked out by stones called by the inhabitants meer-stones, and the ground contained within them is denominated the liberties. The extent of the liberties from east to west, is somewhat more than a mile and two furlongs, and from north to south considerably above two miles. This town exhibits, in general, the appearance of opulence and refinement. The streets are well paved, and during winter tolerably furnished with lamps. Of late years it has received many great alterations and improvements, which still continue to proceed notwithstanding the pressure of the times. In the year 1790, it consisted of 8865 houses, but their number now is little short of 15,000.

Liverpool possesses fifteen churches belonging to the establishment, some of which are worthy the particular attention of the stranger. Near the old church, which is dedicated to our Lady and St. Nicholas, there formerly stood an image of the latter, to which the sailors were accustomed to make offerings on going to sea. This church has been lately rebuilt. The tower of St. Peter's, which was erected in 1704, is a well-proportioned octagon, each side of the angles having a candlestick and gilt vase representing a flame. This and St. Nicholas are the parish churches, and have two rectors over them. The church of St. George, built on the site of the ancient castle already mentioned, is a fine edifice of the Doric order, crowned with an attic wall, and adorned with a variety of vases. On each side is a terrace with recesses underneath. The interior is handsomely fitted up, the fronts of the galleries being mahogany. This is the mayor's chapel, where he attends every Sunday, and where pews are appropriated for the gentlemen, including strangers, who choose to accompany him. St. Thomas's church is of the Ionic order, and has a handsome appearance. It was consecrated in 1750. St. Paul's church was erected by the town in 1760. At the west end is a portico with a pediment, having in the centre, on an octagonal base, a dome

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with a lantern, ball, and cross. The interior is supported by eight Ionic pillars. The altar is plain and neat. The church dedicated to St. Ann, on the road to Everton, is a neat building of brick and stone. It was erected at the joint expense of two private gentlemen. It has a tower decorated with pinnacles. St. John's church is a new building of stone, with a tower. St. Mary's and the other churches have nothing connected with their structures or appearances deserving of particular notice: though all of them are entitled to be called neat. Besides the places of worship belonging to the establishment, there are a great number of dissenting meeting houses, or chapels, for various descriptions of religionists.

The public edifices connected with the trade and commerce of the town are, the exchange buildings, town-hall and mansion house, custom-house, corn exchange, tobacco warehouse, and other warehouses. Of these the Liverpool exchange is the most spacious in plan, and ornamental in its exterior architecture. It has been erected by a subscription of 80,000*l.* raised by 800 transferable shares. The buildings occupy three sides of a quadrangle, having the town-hall on the fourth side. The whole surrounds an area of 194 feet by 180. It has been built by John Forster, esq. (architect, engineer, and dock master to the corporation) from designs by James Wyatt, esq. architect; and is appropriated to a public exchange rooms, coffee rooms, and various offices. The town-hall, formerly called the exchange, is a large insulated pile of building, the greater part of which was erected in 1750, from the designs of Wood of Bath. The whole of its interior was burnt in 1795. It was soon repaired, and appropriated to the use of the mayor, for offices belonging to the corporation, sessions rooms, &c.

The infirmary is another excellent building of brick ornamented with stone. This establishment not only extends to all proper objects within Liverpool, but to every person whom sickness or bodily misfortune may lead to apply, provided they are recommended by a subscriber. The seamen's hospital forms a portion of the buildings of this infirmary, being attached to it by a handsome colonnade. The blue-coat hospital is placed in an airy situation adjoining to St. Peter's church-yard. It is a large handsome building of brick ornamented with stone. The number of persons who annually receive the benefits of this charity are about 280. The expence of this institution is defrayed chiefly by benefactions.

The poor-house is a handsome edifice, 90 feet long and 24 broad, built in a plain style, and in a manner very suitable to its use. On the east side of this structure is a handsome stone building, called the "recovery ward," where persons infected with fevers, and coming under the cognizance of physicians and surgeons of the dispensary, are received. A variety of alms-houses range out on both sides of the poor-house. In Church-street is the dispensary, which is a very good brick building, with a large circular portico, and having in front a small bas-relief of the good Samaritan. This institution is conducted by a president, two auditors, seven physicians, three surgeons, and one apothecary, who officiates as secretary. Two physicians and a surgeon attend every day at certain hours. About 10,000 persons are said to receive medicine and advice here annually. The Lunatic-asylum is contiguous to the infirmary, but, like most other institutions of the kind, cannot be called a complete charity, as patients are not admitted free of expence. At the entrance into the town, on the road leading from Prescot, stands the school of industry for the indigent blind. The original projector was Mr. John Christie, who was him-

self unfortunately deprived of his sight at the age of 19. In this school pupils are taught various trades, which enable many of them to make a comfortable provision for life. Besides these charitable institutions there are a number of others, under different names, intended for the relief of different descriptions of persons, which the limits of an article like this will not permit us to mention particularly.

Liverpool abounds, as may be supposed from its great trade, with rooms appropriated for public correspondence, and the transacting of business. The Atheneum, which comprises a news-room, a library, &c. is situated on the fourth side of Church-street, and is a handsome building of stone. The subscribers to this institution, about 450 in number, are supplied with the London and provincial newspapers, the shipping and trade lists, and various periodical publications. Every subscriber is allowed the privilege of introducing his friend, provided he be a non-resident of the town. There also several more institutions of a similar kind in different parts of the town. Of these, the Lyceum is the first and most worthy of attention. It is situated at the bottom of Bold-street, and is another remarkable instance of the munificence and public spirit of Liverpool. An academy, for the encouragement of the fine arts, has recently been established in this town. The places of public amusement are now little inferior to those in the metropolis. The theatre is a spacious and commodious building, and but little inferior to that of Covent-garden in the extent of its stage. It generally opens at the time the London houses shut, when many of the first performers resort to it. In Bold-street stands the Music-hall, which was opened in 1785. It is a large building, finished with great elegance. The new prison, according to the Howardian plan for solitary confinement, is on a very extensive scale, and has every possible convenience.

Liverpool abounds in docks for the safety and repair of its numerous shipping. The first dock was constructed here in 1710. Its site was the pool, from which the town derived the latter portion of its name. This basin of water is called the old dock, and is principally the receptacle of West India and African ships, being contiguous to the warehouses of the merchants engaged in those branches of commerce. The King's dock is 290 yards in length, and 92 wide. On the east side of this dock stands the tobacco warehouse, where that article is lodged by the custom-house officers till the duties are paid. It was erected by the corporation, and is rented by government at 500*l.* *per annum.* St. George's dock was the third made in Liverpool. It is about 250 yards long, and 100 broad; and is esteemed commodious. The largest, last constructed, and best finished however of the Liverpool docks, is the Queen's dock, which is situated at the bottom of Parliament-street. Salt-house dock, which is the second oldest of the whole, comprises an area of 21,28 square yards; and has a length of quay of 640 yards. Besides these there are five graving docks, and three dry docks, independent of a small one, which belongs to the earl of Bridgewater, for the use of the canal flats. Some of these docks communicate, so that ships can pass from one to the other, and into the graving docks, without being obliged to go into the river. All the wet docks are likewise connected by large tunnels, for the purpose of one dock cleaning or washing another. When large ships loaded arrive at neap tides they are compelled to remain in the river till the flow of the spring tides, as the dock gates have not depth of water sufficient to admit them. This circumstance is certainly a great inconvenience, but it is amply compensated by the capaciousness and excellent arrangement of the docks themselves.

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The custom-house is situated at the east end of the old dock. It is built of brick, in rather a neat style. A small flight of steps leads to a piazza, over which is the long room, and behind it are extensive warehouses. At the south end of the town is St. James's walk, from which the spectator has a fine view of the town, the harbour, the river, the sea, and the Welsh mountains. Behind this lies an excellent quarry, the entrance of which is by a subterraneous passage, supported by arches. Bottle-springs, about four miles distant from Liverpool, furnish the town with water, which is conveyed by means of pipes.

The principal manufactures are those of china and earthen ware, the several branches of the watch-making, and extensive salt, iron, and copperas works. It is computed that about 3000 shipwrights are constantly employed in the different dock-yards of this town. The river, which is here about 1200 yards broad, abounds with salmon, cod, flounders, and turbot. Ships of any burden may come up to this town with perfect safety, even at the lowest tides. The accommodations for sea-bathing have, of late years, received vast improvements, and are not perhaps inferior to any in the kingdom.

Liverpool undoubtedly owes all her opulence and grandeur to the spirit and enterprise of her merchants. She exhibits, to the eye of the statesman and philosopher, a distinguished instance of the rapid progress of commercial greatness. A century ago, a few coasting vessels and petty traders formed the whole of her wealth. For the first fifty years her advance was comparatively slow. After this period, however, the increase of trade which the every year acquires, is truly astonishing. She shares a portion of the commerce of almost every country in the world. Of late years, Liverpool has considerably decreased, in common with that of all the other towns in the kingdom. What effect the abolition of the slave-trade may ultimately have upon Liverpool, it is not possible to prognosticate. For the present, however, the mercantile houses, formerly engaged in that traffic, must undoubtedly suffer considerable difficulties before they can turn their capital and attention to some object more honourable than the purchase and sale of human beings.

Independent of the advantages Liverpool possesses for foreign commerce, it has communication with all the interior counties by canals. These again, being joined by others at different points, extend themselves to the Severn, to the Humber, and to the Thames; thus connecting the four principal trading ports in England. To the beneficial effects of these canals Liverpool has to attribute much of her present greatness.

The markets of Liverpool are well supplied with every necessary of life, and every article of luxury. About 3000 cattle and sheep are brought into the town weekly. The market days are Wednesdays and Saturdays. Liverpool sends two members to parliament. The number of electors amounts to above one thousand. The corporation consists of a mayor, two bailiffs, and a common-council. The mayor and bailiffs are assisted by a recorder, a town clerk, and other necessary officers. The revenues of the town are very great. Enfield's History, &c. of Liverpool, folio. A General and Descriptive History of Liverpool, by Wallace, 8vo. 1797. The Picture of Liverpool, 12mo. 1805. Beauties of England, vol. ix.

LIVERPOOL, a town on the S. side of the bay of Fundy, in Queen's county, Nova Scotia, settled from New England. Between this town and Annapolis lies a considerable lake, called Rossignol. It is 32 miles N.E. of Shelburne,

and 58 N.W. of Halifax, and was formerly called "Port Rossignole."

LIVERY, properly signifies a colour, to which a person has some particular fancy, and by which he chooses to distinguish himself, or his retainers, from others.

Liveries are usually taken from fancy, or continued in families by succession. The ancient cavaliers, at their tournaments, distinguished themselves by wearing the liveries of their mistresses: that people of quality make their domestics wear their livery.

Father Menestrier, in his Treatise of Carousals, has given a very ample account of the mixtures of colours in liveries. Dion tells us, that Cæneaus was the first who invented green and blue colours for the troops which, in the Circus, were to represent land and sea-fights.

The Romish church has also her several colours and liveries; white, for confessors and virgins, and in times of rejoicing; black, for the dead; red, for the apostles and martyrs; blue or violet, for penitents; and green, in times of hope.

Formerly, great men gave liveries to several, who were not of their family or servants, to engage them in their quarrels for that year; but this was prohibited by the statutes 1 Rich. II. 1 Hen. IV. cap. 27. 2 & 7 Hen. IV. 8 Hen. VI. cap. 4. 8 Ed. IV. cap. 2. and no man, of whatever condition, was allowed to give any livery, but to his domestic officers, and counsel learned in the law. However, most of the above statutes are repealed by 3 Car. I. cap. 4.

LIVERY, in Law, also denotes the delivery of possession to those tenants which held of the king in capite, or by knights' service. See POSSESSION.

LIVERY is also used for the writ, which lies for an heir to obtain the possession or seisin of his lands at the king's hands. By 12 Car. II. cap. 24. all wardships, liveries, &c. are taken away. See COURT of Wards.

LIVERY of seisin, is a delivery of possession of land or tenements, or things corporeal, to him who hath right, or probability of right, to them.

Livery of seisin is a ceremony used in the common law, on conveyance of lands, tenements, &c. where an estate in fee-simple, fee-tail, or other freehold, shall pass; and is a testimonial of the willing departing of him who makes the livery, from the thing whereof the livery is made, as well as of a willing acceptance by the other party, of all that whereof the first has divested himself. (See FREEHOLD.) On the creation of a freehold remainder, at one and the same time with a particular estate for years, at the common law livery must be made to the particular tenant. (See ESTATE and REMAINDER.) But if such a remainder be created afterwards, expectant on a lease for years now in being, the livery must not be made to the lessee for years, for then it operates nothing; "Nam quod semel meum est, amplius meum esse non potest;" but it must be made to the remainder-man himself, by consent of the lessee for years: for without his consent no livery of the possession can be given (Co. Litt. 48.); partly because such forcible livery would be an ejectment of the tenant from his term, and partly for the reasons assigned for introducing the doctrine of attornments.

Livery of seisin is either in *deed* or in *law*.

The usual manner of livery of seisin in *deed* is thus performed. If it be in the open field, where is no house nor building, and if the estate pass by deed, the feoffor, lessor, or his attorney, openly reads it, or declares the effect of it; and after that is sealed, the feoffor takes it in his hand, with a clod of earth, or a twig or bough, which he delivers to the feoffee, in the name of possession, or seisin, according to the

the purport of the deed. If there be a house or building on the land, the ceremony is to be done at the door of it, none being then left within; and the ring or latch of the door is delivered to the feoffee, who enters alone, shuts the door, and presently opens it again. If it be a house without land or ground, the livery is made, and possession given, by delivery of the ring or latch of the door and deed only; and where it is without deed either of lands or tenements, there the party declares by word of mouth, before witnesses, the estate he parts with; and then delivers seisin, or possession, as aforesaid: in which case the land passes as well as by deed, by virtue of the livery of seisin. Co. Litt. 48. West Symb. 251.

If the conveyance or feoffment be of divers lands, scattered in one and the same county, livery of seisin of any parcel in the name of the feoffor, sufficeth for all (Litt. § 414.); but if they be in several counties, there must be as many liveries as there are counties. If the lands be out on lease, though all lie in the same county, there must be as many liveries as there are tenants. (Dyer 18.) In all these cases it is prudent to endorse the livery of seisin on the back of the deed, specifying the manner, time, and place of making it, together with the names of the witnesses. Livery *in loco* is where the same is not made on the land, but only *in sight* of it; the feoffor saying to the feoffee, "I give you yonder land, enter and take possession." However, this livery in law cannot be given or received by attorney, but only by the parties themselves. Co. Litt. 48. 52.

Anciently, there were a pair of gloves, a ring, knife, an ear of wheat, &c. delivered in sign of livery and seisin.

LIVERYMEN of London, are a number of persons chosen out of the freemen of each company. (See COMPANY.) Out of this body the common-council, sheriffs, aldermen, and other officers for the government of the city are elected; and they only have the privilege of giving their votes in common-hall for members of parliament, &c. from which the rest of the citizens are excluded. If any one of the company refuse to become a liveryman, he may be fined, and an action of debt will lie for the sum.

LIVERYMEN, in *Natural History*, a name given by authors to a sort of caterpillars, remarkable for their variety of colours. These are of that class of caterpillars which live in communities, and build themselves nests to defend them from the injuries of the weather. They may be ranked among the processionary kinds, always following one another with great order in their marches; but what is most surprising, is to see them straggle very far from their nests, and this often, by several repeated windings and turnings, without losing their way. Their art, in doing this, deserves notice, and is the same by which Theseus got out of the labyrinth of Crete. Phil. Transf. N^o 470. p. 459.

LIVIA DRUSILLA, in *Biography*, a celebrated Roman lady, daughter of Livius Drusus Calpurnianus, who joined the party of Brutus and Cassius, and killed himself after the battle of Philippi. She married Tiberius Claudius Nero, by whom she had two sons, Drusus and the emperor Tiberius. The attachment of her husband to the cause of Antony was the beginning of her greatness. Octavianus, afterwards the emperor Augustus, saw her as she fled from the danger which threatened her husband, and resolved to marry her, though she was then pregnant. He accordingly divorced his wife Scribonia, and with the approbation of the augurs he celebrated his nuptials with Livia. She from this moment enjoyed the entire confidence of the emperor, and was in fact the partner of his whole reign, enjoying a large share of his power and imperial dignity. She gained a complete ascendancy over the mind of Augustus by a constant obedience to

his will: by never expressing a desire to dive into his secrets, and by affecting ignorance of his amours. Her children by Drusus were adopted as his own by the complying emperor; and that she might make the succession of her son Tiberius, Drusus being dead, more easy and undisputed, Livia has been accused of secretly involving, in one common ruin, the heirs and nearest relations of Augustus. There are facts adduced which seem to render the suspicions of her baseness and cruelty wholly without foundation. She has been charged with administering poison to her husband, which is rendered exceedingly improbable by the account we have of his last illness, and by the tenderness he expressed for her in the last words he uttered. By his will she was instituted co-heiress with Tiberius, adopted as a daughter, and directed to assume the name of Julia Augusta. On his deification she became the priestess of the new god. Tiberius, whose elevation had been the object of her policy, disappointed her expectation of sharing with him the imperial power. He took pains indeed to subject her to various mortifications: and at length there was an open rupture between them. She died in the year 29.

Tiberius neglected her funeral, and would not permit public or private honours to be paid to her memory. Tacitus has drawn her character, saying, that "in strictness of conduct she was not inferior to the Roman matrons of old, though her demeanour was freer than they would have approved; that she was an imperious mother, a compliant wife, and a match for her husband in art, and her son in dissimulation."

LIVIA, in *Ornithology*, a name given by some authors to a particular species of pigeon called *palaus* by the Greeks. It is very like the common pigeon in shape, but is somewhat smaller, its legs are red, and its beak white, except that it is a little purplish about the nostrils.

It is all over grey, but that the end of its tail-feathers are black, and there is a purplish and greenish variegation about the sides and shoulders. And its wing-feathers have some white variegations, as has also the lower part of the neck. It is supposed by Mr. Ray, and some others, to be the same with the *passerella* of the Italians, or *columba rupicola*. See COLUMBA.

LIVINEIUS, JOHN, in *Biography*, a learned Flemish divine, was born at Dendermond about the year 1540. Being intended for the church, he pursued his academical studies at Cologne, entered into holy orders, and was in a short time presented to a rich benefice at Liege. He was afterwards promoted to a canonry, and appointed preceptor in the cathedral church of that city. He engaged in the superintendence of the edition of Pantin's Greek bible, and translated into Latin some of the works of the Greek fathers, and was about giving to the public all the works of St. Gregory of Nyssen, when he was cut off by death in 1599. He published "Emendationes et Notae in XII. Paenynicos Vetus," and other learned works; and left behind him in MS. translations of the tragedies of Euripides, and of the works of Athenaeus. Gen. Biog.

LIVINETHAL, in *Geography*. See LEVANTINE Valley.

LIVINGSTON, a county of Kentucky, in America, bounded N. by the Ohio, W. by the Mississippi, and S. by Tennessee; 70 miles long and 60 broad. The principal rivers are the Cumberland and Tennessee. It contains 2787 inhabitants, of whom 414 are slaves. Also, a large township in Columbia county, New York, extending from the E. bank of Hudson river to the Massachusetts line, S. of Hudson adjoining. It contains 7405 inhabitants, of whom 213 are slaves.

LIVISTONA, in *Botany*, named by Mr. Brown, in memory of the right honourable Patrick Murray, lord Livistone, the friend of sir Andrew Balfour, who, when the Edinburgh botanic garden was first established, greatly enriched it from his own private collection, where he had above a thousand species in cultivation. This nobleman travelled over France in search of plants, where he died of a fever, about the middle of the seventeenth century. Brown Prodr. Nov. Holl. v. 1. 267. — Class and order, *Hexandria Monogynia*. Nat. Ord. *Palmæ*.

Eff. Ch. Calyx deeply three-cleft. Corolla deeply three-cleft. Filaments separate, dilated at their base. Germens three, cohering. Styles three, united into one. Stigma undivided. Berry solitary, of one cell. Seed solitary; albumen with a ventral cavity; embryo at the back.

A genus of Palms, whose leaves are palmate, or somewhat pinnate, their segments cloven at the extremities. It should stand between *Corypha* and *Chamærops*. *Latania chinensis* of Jacquem's *Fragmenta*, p. 16. t. 11. f. 1, is thought by Mr. Brown to belong to this genus. Two species of it were found by him in the tropical part of New Holland.

1. *L. inermis*. Segments of the leaves with intermediate threads. Footstalks without thorns. Stem from 14 to 30 feet high.

2. *L. humilis*. Segments of the leaves with intermediate threads. Footstalks thorny. Stem from four to six feet high.

LIVIUS ANDRONICUS, in *Biography*, is regarded as the most ancient of the Roman poets. He was the first who attempted to compose a drama in verse, which he himself sung and acted, while a player on the flute accompanied him in unison to keep him in time. He was ecored and obliged to repeat his pieces so often, that he lost his voice; and being unable to sing or declaim any longer, he was allowed to have a slave to sing, while he only acted the part behind him. Hence came the custom of dividing the declamation or melody of the piece, with which the Roman people were extremely delighted. This poet flourished 240 B. C. Livy and Priestley.

LIUNG, in *Geography*, a town of Sweden, in West Gothland; eight miles S. of Uddevalla. — Also, a town of Sweden, in East Gothland; eight miles N.N.W. of Linköping.

LIUNGBY, a town of Sweden, in the province of Skonen; 16 miles E. of Helsingborg.

LIVNI, a town of Russia, in the government of Orel, on the Sosva; 84 miles E. of Orel. N. lat. 52° 58'. E. long. 38° 22'.

LIV OE, a small island of Denmark, in Lymfiord gulf; having upon it a village. N. lat. 56° 53'. E. long. 9° 6'.

LIVONIA, the name of an ancient province of Russia, which, including *Esthonia* (which see), lies in N. lat. 58°, and is bounded on the N. by the gulf of Finland, on the E. by Novogorod, on the S. by Poland, and on the W. by the Baltic; being 190 miles from N. to S., and 180 from W. to E., and containing 725,300 inhabitants. This province abounds in lakes, forests, marshes, and rivers; but many districts are exceedingly fertile, yielding great quantities of rye and other grain, flax, hemp, and linseed, which are exported to Sweden, Germany, and other countries; so that Livonia has been called the granary of the north. It has several good harbours conveniently situated for trade. Peipus lake, about 15 leagues long, and ten broad, has a communication with the gulf of Finland by the river Narva. This country, formerly claimed by several neighbouring princes, frequently changed masters. Livonia, or Lettland, as it was called, together with Esthonia, Courland, and Semigallia,

being provinces on the Baltic, belonged in the earliest times to the Russian state, and had even a share in the founding of it. (See *LETES*.) But Livonia had then no settled constitution, nor was it bound to the parent state by any firm political tie. To the rest of Europe it remained generally unknown, till in the year 1158 it was discovered by some merchants of Bremen, in their search of new branches of commerce towards the north. These mariners landed at the mouth of the Duna, opened a trade with the inhabitants, returned thither several times, and at length proceeded, with the consent of the natives, along the shores of the Duna, or Dwina, many miles up the country. About eighteen years after the discovery, an Augustine monk, named Meinhard, settled in Livonia, profelyted the Livonians to Christianity, and became their bishop, upon which many Germans, at various times, were induced to repair thither also. The time of the arrival of Meinhard is not precisely ascertained. Some pretend that it was in 1170, others in 1186. The success of the monk was promoted by the service which he rendered to his own countrymen, in repelling the Lithuanians, who had made an incursion upon them. He flated to them the necessity of constructing a strong fortress, and he aided them in accomplishing this object, on condition of their being baptized. But they were reluctant in complying with this condition, and many of them relapsed to Paganism. Meinhard was disappointed in his benevolent efforts, and prevented by force from returning with his clergy to Germany, he died among them, more of grief than of age. After his death, Berthold, abbot of the monastery of Lockum, in Hanover, was elected bishop, and arriving in Livonia, though not without reluctance, in the year 1197, he recommended himself by giving them frequent entertainments: but the ardour of their attachment soon abated, and he was constrained by ill usage to leave the country. He applied to Gothland and to Lower Saxony for succour; and the pope assisted him by causing a crusade to be preached against the heathens of Livonia. In 1198 he returned thither with an army of foldiers. The Livonians prepared to fight, took the field to resist the invaders. A truce was concluded, which was soon broken on the part of the heathens, by the assassination of several Germans. Berthold declared war, and in a bloody battle which ensued, fell by the sword. The heathens, however, were at length routed, and when their corn-fields were laid waste by the Christians, they sued for peace, and flocked in numbers to be baptized. Upon this the Germans returned home; but they were no sooner embarked, than the Livonians bathed in the Dwina, in order, as they said, to wash away their baptism and Christianity together. They also plundered those that remained, and put upwards of 100 to death. The Livonians also resolved, that all priests who should be found in the country after Easter 1199, should be slain. A similar fate also awaited the merchants. These ransomed their lives, but the clergy were forced to fly to Lower Saxony. The monk Meinhard, and the abbot Berthold, were succeeded by Albrecht, who, being elected bishop, arrived in Livonia with twenty-three ships. The Livonians became Christians for fear of starving. Albrecht employed valiant men, from whom the bishopric might expect continual protection; and with this view he gave ample fiefs to some courageous nobles. He established also a standing army, and devised other methods for establishing Christianity in the country. In 1201 he built the city of Riga, and transferred thither the cathedral chapter, where he also built a monastery. In the mean while the clergy dispersed themselves through the country, in order to teach and to baptize. In process of time other means were used to accomplish the conversion of the Livonians.

nians. In the year 1205 Andrew, archbishop of Lunden, visited Riga, and having acquired the reputation of a learned divine by his studies in Italy, France, and England, gave lectures of theology to the clergy of that city; and by his advice the vicar of the bishop of Riga sent priests among the Livonians, divided the country into distinct parishes, and caused them not merely to be baptised, but to be previously instructed. Churches were also erected. From Livonia Christianity was diffused, against much opposition, among the Esthonians. In the year 1522, the reformation found its way into Liefland, by a preacher, who, having been driven out of Pomerania, fled to Riga. The doctrine of Luther was eagerly embraced; and the Popish ritual, afterwards patronized on the part of Poland, had, on the whole, no influence to its detriment. By the tenth article of the treaty of Nyitadt, the Greek religion is secured in the free exercise of its rites. In Riga there is a church for the use of the Calvinists, and the Catholics are allowed the exercise of their worship. In Liefland it may be justly said that every man may follow his own persuasion in matters of religion without the least molestation. Here also count Zinzendorf has found many friends to his church institution.

Soon after the conversion of the Livonians, the bishop, in the year 1201, founded the order of the Sword-brethren, afterwards called Knights-Templars, and granted them the third part of the country with all rights of sovereignty, for conquering and preserving Livonia. These knights were all Germans, who profolyted the natives to Christianity with great success, though not without bloodshed, and made them their vassals. They afterwards united themselves with the Teutonic order in Prussia, to whom Valdimar III., king of Denmark, in 1386, sold Esthonia for the sum of 18,000 marks of standard gold. In the year 1521 the Livonian heermeister Plettenberg again separated from the Teutonic order, and was admitted by the emperor Charles V. among the princes of the German empire. The attempts made by Czar Ivan Vassilievitch II, to reconquer these provinces which had been torn from the Russian empire, and the weakness of the order, which felt itself not in a capacity to resist so powerful an enemy, at length, in 1561, effected the complete separation of the Livonian state. Esthonia put itself under the protection of Sweden, Livonia united with Poland, and Courland was a peculiar dukedom under Polish supremacy, which the last heermeister Gotthard Kettler held as a fief of that crown. From this era Livonia became the unhappy object of contention, for which Sweden, Russia, and Poland, for an entire century, were continually exhausting themselves in bloody wars. Sweden at last obtained the dominion, and at the peace of Oliva in 1660 added this province to the possession of Esthonia. Both countries finally, after a war of 20 years, came to the Russians by the treaty of Nyitadt in 1721; and form at present the vicerealties of Riga and Revel. These two governments are supposed to contain 24,000 geographical square miles. This country formerly contained a considerable number of towns and villages, but by wars and intestine commotions, most of them were destroyed. See RIGA and REVEL.

The tract of country called Polish Livonia, which, under the government of the Teutonic order, formed likewise a part of the Livonian state, reverted in the year 1561, with the whole province of that name, to Poland. At the peace of Oliva, by which Livonia came under the sovereignty of Sweden, this sole district however remained to the Polish state, retaining from that time its name in contradistinction to Swedish Livonia. On the partition in 1773, this country, which had hitherto constituted its particular voivodeship, was annexed to Russia, and now comprehends the two circles of

Dunaburg and Refitza, in the vicerealty of Polatsk. Tooke's View of the Russian Empire, vol. i.

LIVONICA TERRA, in the *Materia Medica*, a kind of fine bole used in the shops of Germany and Italy, of which there are two species, the yellow and the red. (See BOLE.) The distinguishing characters of which are these.

The yellow Livonian earth is a pure and perfectly fine bole, of a shattery friable texture, considerably heavy, and of a dull dusky yellow, which has usually some faint bluish redness in it. It is of a smooth surface, and does not stain the hands; it adheres firmly to the tongue, and melts freely in the mouth, leaving no grittiness between the teeth, and ferments not at all with acid menstrua. In a moderate fire it acquires some additional hardness, and a darker colour. It has been esteemed a sudorific and an astringent.

The red Livonian earth is an impure bole of a loose texture, and a dull red. It is of a smooth surface, breaks easily between the fingers, and slightly stains the hands. It melts freely in the mouth, has a very strong astringent taste, but leaves a grittiness between the teeth, and is alkaline. It acquires a considerable hardness in the fire, and becomes of a paler colour with a strong cast of yellowish-brown.

These earths are both dug out of the same pit, in the place from whence they have their name, and in some other parts of the world. They are generally brought to us made up in little cakes, and sealed with the impression of a church, and an escutcheon with two cross keys, and recommended in diarrhœas, dysenteries, &c.

LIVORNINA, an old coin of Leghorn, equal in value to 4s. 5½d. sterling.

LIVORNO, in *Geography*. See LEGHORN.

LIUR, a town of Sweden, in West Gothland; 33 miles N.E. of Gotheborg.

LIVRE, a French money of account, in the old system, consisting of twenty sols; each sol containing twelve deniers and four liards.

The origin of the word is derived hence, that anciently the Roman libra, or pound, was the standard by which the French money was regulated; twenty sols being made equal to the libra. By degrees the libra became a term of account; so that any coin just worth twenty sols was a livre, or libra; and since the time of Charlemagne, all contracts have been made on the foot of this imaginary coin; though the sols have frequently changed their weight and alloy.

The livre is of two kinds, *Tournois* and *Paris*.

LIVRE *Tournois*, as above, contains twenty sols Tournois, and each sol twelve deniers Tournois.

LIVRE *Paris*, is twenty sols Paris, each sol Paris worth twelve deniers Paris, or fifteen deniers Tournois; so that a livre Paris is equivalent to twenty-five sols Tournois; the word Paris being used in opposition to Tournois, on account of the rate of money, which was one-fourth higher at Paris than at Tours.

The franc and livre were formerly synonymous; but in the coinage of 1795, the franc was made too heavy, and its value was accordingly raised 1¼ per cent.; thus, 80 francs = 81 livres. In 1796, it was ordered that the piece of five francs should pass for five livres one sol three deniers Tournois, from which the proportion of the franc to the livre of 100 to 101½ is determined; but the accuracy of this proportion has been questioned by writers of the first authority, who have calculated it to be as 100 to 101½. See COINS, EXCHANGE, and MONEY.

For an account of the coin and money of account, both under the old and new system of 1795, see MONEY.

There have since been pieces of gold struck of twenty sols value;

value; and under Henry III. in 1575, pieces of silver of like value: both the one and the other were called *frances*; and thus the imaginary coin became real. It appears that the Romans had also a kind of money, which they called *libra*, or *libella*; which was the tenth part of their denarius; so called, because equivalent to an *as*, which at first weighed a *libra* or pound of copper. Scaliger adds, that they used *libra* as a term of account, not as a coin: "*Libra erat collectio nummorum non nummus.*"

LIVRE OUVERT, *Fr. in Mus.* To sing or play a *livre ouvert*, is equivalent to playing or singing *à sight*, at the opening of a book. All musicians pique themselves on being able to perform a musical composition at sight, without previous study or practice; but Rousseau very justly observes, that there are few who, in this kind of execution, seize the true spirit of the author, and who, though they hit the right notes, do not mistake the expression.

LIUSDAL, in *Geography*, a town of Sweden, in the province of Helmingland; 32 miles W.N.W. of Hudwicksf-wal.

LIUSNABRUCK, a town of Sweden, in the province of Helmingland; 5 miles S. of Soderhamm.

LIUSNAN, a river of Sweden, which rises in the mountains of Harjedalen, and discharges itself into the gulf of Bothnia; 8 miles S. of Soderhamm. N. lat. 61° 15'. E. long. 17°.

LIUSTARNO, an island of Sweden, in the Baltic. N. lat. 59° 30'. E. long. 18° 30'.

LIUSTORP, a town of Sweden, in Medelpadia; 15 miles N. of Sundfwall.

LIUSUDBORG, a town of Sweden, in Nericia; 40 miles N. of Orebro.

LIUTPRAND, in *Biography*, an historical writer of the tenth century, said by some authors to have been a Spaniard, by others an Italian. His father was in the confidence of Hugo, king of Italy; and the son, while very young, was placed in the court of Berenger II., who obtained the kingdom by dispossessing Hugo, and was sent by him ambassador to the Greek emperor, Constantine Porphyrogenitus, on account of his intimate acquaintance with the Greek language. Losing the favour of his own master, he was obliged, in 958, to go an exile to Germany, where he composed the history of his own times, which is extant. The fall of Berenger, who was stripped of his dominions, in 961, by Otho I., restored Liutprand to his country; and he was soon after consecrated bishop of Cremona. In quality of this office, he attended an assembly of bishops at Rome in 963, in opposition to the pope, John XII. He was again sent as ambassador to the court of Constantinople, in the name of Otho, to solicit the daughter of the Greek emperor for the son of Otho: he was unsuccessful; and being much hurt at the reception he met with, he satirized the pride and ignorance of the court in an account of his embassy, annexed to his history. The time of his death has not been ascertained; but his signature occurs in a synod held at Ravenna in 975, under the title of Lixzio, bishop of Cremona. This historical work of Liutprand consists of six books, of which some of the latter chapters are supposed to have been written by another hand. It has passed through several editions: the last is that of Muratori, in his "*Scriptores Rerum Ital.*"

LIUTZEN, in *Geography*, a town of Russia, in the government of Polotsk; 60 miles N.N.W. of Polotsk. N. lat. 56° 25'. E. long. 27° 34'.

LIVY, **TITUS LIVIUS**, in *Biography*, an eminent Roman historian, is supposed to have been a native of Padua. He came to Rome in the reign of Augustus, and was ad-

mitted to the familiarity of several persons of rank, and of the emperor himself. He made himself known by some philosophical dialogues; but his literary reputation was principally built upon his Roman history, which enjoys a perpetual celebrity: no work of the kind was ever received with greater applause. Few particulars of his life are known; yet his fame was so universally spread, even in his life time, that a person traversed Spain, Gaul, and Italy, merely to see the man whose writings had given him such pleasure and satisfaction in the perusal. Livy died at Padua in his 67th year, and, according to some, on that same day Rome was also deprived of another of its brightest ornaments by the death of Ovid. Livy wrote a letter, addressed to his son, on the merit of authors, which is greatly commended by Quintilian, who expatiates with great warmth and ardour on the judgment and candour of the writer. His Roman history was comprehended in 140 books, of which only 35 are extant. It began with the foundation of Rome, and was continued till the death of Drusus in Germany. The merit of this history is well known, and the high rank which Livy holds among historians will never be disputed. His style is clear and intelligible, laboured without affectation, disfluent without tediousness, and argumentative without pedantry. His descriptions are singularly lively and picturesque; and there are few specimens of oratory superior to that of many of the speeches with which his narratives are copiously interspersed. Of the editions of Livy, those most esteemed are that of Gronovius cum Notis variorum, 3 vols. 8vo. Lugd. B. 1679; of Le Clerc, Amst. 10 vols.; of Crevier, 6 vols.; of Drakenborch, Amst. 7 vols. Livy's works have been divided by some moderns into 14 decades, each consisting of 10 books. The first decade comprehends the history of 460 years. The second decade is lost, and the third includes the history of the second Punic war, or a space of about 18 years. In the fourth decade, Livy treats of the wars with Macedonia and Antiochus, which contain 23 years. For the first five books of the fifth decade we are indebted to the researches of the moderns. They were found at Worms, in the year 1451. These are the remains of Livy's history. Freinshemius, with great industry and attention, has made an epitome of the Roman history, which is now incorporated with the remaining books of Livy.

LIV, in *Geography, a town of the duchy of Warsaw; 40 miles E. of Warsaw.*

LIXEME, a town of Prussia, in Oberland; 5 miles S.S.W. of Saalfeldt.

LIXIVIOUS, **LIXIVIAT**, or *Lixiviate*, in *Chemistry*, is understood of salts extracted from burnt vegetables by lotion.

Lixivious salts are the fixed salts of plants, &c. extracted by calcining the plants, or reducing them to ashes, and afterwards making a lixivium of those ashes with water.

Mr. Boyle observes, that the difference between lixivious and urinous salts consists in this, that the former change the dissolution of sublimite in common water into a yellow colour, which the latter do not. See **ALKALI** and **SALT**.

LIXIVIUM, **LEY**, or *Lees*, a liquor made by the infusion of wood-ashes; or, it denotes any alkaline solution, made by lixiviating pearl, or wood, or other ashes.

What is left after the evaporation of such a liquor is called a lixivious salt; such as all those are which are made by incineration.

Lixiviums are of use, not only in medicine, but also in bleaching, sugar-works, &c. See **BLEACHING**, **SUGAR**, and **POT-ASHES**.

LIXIVUM Martis, in *Medicine*, a form of medicine introduced into practice in the London Dispensatory. The manner of preparing it is to set the matter remaining in the retort after the subliming of the flores martis, in a damp place, where by means of the moisture of the air it will run into a liquor. See *Flores Martiales*, and *IRON*.

LIXIVUM Saponarium, *Soap-lee*, *Aqua kali puri*, P. L. 1787; *Liquor potassæ*, P. L. 1809; a liquor that has been much used in medicine in cases of the stone (see *LITHONTRIPTIC*); and when intended for this use, it is to be made something less strong than for the soap-boilers' use, and should be prepared in the following manner. Take Russia pot-ash, and quick-lime, of each an equal quantity; though pure alkaline salt requires commonly about twice its weight of quick-lime to render it completely caustic, which is known by the ley making no effervescence with acids: throw water on them in small quantities till the lime is slaked; then throw on more water, and stir the whole together, suffering it to stand for a day or two, that the salt of the ashes may be dissolved; after some time pour the liquor, filtered through paper, if needful, into another vessel. A true standard wine-pint of this liquor measured with the greatest exactness, ought to weigh just sixteen ounces troy. If it be found on trial to be heavier than this, for every drachm it exceeds that weight, an ounce and a half of water is to be added to each pint: but if it be lighter than this, it must be either boiled to this standard, or else poured upon fresh lime and ashes.

The makers of soft soap with us prepare their lees so much stronger than this, that to be reduced to this standard, it requires to be diluted with an equal quantity of fair water.

Quick-lime has the property of increasing considerably the causticity of all fixed alkalies, by absorbing their fixable air or gas. See *LIME*.

This caustic ley, evaporated to dryness, furnishes an alkaline salt exceedingly acid, which being melted in a crucible becomes what is called common *caustic*; because when it is applied to the skin, it makes an eschar, pierces it, and leaves an ulcer, the suppuration of which, when continued, is called an *issue*. Caustic alkali has not only much greater dissolving power, but it is also much more deliquescent, and attracts much more powerfully the moisture of the air, than ordinary alkali. This inconvenience is avoided by boiling down the soap ley only to one-fourth part, and then, while the liquor continues boiling, sprinkling in, by little and little, so much powdered quick-lime as will absorb it, so as to form a kind of paste.

The *liquor potassæ*, or solution of potash, of the last London Pharmacopœia, is prepared by dissolving a pound of subcarbonate of potash, *i. e.* the kali præparatum, P. L. 1787, or sal abstinii, sal tartari of P. L. 1745, in two pints of boiling distilled water; then adding three quarts of the water to a pound of lime newly prepared: mix the liquors while they are hot, stir them together, then set by the mixture in a covered vessel, and, after it has cooled, strain the solution through a cotton bag. If any diluted acid, dropped into the solution, occasion the extrication of bubbles of gas, more lime must be added, and the mixture strained again. This solution is more dense than water, and, when shaken, appears like oil.

LIXIVUM Tartari, the name given in the London Dispensatory of 1745 to the liquor called by most authors, as in P. L. 1720, *oil of tartar per deliquium*; in P. L. 1787, *aqua kali præparati*; and in P. L. 1809, *liquor potassæ subcarbonatis*. This is made of tartar, which is to be calcined to a whiteness, and then set in a damp place, where it will

liquify by the moisture of the air. The liquor thus procured is more pure than if the calcined tartar were dissolved directly in water.

In the last P. L. it is directed to be prepared by dissolving a pound of subcarbonate of potash in twelve fluid ounces of distilled water, and then straining the solution through paper. This solution will, in the ordinary state of the subcarbonate, amount to nearly 18 ounces in bulk.

LIXURI, in *Geography*, a town of the island of Cephalonia; 12 miles W. of Cephalonia.

LIZARD, in *Astronomy*. See *LACERTA*.

LIZARD, in *Natural History*. Lizards, in various parts of our work, referred to the article *LACERTA*, of which, in its proper place, we were disappointed, we shall now, it being the first opportunity afforded us after the omission, give an account of the whole genus, including a great variety of animals, which, although they possess many characters in common, yet exhibit considerable differences in their economy and habits, and also in their structure and external form.

For the anatomical description of this genus, we refer to the article *REPTILES*.

The genus *lacerta* has by some naturalists been regarded as a distinct order, and as such has been divided into several genera; but following the Linnæan arrangement, we shall consider the subject under the divisions or sections into which Linnæus separated the genus.

Dr. Shaw has thus enumerated them:

1. Crocodiles, furnished with strong scales.
2. Guanas, and other lizards, either with serrated or carinated backs and tails.
3. Cordyles, with denticulated, and sometimes spiny scales, either on the body or tail, or both.
4. Lizards proper, smooth, and the greater number furnished with broad square scales, or plates on the abdomen.
5. Chameleons, with granulated skin, large head, long missile tongue, and cylindric tail.
6. Geckos, with granulated or tuberculated skin, and lobated feet, with the toes lamellated beneath.
7. Scinks, with smooth, fish-like scales.
8. Salamanders, newts, or efts, with soft skins, some of which are water-lizards.
9. Snake-lizards, with extremely long bodies, very short legs, and minute feet.

This is an active tribe, and, with the exception of the aquatic animals, feeds on insects: the crocodiles have both jaws moveable, and the largest mouth of all animals: their body is covered with callonities: the chameleons have a prehensile tail; sit on trees; walk slowly and irregularly; have no teeth; eyes large, fixed in a wrinkled socket; tongue very long, worm-shaped, with which they draw in flies; head angular, covered with very thin lucid tubercles or scales.

The foregoing divisions, it is admitted, neither are nor can be perfectly precise, since species occur which may, with nearly equal propriety, be referred to either of the neighboring sections: on this account naturalists have not been agreed as to the exact number of species in each section, nor even as to the number of sections themselves. Dr. Shaw, as we have seen above, has separated the genus into nine sections; he has been followed by many other respectable writers, but in the last edition of Gmelin, as given by Dr. Turton, the genus is divided into eleven sections, which shall be given in their order.

Section A. Tail two-edged, divided into segments; tongue very short.

Species.

CROCODILUS, or Crocodile of the Nile; has a mailed head; nape carinate, tail above with two lateral crests.

This animal, as its name imports, is chiefly found in the river Nile, or on its banks. It sometimes arrives at a very great size: the common size of a full grown crocodile is from 18 to 25 feet long, though some have been seen that measure full forty feet in length. The colour of the upper part is a blackish-brown, but beneath it is of a yellowish-white. The upper parts of the legs and sides are varied with deep yellow, and in some parts tinged with green. The opening of the mouth is of vast extent, and both jaws are furnished with numerous sharp-pointed teeth; those in the middle part of the jaw being largest, and resembling the canine teeth of viviparous animals. The external openings of the ears are placed on the top of the head, above the eyes, and the eyes themselves are furnished with a nictitating membrane, similar to that of birds. The legs are short, strong, and muscular. The tail is long, compressed on the sides, and furnished above with an upright process, formed by the gradual approach of two elevated crests, which proceed from the lower part of the back. The upper part of the body of the crocodile is covered with a strong armour, which in its structure exhibits the appearance of the most curious carved work, and is indeed a fine piece of mechanism. The crocodile deposits its eggs in the sand or mud on the banks of the rivers which it inhabits, and as soon as the young are hatched, they proceed to the water. The crocodile is a native of Asia and Africa, but it seems more common in the latter than in the former country. It inhabits only large rivers, and lives chiefly on fish, but being extremely voracious, it seizes any other animal that comes within its reach. The crocodile has long been regarded as one of the most formidable animals of the countries in which it is found, but some late travellers seem to have entertained a less formidable opinion of them. M. Denon, speaking of the French army in Egypt, says that the soldiers and himself bathed daily in the Nile, and yet they were never once attacked by them, nor did they ever meet with a single crocodile at a distance from the water. Hence he inferred that they find in the river a sufficient quantity of easily procurable food, which they digest slowly, being, like the lizard and serpent, cold blooded, and of an inactive stomach. "Besides," says the traveller, "having in the Egyptian part of the Nile no enemies but each other and man, they would be truly formidable, if, covered as they are with an almost impenetrable defensive armour, they were skilful and alert in making use of those means which nature has given them for attack." He farther adds, that they saw three crocodiles, one of which was nearly twenty-five feet in length; they were all asleep, so that they could approach them within about twenty yards, and had an opportunity of distinguishing them very accurately. He says, that in that position they resembled dismounted cannon: he fired on one, the ball struck him and rebounded from his scales. He made a leap of ten feet, and dived into the river.

In the large rivers of Africa, and in certain parts of those rivers, they may be seen in vast shoals swimming together, where they exhibit the appearance of floating timber. A variety of the common crocodile has been found in the river Senegal, it has a longer snout, and is almost entirely black. It is very swift, voracious, and of amazing strength; it roars hideously; devours every thing that comes in its way; swallows stones to prevent hunger, and cannot be killed by a musket ball unless struck on the belly: it seldom moves but in a straight line, and may accordingly be

avoided: the female lays her eggs in the sand, which are not much larger than those of a goose.

GANGETICA, or Gangetic crocodile. This animal has long, roundish, or sub-cylindric jaws; its tail on the upper side has two crests running into one.

This species is found in the Ganges, where it is nearly equal in size to the common crocodile. In this the structure of the snout is very remarkable, it being nearly three times as long as the head. The eyes are extremely prominent, and it is said they are so constructed, that they may be raised above the water, when the rest of the body is under the surface, by which the animal is enabled to see its prey either on the surface of the water, or on the banks of rivers. In the general form and colour of the body and limbs, this species resembles the common crocodile. In the British Museum is a specimen of this creature, measuring eighteen feet in length.

ALLIGATOR. The head of this animal is flat, imbricate; nape naked; tail above with two rough lateral lines.

It inhabits the middle parts of America, is less than a crocodile, but resembles it in habits and voracity. The largest in size, and the greatest numbers of alligators, inhabit the torrid zone, nevertheless the continent ten degrees more north abounds with them, particularly as far as the river Neus in North Carolina. In the latitude 33, which answers to the northernmost parts of Africa, where they are likewise found, they frequent not only salt rivers near the sea, but streams of fresh water in the upper parts of the country, and in lakes of salt and fresh waters, on the banks of which they lie lurking among the reeds to surprise cattle and other animals. They are found in Jamaica, and many parts of the continent, full 20 feet in length. But we are told they cannot be more formidable in their aspect than terrible in their nature, sparing neither man nor beast which come within their reach, pulling them under water and drowning them, in order that they may with greater facility, and without a struggle or resistance, devour them. They subsist chiefly on fish, but as Providence, for the preservation, or to prevent the extinction of defenceless creatures, has in many instances restrained the devouring appetites of voracious animals, by some certain impediments; so this destructive monster can proceed only in a straight forward direction, and is consequently disabled from turning with that agility requisite to catch his prey by pursuit; therefore alligators do it by surprise in the water, as well as by land: they have the power of deceiving and deceiving their prey, by a sagacity peculiar to themselves, as well as by the outer form and colour of their body, which on land resembles a log or tree, and in the water lies floating on the surface, and has the like appearance, by which, and their silent artifice, fish, fowl, and turtle, are lured into their grasp, and suddenly caught and devoured. Carnivorous animals get their food with more difficulty, and less certainty than those which subsist on vegetable substances, and are frequently obliged to fast long, which a slow digestion enables them to endure. Reptiles particularly, by swallowing whole what they eat, can live long without food. Alligators swallow stones and wood, to distend the stomach and prevent its contraction by emptiness. They lay a great number of eggs at one time on sandy banks of rivers and lakes, which are hatched by the heat of the sun, without any care of the parent. The young, as soon as they are disengaged from the shell, run to the water by a natural instinct, and shift for themselves, and while young they serve as a prey not only to ravenous fish of other tribes, but to their own species. In South Carolina they are numerous, but smaller than those towards the equator, but they attack men and cattle, and

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are great devourers of the race of swine. In Carolina they lie torpid during the winter in caverns and hollows in the banks of the rivers, and at their coming out in the spring make a hideous bellowing noise. According to Catesby, in his history of Carolina, some parts of alligators are reckoned very delicious food by the Indians. They deposit their eggs at two or three different periods, and more than twenty of them at each laying. They have been observed to raise a small hillock near the banks of the river, and after hollowing it out in the middle, to collect a quantity of leaves and other vegetable matters, in which they deposit their eggs. Both the alligator and crocodile are supposed to be long lived animals. It has been thought the crocodile, or some of the species, was the leviathan mentioned in the book of Job, chiefly, perhaps, because the description of this monster does not sufficiently correspond with the general structure of the whale; nevertheless, the leviathan there mentioned will correspond full as little with any of the species of the crocodile now known as with the whale, and it is more probable, that, like the mammoth, the leviathan of the scriptures is not now to be found on the face of the earth.

Section B.—The animals of this section have the body covered with carinate scales.

Species.

CAUDIVERBERA, or flat-tailed lizard, is found in Peru and Chili, and is about twelve or fifteen inches long. The tail is depressed, flat, wing-cleft; feet palmate. The body is inclining to blue; scales very minute; head convex, oblong; eyes very large, yellow; nostrils wide, with a fleshy edge; mouth large, teeth minute, hooked in a double series; tongue thick, broad, red; chin with a dilatable pouch; crest running down the back from the front to the tip of the tail, undulate at the edge; feet five-toed, with a cartilage instead of nails.

DRACENA, or large long-tailed lizard, with a smooth body, and tail denticulated along the upper part. The body is of a deep chestnut-colour; the scales are very minute; the legs tessellate, with saffron and white. It inhabits America, and has been named the large American cordylus, and has sometimes been confounded with the caudiverbera just noticed.

It is a native of several parts of South America, and of some of the Indian islands, and is regarded, in some countries in which it is found, as a great delicacy. The head is small, and rather elegantly formed, the snout tapering in such a manner as to bear a resemblance to that of an Italian grey-hound; the teeth are small and numerous, and the tongue forked; the proportions of the neck and limbs are elegant, though strong; and the body is moderately thick; the tail is of great length. The whole animal is smooth, or destitute of prominences on the skin, which is covered with small, ovate, and, in some parts, slightly subquadrate scales, largest on the outside of the limbs, the back, and the abdomen; along the upper edge of the tail runs a continued series of short triangular denticulations; the feet are moderately strong, and the toes are armed with sharp crooked claws.

Dr. Shaw mentions a variety, of which there was a specimen in the Leverian Museum, which differs in being of a pale brown colour, variegated on the body and tail by several deep-brown transverse bands, among which, as also on the abdomen and limbs, are interspersed many smaller variegations, and spots of a similar colour.

BIMACULATA, or Pennsylvanian lizard, has a tail carinate, notched, twice as long as the body, all the toes, of which

there are five on each foot, are lobate. The colour of its body is greenish-blue, mostly spotted with black; the shoulders with two large spots. It is found in the woods of St. Eustatius and Pennsylvania, and lives in holes, gutters, and hollow trees; makes a hissing noise, and deposits its eggs in the earth.

MONITOR, or monitor lizard, is one of the largest of the lizard tribe; it measures sometimes from four to five feet. Its colour is black; tail very long, compressed, carinated; body marked with transverse rows of white, ocellated.

This is a very beautiful animal. The head is small; the snout gradually tapers; the limbs are slender; and the tail, which is laterally compressed, gradually decreases towards the extremity. As a whole, the form is slender and elegant; though the colours are simple, they are so disposed as to produce an agreeable effect. It is a native of South America, inhabiting woody and marshy places. If credit may be given to reports of authors, who pretend to have studied its habits and characters with much accuracy, its disposition is as gentle as its appearance is beautiful. It has even gained the title of monitor salvaguarda, &c. from its pretended attachment to the human race: it has been confidently affirmed, that it warns mankind of the approach of the alligator by a loud and shrill whistle.

There is a variety of this animal mentioned by White, in his "Journal of a Voyage to New South Wales;" but in Gmelin's edition of the "Systema Naturæ," it is given as a distinct species, under the name of

VARIA, or variegated lizard. Though there is a great resemblance between this and the monitor; yet there are certain points of difference in its colour, and variegations that will justify its introduction as a separate species. The tail is long, carinate; body blackish, transversely variegated with yellow spots and marks.

It is found in New Holland. The markings on the body, instead of the general ocellated pattern of the preceding, consist of rounded, or slightly subangular spots and variegations: the limbs, as in the monitor lizard, are marked with numerous bands and spots, and the tail is banded; the claws are very large and strong.

BICARINATA, or bicarinated lizard, has a tail of moderate length; four rows of strong carinated scales on the back. The head is small; the mouth very wide in proportion, and the snout somewhat sharp. It is of a reddish-brown colour, tinged in some parts with various shades of green.

In its general habit, this species bears a resemblance to a small crocodile, on account of the hard tuberculated and carinated scales, on the upper parts of the body, two rows of which are more prominent than the rest, and extend from the upper part of the back to the tail, where they coalesce and form a serrated crest to the extremity. It is a native of South America, where it is sometimes used as food, and its eggs are highly esteemed. Its haunts are woody and marshy regions: it is fond of water; and one kept some time by M. de la Borde, often continued in it for several hours together, hiding itself when disturbed or affrighted, but it seemed delighted in coming out and basking in the direct and strong rays of the sun.

A lizard, known under the name of *ignarica*, a native of Brazil, is regarded as a variety of the species just described, differing only in colour, which is darker, and the claws, which are shorter, but, like it, there is some resemblance between it and the crocodile: it readily climbs trees.

CORDYLUS, or Cordyle lizard, has a smooth body, short tail that is verticillated with denticulated scales. This species is sometimes blue, and sometimes of a livid-brown, and the

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total length is not above ten or eleven inches. The scales which cover the body are of an oblong form, and the tail is verticillated with rows of large scales.

Section C. Back and tail, or the whole body, covered with denticulate or sharp-pointed scales.

Species.

PELLUMA, or Pelluma lizard, has a long tail, and verticillated with rhomboidal scales. It is about two feet in its total length, and is distinguished on the upper parts of its body by a beautiful variety of green, yellow, blue, and black colours. The under parts of the body are of a glossy yellowish-green: it is a native of Chili, and lives under ground; the inhabitants of that country make its skin into pouches. Its feet are five-toed, and its claws very strong.

STELLIO, or rough lizard, has a verticillated tail, with denticulated scales: the body and head are muricated.

This species, as its English name implies, is remarkable for the unusually rough appearance of its whole upper surface; both body, limbs, and tail being covered with pointed scales, projecting here and there to a considerable distance beyond the surface. The general colour of the animal is a pale blueish-brown, with a few deeper and lighter transverse variegations. It is not above eight or nine inches in length. It is a native of many parts of Africa. Dr. Shaw, in speaking of this species, says, "it may be observed that the lizard, which was probably termed *Stellio* by the ancients, from its being marked with spots resembling stars, seems at present unknown. It is, however, observable, that in one of Seba's plates a species occurs, which is actually marked with well-defined or regular star-shaped spots." Some naturalists consider the lizards called geckos as the true *stelliones*.

MAURITANICA, or Moorish lizard, is characterized by a subverticillate tail, muricate, short, smooth at the tip, body above muricate, toes unarmed, lamellate beneath.

This is one variety: the second is distinguished by a verticillate tail; and the third by having a prickly body. It is found in Mauritania, and in some parts of India. The body is lurid, the upper part has protuberances, the lower is smooth; scales are very minute; tail shorter than the body, from the base to the middle rough, with six rows of spines, thence to the tip smooth.

AZUREA, Azure lizard. Tail verticillate, short with mucronate scales.

This is the *elegantissima* of Seba. The colour, in its natural state, seems to be an elegant pale blue, fasciated on the body and tail with several transverse, and alternate bands either of black or very deep blue; but this is said to be most conspicuous in the smaller specimens or varieties. It is sometimes only a few inches long. The larger variety has a deep chestnut band on the shoulders. The smaller variety is a native of some parts of Africa; the larger of South America.

ANGULATA, or Angulated lizard, has a long and hexagonal tail, and is furnished with carinated and mucronated scales. This is a small species, having a tail longer than the body. The colour is of a dusky brown. Beneath the throat there are two rounded scales. The tail is longer than the body, and strongly marked with longitudinal ridges. It is a native of America.

ORBICULARIS, or Orbicular lizard, has a brown body; the tail is short, scales muricated. Both body and tail are round. The colour is of a dusky brown, variegated with different shades; the body is large, and in some respects it

resembles a toad. It is a rare species, and is a native of South America, particularly in New Spain.

BASILISCUS; Basilisk lizard. Tail round; dorsal fin radiate; hind-head crested. The basilisk is about eighteen inches long, of a pale ash-brown colour, with some darker variegations about the upper part of the body. In the young animal, the dorsal or caudal process, and the pointed occipital crest, are less distinct.

The basilisk is chiefly a native of South America. It resides principally among trees, and its food is insects. It is active, and by means of its dorsal crest or fin, it is enabled to spring from tree to tree. It can swim with great ease. It has a very formidable appearance, but is quite harmless. In the poetical descriptions of the ancients, it was considered to be the most malignant of all poisonous animals, even its look was regarded as fatal. The terrific glance of the basilisk in the African deserts, according to Lucan, obliged the rest of the poisonous tribe to keep at a distance.

PRINCIPALIS; Smooth-crested lizard. The tail of the species is subcarinate; crest on the throat very entire, back smooth. It is of a slender form, and small, rarely exceeding eight or nine inches in length, including both body and tail. The colour is blue, the head small, and the snout taper. It is a native of South America.

PLATURA; Broad-mailed lizard. Colour grey-brown, paler beneath; body rough; tail depressed, lanceolated, and spiny on the margin. This species is from four to six inches long; it is distinguished by the singular form of its tail. The feet are pentadactylous; the toes slender, and the claws curved. It is found in New Holland.

Section D. Back ciliate, toothed or crested; head covered with callonities.

Species.

IGUANA; Common or great American Guana. This species has a long round tail; back serrated; the throat crest denticulated. This, of all the lizard tribe, is the most peculiar form, and grows to a considerable size. It is sometimes three, four, or five feet long. The general colour is green, shaded with brown. The back is strongly serrated, which, as well as the denticulations of the pouch at the throat, gives it a formidable appearance.

It is a native of the West Indies, and some parts of the continent of America. It frequents rocky and woody places, and feeds chiefly on insects and vegetables. It is easily tamed, and follows the human race like a dog; it is caught by a noose thrown over its head; the flesh is reckoned a great delicacy: the general colour is green, but variously tinged in various animals: it has the power of inflating the throat pouch to a very large size.

According to Catesby the animals of this species are of various sizes, from two to five feet in length; their mouths are furnished with exceedingly small teeth, but their jaw is armed with a long beak, with which they bite with great strength. They inhabit warm countries only, and are rarely met with any where north or south of the tropics. Many of the Bahama islands abound with them, where they nestle in hollow trees and rocks. Guanas make a considerable part of the subsistence of the inhabitants of the Bahama islands, for which purpose they visit many remote islands in their flocks to catch them, which they do by dogs trained for the purpose. Guanas feed on vegetables and fruit, particularly on a kind of fungus growing at the roots of trees, and on the fruits of the anona. Their flesh is easy of digestion, but is thought not to agree with constitutions labouring under a particular disease.

Though

Though guanas are not amphibious, they are said to keep under water above an hour. When they swim they make no use of their feet, but clap them close to their body, and guide themselves with their tails. They are so impatient of cold, that they rarely appear out of their holes except when the sun shines strongly.

The *horned* guana is a variety of the iguana, and is nearly the same in size and general proportions; the back is serrated, and the form of the scales is the same. It wants, however, the throat pouch, and there are in front of the head, between the eyes and nostrils, large scaly tubercles, behind which there is a bony conical process, which is covered with a single scale. It is a native of St. Domingo, where it is common.

CALOTES; Galeot lizard. Tail long and round; back denticated on the fore part, and the head on the hind part.

The animals of this species seldom exceed a foot and a half in length, from the tip of the nose to the extremity of the tail, but in other respects the calotes resembles the common guana. It wants the pouch, and in its place there is only a slight enlargement of the throat: the colour is commonly of an elegant bright blue, variegated with broad, irregular, white, transverse bands on each side of the body and tail. The limbs are slender, and this is particularly the case with the toes. It is a native of the warmer regions of Africa, Asia, and many of the Indian islands. It is very common in Ceylon. It is said to be found in Spain, where it wanders about the tops of houses in search of spiders.

There is a variety, of which the body above is livid, and beneath green; and a second, the neck of which is covered with broad obtuse prickles.

SUPERCILIOSA; Fringed lizard. Tail carinated; back and eye-brows ciliated, with upright lanceolated scales. It inhabits South America and India.

The general appearance of this species bears some resemblance to the guana, and still more to the variety described as the horned guana, in having the appearance of a pair of sharp-pointed horn-like processes above and beyond each eye; between these are placed some aculeated scales.

SCUTATA; Shielded lizard. Tail sub-compressed, moderately long; dorsal future toothed; hind-head with two sharp scales. It inhabits Asia. This species is distinguished from the fringed lizard by having a proportionably larger head, and a row of scales more elevated than the rest, passing over each eye; and from these a ridge is continued towards the back, in form of a denticulated crest to the beginning of the tail. The body is covered with small acuminate scales; the limbs and tail with larger ones. This is a native of Ceylon.

AMBOINENSIS; the Amboina lizard. Tail compressed, long, with a radiate fin; dorsal future toothed. This species, which sometimes grows to the length of three feet, is distinguished by the singularity of its appearance, and the beauty of its colours. The head and neck are green, and variegated with white transverse undulations. The back and tail are brown, with a shade of purple. The sides and belly are greyish, or pale brown, the head is tuberculated above, and covered with roundish scales; the mouth is wide, and the teeth are sharp and numerous.

It is a native of the East Indies, but is found most frequently in the island of Amboina, frequenting the neighbourhood of rivers and other fresh waters. It is often seen on the banks of rising grounds, and on low shrubs which grow near the water. Whenever it is disturbed by the approach of men or other animals, it plunges into the nearest water and conceals itself beneath the rocks, or stones under the banks. It may be easily taken, as it does not attempt

to defend itself, but seems, in some measure, stupified. Like other species of this numerous tribe, it deposits its eggs in the sand, on the banks of the rivers which it frequents. The eggs, while in the body of the animal, are disposed in two long groups or clusters, and are of a yellow colour; but when excluded, they are white and oblong.

This lizard appears in some degree to form a connecting link between the guana and the basilisk. The male and female differ considerably in size and in the distribution of their colours; the female being of a more obscure tinge than the male, and having but little appearance of the crest or process on the tail. It has been dissected, and a small triangular heart found within it: an oblong liver, with a round gall-bladder; small reddish lungs, slightly tinged with lead-colour; a narrow, whitish stomach, coated, or enveloped in fat, and large intestines, in which were discovered the berries and seeds of certain aquatic shrubs, together with some small semi-transparent pebbles, and a kind of worms not unlike millepedes. There was a fine specimen of this species in the Museum of the late Mr. John Hunter.

AGAMA; American galeot. Tail long, round; the upper part of the neck, and the back of the head, are aculeated; scales of the hind head reversed. This species resembles, in some respects, the calotes: but it wants the strong serratures on the back, instead of which it has only a small denticulated carina. The head is proportionally larger, and on the back part it is furnished with sharp-pointed scales, some of which are reversed at the extremities. The colour is brownish, and variously clouded. In the male, the crest on the back is composed of longer spines, and extends to the lower part. It is found in different parts of South America and in the West Indian islands.

There is a variety of this species named the muricated lizard. The tail is long, round; body greyish; scales carinated and sharp pointed. This lizard measures a foot or more in length. The want of the reverse scales on the back part of the head constitutes the principal difference between this and the calotes. It is found in New South Wales.

UMBRA; Clouded lizard. Tail round, long; nape sub-crested; hind-head callous; back striated. This is found in the southern parts of America: the body is clouded; scales keeled, and daggered at the tip, head more obtuse and round than others of its tribe: the *callus* on the hind part of the head is large and naked: under the throat is a deep fold.

MARMOREA; Marbled lizard. Tail round, long; throat subcrested, dentate on the fore-part; back smooth. It is found in America, and also in Spain. Its body is compressed; tail streaked, and the claws are black above.

CRISTATA; Crested lizard. Tail lanced, short, pinnate; back crested; body porous, naked. It is of a reddish-brown with lead-colour spots; crest reaching from the head to the tail; the head is very thick, obtuse; snout broad; feet cleft; four toes on the front feet and five on the hinder ones; tail bordered on each side with a membrane.

Section E. Body naked; feet unarmed; fore-feet four-toed.

Species.

AMERICANA. Tail lanceolate, middle-sized; back fringed; belly spotted with yellow; it is only about four or five inches long, and is found in America. The fore-part of the head is rounded; snout broad; body dusky blueish, beneath yellow spotted with black, sides pale ochreous legs

legs without blueish, within yellow; a fringe extending from the head to the tip of the tail.

PALUSTRIS; Warty newt. Body blackish; sides speckled with white; belly orange, with irregular black spots. This species is small, and bears a considerable resemblance to the salamander. It is from five to six inches in length. The tail is flat, with thin sharp edges, and terminating in a point; on each side of it in the male there is a silvery white broad band, accompanied with a blueish tinge. This stripe and the dorsal crest are sometimes wanting in the female.

It is found in many parts of Europe, but is rarely seen in Britain. It frequents stagnant waters in cool and shady places, and lives entirely on insects. It is said to be entirely harmless with regard to larger animals, but that a fluid is exuded from its skin which seems to act as a poison on small animals.

LACUSTRIS; Fenny newt. Of this species there are several varieties. 1. Black; tail lanceolate, middle-sized. 2. Much larger; spotted with black. 3. Variegated black and yellow, and spotted with black. 4. Tuberculate; chin speckled; belly spotted; tip of the tail red. 5. Tuberculate; belly saffron colour. 6. Head round; black spotted with pale yellow. 7. Black with whitish bands. 8. Black; beneath dotted with white. This species, which is found in many parts of the world, is very destructive of fish.

AQUATICA; Water-newt. Tail roundish, middle-sized; there are likewise varieties; brown or yellowish; and one with a dorsal line dotted with white and black; the first is found in many parts of Europe; the second inhabits France; and the third in Germany.

It lives in pools, ditches, and stagnant waters, and is killed in three minutes if salt be sprinkled upon it. The body is spongy, blackish dotted with black; chin rough; back sub-crested; tail smooth, speckled with a longitudinal white stripe on each side.

The general length of this species is from three to four inches. The male is readily distinguished from the female by a conspicuous dorsal crest, which is more elevated, and more regularly sinuated than that of the palustris. The broad crest is very transparent, and when examined by a magnifying-glass shews the ramifications of the blood-vessels and the circulation of the blood. In the female the dorsal crest is nearly wanting. The fore-feet are tetradactylous; but the hind-feet have five toes, and in all, the claws are wanting; but with regard to colour, the breadth of the tail, and that of the toes, water-newts differ at different seasons of the year, in different states of the weather, and sometimes a considerable variation is observed even in the course of the same day.

This species is very common in stagnant waters. It breeds early in the spring, and deposits small oblong strings or clusters of spawn. The ova are of a kidney shape, and the larvæ are ready formed, and may be seen active and sporting before they leave the gluten. They extricate themselves in about ten days, and when they are first excluded, the branchial fins are distinctly seen, and soon after their fore-legs appear. In a fortnight the hind-legs are visible, and in about four or five months the branchial fins become obliterated, and the animal assumes a perfect form. In the larva state, the animal has the appearance of a small fish. It casts its skin, which may be found floating on the waters which it frequents, and is sometimes so perfect as to represent the whole form of the complete animal. The reproductive power of this species of lizard has been noticed as a very striking circumstance in natural history. They have been known to have their legs, tails, and even their eyes

restored after they have been destroyed. It has also been ascertained that water-newts have been completely enclosed in a mass of solid ice, in which they have remained several weeks, and yet upon a thaw the little animals have been restored to their former health and vigour. We may mention in connection with this a species described by Dr. Shaw, denominated the

LEVERIAN Water newt; of which there was a good specimen in the Leverian museum. The total length of this is $17\frac{1}{2}$ inches, and its tail is about six or seven inches of it. The head is flattened, the mouth moderately wide, and the upper jaw is furnished in front with two concentric rows of numerous, small, bristly teeth. The under jaw has only a single row. The eyes are small, round, situated on each side of the front of the head, so that they are remote from each other. The colour is pale brown, marked with darker variegations. The legs are about an inch in length, and they are all furnished, along their whole length behind with a dilated skin or crest. The tail is like that of a common water-newt, but shorter and not so deeply finned.

SALAMANDRA; Salamander. The specific character of this animal is, colour black, spotted with golden yellow; tail round, and of moderate length. Of this species there are, besides the one described, some entirely black; some brown; some white; and some small, brown; with a tail in some degree compressed. The salamander, so long the subject of popular error, and of which so many idle tales have been recited by the more ancient naturalists, is an inhabitant of many parts of Germany, Italy, France, &c. but has not been discovered in England. It delights in moist and shady places, and during winter conceals itself in recesses under ground, in the cavities of old walls, or about the roots of old trees. It is easily distinguishable by its fine colours; being of a deep shining black, variegated with large, irregular patches of bright orange-yellow; which on each side the back are commonly so disposed, as to form a pair of interrupted longitudinal stripes; on each side of the back of the head is situated a pair of large tubercles, which are in reality the parotid glands, that are protuberant not only in this and other species of the *Lacerta* genus, but in a remarkable manner in the *Rana* or frog tribe. See *RANA*.

These parts, as well as the back and sides of the body, are beset in the salamander with several large open pores, through which a peculiar fluid is exuded, serving to lubricate the skin, and which, on any sudden irritation, is secreted in a more sudden and copious manner under the form of a white gluten of a slightly acriminous nature; and from the readiness with which the animal, when disturbed, appears to evacuate it, has arisen the long continued popular error of the salamanders being enabled to live uninjured in the fire, which it has been supposed capable of extinguishing by its natural coldness and moisture; the real fact is this, that like the other cold and glutinous animals, as snails, frogs, &c. it is not quite so instantaneously destroyed by the force of fire as an animal of a drier nature would be. The general length of the salamander is about seven inches, though it sometimes arrives at a much larger size. It lives principally on insects, small snails, &c.; its tongue is not by any means formed to catch these in a sudden manner, being short, broad, and in some degree confined, so as not to be darted out with celerity. It is capable of living in water as well as on the land, and is found occasionally in stagnant pools. Its pace is slow, and its habits torpid. The salamander is viviparous, and the young are produced perfectly formed, in the same way as the viper. It is said to retire into the water to deposit its young, the number of which at one birth amounts to 30 or 40; when they are first excluded, they are furnished with branchial

L I Z A R D.

chial fins on each side the neck; these are but temporary organs, and are afterwards obliterated like those of the tadpole.

It has been thought that the salamander was a venomous animal, and that its poison is of so malignant a nature, as scarcely to admit of any remedy. Later observations and experiments have ascertained that it is perfectly innocent, and although the fluid secreted from the skin may be noxious to smaller animals, it is incapable of inflicting either wound or poison on any large animal.

STRUMOSA; Strumous lizard. Tail round, long; breast gibbous, projecting forward. This is of a small size, has no serratures, but is furnished with a large flat crest at the throat, of a pale red colour; the other parts of the animal are of a pale bluish-grey, with some slight shades of a more dusky hue. The limbs are slender. It is a native of South America.

VITTATA; Forked lizard. The tail of this species is round, long; body brown with a white dorsal fillet, forked over the head. It inhabits India; it does not exceed six or seven inches in length; the head is large in proportion to the body, the toes are lamellated beneath; terminated by curved claws. The upper surface is covered with extremely small tubercles, which are so minute as scarcely to be perceptible.

TURKICA; the Turkish lizard. Tail subverticillate, middle-sized; body grey, and a little warty. It inhabits the East. Its body is dusted with brown spots, unequal, and as if sprinkled with scarcely visible warts; the tail is about the length of the body.

RAPICAUDA; Turnip-tailed lizard. Tail turbinate; ears concave. This species is found in several of the American islands; the body is white, spotted with brown; warts small, thickly sprinkled; claws hollowed in the middle underneath.

GECKO; Common Gecko lizard. Tail round, middle-sized; toes a little clawed; ears concave. This animal is said to have received its name from the peculiar sound of its voice, which bears a resemblance to that word when uttered in a shrill tone. It is twelve or fourteen inches long, and is accordingly ranked among the middle-sized animals of the lizard tribe; but it is thicker and stronger than the greater part of lizards. Its head is flattish, somewhat triangular, and large, with a covering of minute scales; its mouth is wide, eyes large, teeth small, and its tongue is broad and flat. The usual colour of the gecko is brown, with some irregular dusky or bluish variegations, but this colour becomes more brilliant in warmer regions.

It inhabits India, Arabia, Egypt, and the warmer parts of Europe; it frequents houses in summer, but is seldom seen in the winter; makes a noise like a weasel; is tame, and when frightened will run into houses for shelter; it emits a poisonous fluid from the lamellæ beneath its feet, which, if smeared over fruit, or other articles of food it has run over, causes a violent colic in those who happen to eat them; it frequently stands in an erect posture on its hind-feet; from the peculiar structure of its feet the animal is enabled to attach itself to the smoothest surfaces.

There is a variety of this species denominated *Tokai*, described by the Jesuit missionaries sent by Lewis XIV. to Siam; of which the body is covered above by a granulated skin, varied with red and blue undulations; the belly is of an ash colour, and interspersed with red spots; the head is large and triangular. It is a native of Siam, and is regarded as a poisonous animal. Bontius, in his History of Java, appears to describe one of a similar kind, under the name of the Indian salamander. It is called *Gecko*, on account of its

shrill cry. It is about a foot long, and its colour is fea-green, spotted with red, the head is large and toad-like; the eyes are large and extremely protuberant. It is said that the Javanese hold up the animal by the tail to make it discharge saliva from the mouth, which they collect and preserve for the purpose of poisoning their arrows.

GEITJE. Tail lanceolate, middle-sized; fore-feet with four toes; this species is found at the Cape of Good Hope. It is called by some naturalists *Sparmanniana*, on account of its having been first described by Sparmann. Its colour on the upper parts is a variegation of darker and lighter shades, and on the under parts it is whitish. It is looked on as a poisonous animal, and is supposed to secrete from its pores a fluid which produces tumours and even gangrenes, that are sometimes cured by the application of citron juice, but which, if long neglected, are very productive of dangerous symptoms.

Section G. The animals in this division have feet with five toes; some of which are connected; the tail is round, short, incurved.

Species.

CHAMÆLEON. Three varieties are mentioned in the *Système Naturel*, of which the specific character of the first is, body cinereous; head flat; of the second the body is white; and of the third the head is very large.

The chamæleon inhabits India and New Spain; it lives chiefly in trees: from the anatomical description, the lungs are large, and capable of being inflated to an enormous size by the animal; the eyes are so moveable that the creature can look in different directions at the same time; the pupil has a golden glare, and frequently changes its colour.

Few animals have been so much celebrated as the chamæleon, which, it was long believed, has the power of changing its colour at pleasure, and of assimilating it to that of any particular object or situation. This, however, is not the real state of the case; the change of colour which the animal exhibits varies in degree according to the circumstances of health, temperature of the weather, and other causes, and consists chiefly in an alteration of shades from the natural greenish or bluish-grey of the skin into pale yellowish, with irregular spots of dull red. Another erroneous assertion with regard to the chamæleon was, that it could subsist on air. This arose from the long abstinence which it is known capable of enduring.

The length of the chamæleon is about ten inches, but including the tail, it is nearly double that length. The skin on every part of the animal is granulated. There are five toes on each foot, two and three of which are united by a common skin as far as the claws. The structure of the tongue is peculiar; it is very long, and furnished with a dilated somewhat tubular tip, by which means it is enabled easily to seize insects, by darting it out and securing them on the tip. It is found in many parts of the world, and particularly in India and Africa; and has been seen in the warmer parts of Spain and Portugal. For a farther account of this animal, see **CHAMÆLEON**.

AFRICANA; or African lizard. Black; head carinate; it inhabits the northern parts of Africa and Spain; in its habits it resembles the chamæleon; the protuberant parts are all white.

PUMILLA; Dwarf lizard. Sides bluish, with two yellowish lines; it is found at the Cape of Good Hope. In this species the head is somewhat flatter than that of the *Africana*, but still elevated in the middle, and edged on each side with a denticulated margin. The *Africana* and the *Pumilla* have been regarded, by some naturalists, as varieties of the same species.

Section H. The animals of this division have their collar double; and square abdominal scales.

Species.

AMIVA; the blue lizard. Tail verticillate, long; abdominal scales thirty; collar beneath with a double wrinkle. It inhabits America, but occurs in Africa and Asia. The abdominal scales are in eight rows.

TILIGUERTA. Tail verticillate; twice as long as the body, abdominal scales eighty. It is about seven or eight inches long, and is found during the whole year in the fields and meadows of Sardinia.

AGTUS; Sealy or green lizard. Tail long, verticillate, with sharp scales; collar is sealy beneath. This elegant species, which is found in all the warmer parts of Europe, varies in length from fifteen inches to two feet. It is the most beautiful of all the European lacertæ, exhibiting a rich and varied mixture of darker and lighter green, interspersed with specks and marks of yellow, brown, blackish, and even sometimes red. The head is commonly of a more uniform green than the rest of the body; the under part of the animal, both on the body and limbs, is of a pale blue-green cast; the head is covered with large angular scales; the rest of the upper parts with very small ovate ones; the tail, which is commonly longer than the body, is marked with numerous rings of oblong-square scales, slightly bifid at their extremities; beneath the throat is a kind of collar, formed by a row of scales of much larger size than the rest: the abdomen is covered, down its whole length, with six rows of broad transverse plates, and the under surface of the limbs is also covered with similar scales; along the inside of the thighs runs a row of papille or tubercles, about thirteen in number, which, in this and other species, probably assist the animal in climbing or clinging to the stems and branches of vegetables; the tongue is moderately long, and formed to enable the animal to retain and swallow its prey, which consists chiefly of insects, small worms, &c.

This species is a native of all the warmer parts of Europe. It is found in gardens, about and in crevices of warm walls, buildings, &c. It is, as its name imports, a very active animal, and pursues its prey, which consists of insects, with great celerity. When it is caught it may be tamed, and it soon becomes familiar.

It appears to run into numerous varieties both as to size and colour; but in them all the particular characteristics of the species are easily ascertained. Besides the one already described, we have in the Syst. Nat. the following varieties: 1. One in which the lowest scales of the collar are loose. 2. That in which the skin is very thin and of a brown colour. 3. Body with eye-like spots. 4. Brown; on each side a series of indistinct spots. 5. Sides brown; back tawny. 6. Blueish; each side a triple row of ocellate spots. 7. Green speckled with brown; collar tawny. 8. Blue; head white; back longitudinally striate; hind-legs spotted. 9. Blue; the sides speckled with white.

The 8th, found in America, is described as innocent, active, elegant, living in dry meadows, walls, and rocks. Some of the animals of this species have been used as a medicine, and have been supposed to possess peculiar virtues in leprosy and other similar cases.

SEPIA; the eft. Tail verticillate, long; lateral future of the scales square.

This is a small species, and is easily known from the thin length of the body, and its long slender tail. There are three varieties, the first answers to the specific character, being the second is variegated with chestnut; head varied with black and white; the third is black-blue, marbled

with confluent white bands mixed with round spots. It inhabits southern countries. The body is covered above and beneath with truncate scales in eight rows, forming lateral and longitudinal streaks, belly flat; tail with about 50 whorls, half as long again as the body; legs short, distant, but well formed for running. See EFT.

VELOX; Swift lizard. Tail verticillate, longish; collar beneath sealy, body above cinereous, varied with five longitudinal paler streaks and brown dots; sides spotted with black, dotted with blueish.

This species is found in Siberia, particularly in the sultry desert places about the lake of Inderfkién; it wanders among the rocks, and is exceedingly swift; it resembles the sealy or green lizard, but is much slenderer and less; hind-legs marked with round patches.

CRUENTA; Red-tailed lizard. Tail verticillate, above cinereous, beneath scarlet with a whitish tip; fold of the neck beneath transverse. This species is found about the salt lakes in southern Siberia; resembles the velox in shape, but is three times as small, and has a sharper head. The body is brown, with seven white streaks on the neck, of which four reach the tail, beneath is white; limbs varied with round milky spots; thighs without the line of callous dots.

ARGUTA; the argute lizard. The specific character is this; tail short, verticillated; thick at the base and filiform at the tip; collar marked with obscure scales. There is a remarkable double plate under the neck.

The species is similar in some respects to the green lizard, but is shorter and more ventricose, and has a sharper snout. It is a native of the south of Siberia, and is found in the dry sunny places of Irtysh, and on the sandy plains beyond.

ALGERA. Tail long and verticillated, and two yellow lines on each side the body; it is a small species, of about a finger's length; it is brown above, and beneath yellowish; back covered with carinated scales, and bounded on each side by a yellow line, separating the abdomen from the upper parts. It is a native of Algiers.

TILIGUGU; Sardinian lizard. Tail round, conic, middle-sized; toes five, marginate claws.

It inhabits Sardinia, and is eight inches long. The body is thick, brown above, variegated with numerous black dots, beneath whitish; legs very short, the hinder ones longer; tail three inches and a half long.

URALENSIS; Ural lizard. Tail round, longish; neck beneath folding; feet all toed; back livid-ash, wrinkled, and subwarted.

It inhabits the country about Ural, is four inches long; very swift. The head is roundish; body whitish beneath.

BULLARIS; Bladder lizard. Tail round, long; chin pouched.

This species is about six inches long, of a shining grass-green colour. When it is approached, the throat swells into a globular form, and the protruded skin becomes of a bright colour. This has been thought to be a threatening aspect, but probably without any foundation. It is a native of Jamaica, where it is common about hedges and trees. The green Carolina lizard is supposed to be a variety of this species, as it is an exact resemblance in every respect, except in the appearance of the pouch. In dry hot weather it appears of a bright green colour; but in cold weather it changes to a brown. It is very common in and about the houses of Carolina.

AURITA; Eared lizard. Tail round, middle-sized, with callous dots on each side; the throat fold transverse, almost double; angles of the mouth each side dilated into a semi-

orbicular, soft, rough, dentate crest. This species is found among the sandy hillocks of southern Siberia, and gravel-pits in the desert of Comani, it is something larger than the gecko; the upper part waved with cinereous and yellowish, and thickly speckled with brown; underneath it is whitish; tip of the tail and blotch on the chest black.

TEGUINX. Tail round, long; lateral suture folded; neck beneath with a triple fold. Inhabits India and South America. Back and tail verticillate with crowded streaks.

HELIOSCOPIA; Star-gazing lizard. Tail imbricate, tapering; neck with a transverse fold beneath; head covered with callosities. This species inhabits in vast numbers the burning sand-hillocks of southern Siberia; moves very quick, but in a less serpentine direction than the scaly lizard; holds its head very erect with its eyes turned upwards, and is about two inches long. The colour of the upper parts of the body is grey, with brown and blueish spots, and linear streaks. The neck is often marked above with a red spot. The tip of the tail is red beneath.

PLICA; Plica lizard. The hinder part of the head is callous; eye-brows excoriated above; neck plaited beneath, and warted at the sides; tail long and round. This is a small species, about two or three inches in length. It is entirely covered with conical scales; there is a double plate beneath the throat. It is a native of South America and India.

Section I. Body lineate or banded, scaly; tongue bifid.

Species.

SEXLINEATA; Six-lined lizard. Tail verticillate, long; back with six white lines. It inhabits Carolina. The back is hoary, with three narrow white lines and three black; under the neck are two wrinkles; thighs with a row of callous dots behind.

QUINQUELINEATA; Five-lined lizard. This also is an inhabitant of Carolina. The head is marked with six yellow lines, and two between the eyes; back is blackish, with lines reaching to the middle of the tail; the tail half as long again as the body; the belly is streaked imbricately.

NILOTICA; or the lizard of the Nile. Tail long, the outer side triangular; body smooth; back with four lines of scales. It is found in Egypt.

INTERPUNCTATA; Asiatic lizard. Tail round, long; back with yellow lines, interspersed with black dots. Inhabits different parts of Asia. Body included between two lines and distinct from the sides. In the area are six longitudinal rows of brown dots, and as many on each side; legs and tail dotted in the same manner.

LEMNISCATA; Eight-lined lizard. Tail round, long; back with eight whitish lines. It inhabits Guinea. The thighs are dotted with white.

FASCIATA; Blue-tailed lizard. Tail round, long, blue; back with five yellowish lines. Inhabits Carolina.

VULGARIS; Brown lizard, or common Newt. Tail round, middle-sized; feet clawed; fore-feet four-toed; back with a double brown line.

It inhabits Europe, and is about three inches long. It is found in gardens, in the neighbourhood of dunghills, &c. Like the slug and toad it makes its way into cellars. It is altogether a land species, and it seems to be viviparous.

JAPONICA; Japanese lizard. Tail round, long; feet clawed; fore-feet four-toed; back banded. Body beneath yellow; the upper part is livid, with a dentate broad yellow band from the hind-head to the tip of the tail; eyes small; eye-brows large, rough; claws black; tail a little compressed at the tip. It is found in the Japan islands.

DESERTI; Ural lizard. Tail round, longish; feet five-toed; body above black, with six white longitudinal lines. It is found in the desert of Ural, and is somewhat more than two inches long. The body beneath is white; lines of the back consisting of oblong spots, and between each outer line, and the next, are five white dots.

QUADRILINEATA; Four-lined lizard. Tail round, long; feet somewhat clawed; hind-feet four-toed; body with four yellow lines. It inhabits North America.

PUNCTATA; Dotted lizard. Tail round, middle-sized; feet unarmed; fore-feet four-toed; back longitudinally dotted with white. It is found in Carolina. The body is brown, with a double row of white spots on the back, and a single one on the tail.

SPUTATOR; Spitting lizard. Tail round, middle-sized, with a longitudinal row of scales beneath; feet unarmed, five-toed; body cinereous, with white bands above, before and behind it is edged with liver colour. It is found in South America, in houses and among old buildings; when irritated, it discharges a black acrid matter, the effects of which on the human body may be cured by camphor or spirits of wine. The whole animal, except the very tips of the jaws, and the lower surface of the tail, is covered with minute truncate scales; the tongue is round, a little notched at the tip; tail near the end, and legs spotted with brown.

Section K. The belly of the animals of this division is covered with imbricate scales; the tongue is entire.

Species.

SEPIFORMIS. Tail short; body greenish-black; head armed; back flat; hind-thighs on the hinder part covered with callous dots.

SCINCUS; Scink. Tail round, middle-sized, compressed at the tip; toes unarmed, marginate. This species is thus characterized by Dr. Shaw. "Yellowish-brown lizard, with transverse brown bands on the upper part, short tail with compressed tip, and upper jaw longer than the lower."

"The scink," says the writer just quoted, "is one of the middle-sized or smaller lizards, and is a native of many of the eastern parts of the world. It abounds in Lybia, Syria, Egypt, and Arabia, frequenting moderately dry and sandy soils, and growing to the length of six or seven inches, or even sometimes more. The head of the scink is large, the body thick and round, and the tail considerably shorter than the body."

It is of a pale yellowish-brown colour, with a few broad, dusky, transverse undulations or zones, and is uniformly covered with moderately large or fish-like scales, lying extremely close and smooth, so that the surface has a glossy or oily appearance. It is an animal of harmless manners, and like most lizards derives its subsistence from various insects, which wander about the regions that it inhabits. It was once in high estimation as an article in the *Materia Medica*.

Mr. Bruce, in his *Travels*, has described the scink under the name of *El Adda*, which, he says, is very common in the province of Atbara in Abyssinia. (See *El Adda*.) It burrows in the sand so quickly, that it is out of sight instantly, and appears rather to have found a hole than made one, yet it comes out in the heat of the day to bask in the sun; and if not very much frightened, will take refuge behind stones, or in the withered, ragged roots of the abutthium, dried in the sun to nearly its own colour. It has long legs, but makes no use of them to stand upright; it creeps with its belly almost close to the ground; its motions are, however, very rapid. Mr. Bruce informs us, that lizards in general

are peculiarly numerous in the eastern regions. The desert parts of Syria bordering on Arabia Deserta abound with them to such a degree, as to render it impossible to count them. "I am positive," says the traveller, "that I can say, without exaggeration, that the number I saw one day in the great court of the temple of the sun at Balbec, amounted to many thousands; the ground, the walls, and floors of the ruined buildings were covered with them, and the various colours of which they consisted made a very extraordinary appearance, glittering under the sun, in which they lay sleeping and basking."

SCINCODRIS; Scincoid lizard. Tail round, middle-sized; legs short; toes very short.

This species is a variety of the *ocellula* of Dr. Shaw, to which he gives the name of the gallwasp. It is nearly two feet long, according to him; but Gmelin makes it about eighteen inches only. It is a native of New Holland. The body is a pale yellowish-brown, with a long patch of deep brown or blackish each side the neck; sides tinged with the same colour; tail deeper than the sides; teeth somewhat obtuse, short. The tongue in this, as in other scinks, is short, flat, rounded and entire; not forked, as in most lizards.

The *ocellula* or gallwasp itself is a native of the American islands, and is particularly common in Jamaica, where it frequents woody and marshy districts. Its colour is usually a palish brown, clouded with somewhat irregular bands of a deeper cast; but it is said occasionally to change its colour into a lively golden yellow. It was formerly thought to be the most venomous reptile in the island of Jamaica, and it was said that no creature could recover from its bite; but this is now regarded as a popular error.

OCELLATA; Ocellate lizard. Tail roundish, short; body beneath white, above greenish-grey, with roundish ocellate spots, brown on the margin, rectangular and white on the disk. It is found in Egypt, is very beautiful, and about a span long.

GUTTATA; Spotted scink. Tail round, long, the tip and four transverse spots black; body above hoary, dotted with white, beneath whitish.

It is a very small species, not much exceeding three inches in length. It inhabits the deserts of Ural. The body is smooth above; the feet are five-toed, with claws.

Section L. The animals of this division crawl on the belly; resembling both the lizard and serpent.

Species.

CHALCIDES. Tail round, long; feet five-toed; legs very short. Inhabits southern Europe and Africa. It is found of different sizes, from the length of a few inches to that of a foot, or even more. The head is covered in front with large scales, and is terminated by a slightly tapering, but not pointed, snout; the eyes are small, and the openings of the ears very distinct. There is no neck, the diameter continuing nearly equal from the head to the beginning of the tail, which is often longer than the body, and gradually tapers to a small point. The colour of this animal is pale ferruginous, or chestnut brown; hence its name, with some variations, is the "Ferruginous lizard."

In the living animal, the colour is generally said to have a kind of metallic or brassy cast, which probably gave rise to the specific appellation "*Chalcides*," and "*Chalcidica*."

"This singular lizard," says Dr. Shaw, "is described by Linnæus as having feet furnished with five toes; but whatever may have been the case with the individual specimen which he examined, it seems pretty certain that the general number is three. In the British Museum is an ele-

gant specimen. The *chalcides* is an animal of a very harmless nature, frequenting moist shady places, moving rather slowly, and feeding on insects, small worms, &c. It is a viviparous species, and is said to produce a great many young. The serpents to which it bears the nearest alliance, in point of form, are those of the genus *anguis*, and particularly the *A. fragilis*, or common slow-worm."

The "*Chalcide*," described by the count de Cope, appears to be extremely allied to the one just mentioned; but, instead of having imbricated scales, it is marked into a continual series of annuli throughout its whole length.

SERPENS; Serpent lizard. Head, body, and tail, a continued cylinder; legs very minute, remote, five-toed, and clawed. It inhabits Java; is about four or five inches long. Its shape is very much like that of a serpent, but more conical; the upper part of the body is decorated with from fourteen to twenty brown, longitudinal stripes; beneath it is silvery. It has an auditory canal.

ANGUINA; Snake lizard. Tail verticillate, flimsy at the extremity; body striate; feet without toes, subulate. The animals of this species are about fourteen inches long, of which the body itself is only four. The head is rather small; the snout taper; the legs very short, placed near the head and vent, and apparently terminating in one undivided toe or process; the whole animal appears covered with ovate scales, and is brown above, ash-coloured on the sides, and yellowish beneath; the upper surface is marked throughout its whole length by several dark lines or stripes. It is a native of the Cape of Good Hope, where it is found in great plenty in the water, and about the rocks in the Table bay.

LUMBRICOIDES; Lumbriciform lizard. Body subequal, round, ferruginous, tessellate with square streaks; beneath paler; there are no hind-feet, but the others are short and four-toed. This is the *la canelle* of the count de Cope, who first described it in his History of Oviparous Quadrupeds. Its length is about eight inches, of which the tail is only one inch. Along the whole body, from head to tail on each side, runs a continued sulcus or channel, separating the upper and lower surfaces; legs only two, extremely short, placed near the head, and divided into five minute toes with claws. Colour of the living animal suspected to be green; paler beneath. It inhabits Mexico.

BIPES; Biped lizard. Body subequal, round, pale, imbricate; each scale with a brown dot. There are no fore-feet; hind-feet with two toes. This is a very small species, said to be found in South America and in India. Its length is six inches; the diameter no larger than that of a good sized goose-quill. This lizard was described by Linnæus in the Museum Adolpho Frederici, as a species of snake, under the title of "*Anguis bipes*."

APUS; Cylindrical lizard. Head, body, and tail, a continued imbricate cylinder; it has no fore-feet, and scarcely any that can be so called behind. This species is a still nearer approach to the snake tribe than even the *chalcides*. It is a native of Greece, the southern parts of Siberia, and probably of many other parts of Europe and Asia. It is sometimes full three feet long, and so perfectly resembles the general form of a large snake, that it requires very close inspection to find that it belongs to the race of lizards. It inhabits the grassy meadows of the deserts of southern Siberia, and near the rivers Sarpa, Coana, and Terok. Though in general appearance it resembles a snake, in its internal structure it is formed like a lizard.

Two specimens of this lizard were brought from Greece by Dr. John Sibthorp, professor of botany in the university of Oxford.

Having,

Having, in the foregoing account, followed the Linnæan system, with such occasional additions and illustrations as occurred from other writers of distinguished reputation; we shall conclude with noticing some species which later naturalists have added to this genus, and which have been described, and most of them figured, in the interesting works of Dr. Shaw. Of these the first is the

ACANTHURA. The specific character of this is as follows: Throat plaited beneath; the body covered with minute scales; the tail long, and verticillated with carinated triple-spined scales. A specimen of this animal is preserved in the British Museum. Its length is a foot and a half; the head resembles that of the ameiva and teguixin, is covered with rather small subhexagonal scales, and is very distinctly marked off, as it were, from the body; beneath the throat is a conspicuous transverse plait; the whole skin about the neck, throat, and beginning of the sides, is very lax, so that it is thought in the living animal the skin beneath the throat may have a kind of pouch appearance, though entirely without any middle carina on that part: the feet are all pentadactylous, and the toes rather long. The colour of this species on the upper part is glaucous, variegated with a few small and somewhat indistinct clouds and marblings of a whitish cast; the tail and under parts are of a pale or yellowish-white colour. Dr. Shaw says, this species is much allied to the quetzaleo of Seba, which is generally supposed to represent the azurea of Linnæus.

LOPHURA. Body covered by dissimilar scales; the back serrated; the tail is long and carinated. This is a very large species, resembling the teguixin in size, colour, and some other respects, but is coated with scales of dissimilar size on different parts. Specimens are found in the British Museum, and in that of Dr. William Hunter.

ERYTHROCEPHALA. Blackish-green, with transverse black undulations; abdomen longitudinally banded with black, white, and blue; the breast black, and the top of the head red. This, which is reckoned a middle-sized species, is a native of the island of St. Christopher, and is described by the count de Cépède. Colour deep or dark green above, mixed with brown; back marked by several transverse black undulations; top of the head and part of the sides of the neck red; throat white; breast black; belly variegated with longitudinal black, blue, and whitish bands, and covered with scales or plates. The head is covered with larger scales than the other parts; beneath the thighs is a row of tubercles.

TENIOLATA. Lizard with long round tail, and body marked above with black and white stripes; beneath it is white. This species, allied to the fasciata, is covered entirely with scales; colour chestnut brown above; pale or whitish beneath; on the back six narrow white linear stripes, the intermediate spaces of the central and lowermost stripes being black; the tail is long and narrow; limbs striped longitudinally with black. It is slender, five-toed, and a native of New Holland.

SINENSIS. Tail flat, all the toes unguiculated, and the face perforated by several pores. This species, which is omitted in the Syst. Nat., was first described by Osbeck, who observed it in China, where it is frequently seen in houses, running about the walls, and climbing with extreme readiness on the smoothest surfaces, preying chiefly on the smaller kind of blattæ.

FIMBRIATA. Body with a membranaceous fimbriated border on each side of the body, tail flat, and lamellæ of the feet divided by a furrow. This species was first described by the count de Cépède, who informs us that it appears in some degree to connect the chamæleon, the gecko, and the

water-newts: the head, skin, and general form of the body, resembling those of the chamæleon; the tail, that of the water newts; while the feet resemble those of the gecko.

The colour of this animal is not constant or permanent, as in most of the lizard tribe; but variable, as in the chamæleon, presenting successively shades of red, yellow, green, and blue. This variation of colour is confined to the upper surface of the animal; the lower always continuing of a bright yellow. These several changes have been observed in the living animal in its native country, Madagafcar, where it is rather common, and where, though harmless, it is held in great abhorrence by the natives, who believe that it darts on their breast, and adheres with such force by its fringed membrane, that it cannot be separated from the skin without being cut off. Its residence is on the branches of trees, where it lives on insects, holding itself secure by coiling its tail half round the twig on which it sits. It chiefly appears in rainy weather, when it moves with great agility, often springing from bough to bough.

LIZARD, Devil. See MAEOUJAS.

LIZARD, Fly-catching. See GOEMOUC.

LIZARD Island, in Geography, one of the islands called "Direction islands," in the South Pacific ocean, about 240 miles in circumference, and in general rocky and barren. Captain Cook gave it the name on account of the number of lizards, some of which were very large, which he found upon it; 20 miles N.E. of Cape Flattery.—Also, one of the smaller Bahama islands.

LIZARD Point, or The Lizard, a promontory on the south coast of Cornwall, and the most southern point of land in England, at the north entrance of the English channel. N. lat. 49 59'. W. long. 5° 12'.

LIZARD, in Naval Rigging, an iron thimble spliced into the main bow-lines, and pointed over to hook a tackle to.

LIZARD'S Tail, in Botany. See SAURURUS.

LIZENED CORN, in Agriculture, a term provincially used for shrunk or lank corn.

LIZIERE, the same with *berme, forland, or relais*.

When this space is covered with a parapet, it is called a *fausse-braye*, or low wall.

LIZOU-TCHEOU, in Geography, a city of China, of the first class, in the province of Quang-si, on the river Long. N. lat. 24 12'. E. long. 108 47'.

LIZY-SUR-OURCQ, a town of France, in the department of the Seine and Marne, and chief place of a canton, in the district of Meaux. The place contains 1200, and the canton 11,885 inhabitants, on a territory of 245 kilometres, in 28 communes.

LLALA, a town of Peru, in the audience of Lima; 100 miles N. of Lima.

LLAMA, or GLAMA, in Zoology. See CAMELUS.

LLANBADARN VAWR, in Geography, a market town and parish in the hundred of Genecin Glyn, Cardiganhire, Wales. This place is supposed to have been anciently called *Mauritania*, and to have changed its name in the sixth century, in memory of St. Paternus, who built a monastery here, which was afterwards constituted an episcopal see. This dignity it retained till the inhabitants, quarrelling with the bishop, murdered him, when it was united to the see of St. David's. The government of the town is vested in a portreeve. It has a small harbour; but the little trade it formerly possessed has of late years been transferred to Aberystwith. The market for meat is now likewise held at the same place, so that this town is much declined. The ancient church, built in the form of a cross, and surmounted by a massive square tower, is a large edifice, in an early style of architecture. It is remarkable as the seat of one

of the oldest bishoprics in Wales. The interior contains a few modern monuments, one of which was raised to the memory of Lewis Morris, the celebrated author of the "Celtic Remains." In the church-yard is an ancient cross, finely decorated with fret-work. The parish is very extensive, and contains a number of hamlets, of which Aberystwith is the largest and most populous. The waste lands, or commons, may be about 8000 acres. Several old British forts and tumuli can easily be traced in different parts of it. In a vale, called Dyfryn castell, is a circle of stones, which tradition informs us was a Druidical temple and court of judicature. This town and parish were entirely laid waste by the Danes in the year 988. The town was soon rebuilt; but in little more than thirty years after again suffered a similar fate, being burnt to the ground by Gruffydd al Llywellyn, during his contest for the sovereignty of this district with Howel ap Edwin. The houses in this parish, according to the parliamentary returns of 1800, amounted to 240 in number, and the inhabitants to 1228. For an ample and interesting account of this parish and the county, the reader is referred to a volume recently published by S. R. Meyrick, entitled "The History and Antiquities of the County of Cardigan," 4to. 1808.

LLANBEDER, *Llanbeder*, or *Llanbedrport-Stephen*, a market-town and parish in the hundred of Modwyn, and county of Cardigan, South Wales. It is a corporation, governed by a portreeve, bailiff, and town-clerk, and joins with Cardigan, Aberystwith, and Aspar, in returning one member to parliament. The addition of Pont-Stephen to the name of this place is supposed to have arisen from the circumstance of king Stephen having thrown a bridge over one of the principal trenches of a camp in this vicinity. The market is held here on Tuesday. The principal traffic consists in horses, cattle, and hogs, vast numbers being bought for the English markets. The foundations of a noble castle, which anciently stood in this neighbourhood, can still be discovered at a very short distance from the town. The old family mansion of the Llo-ys forms a very curious and picturesque object. It is surmounted by four lofty turrets, which, peeping through a thick planted inclosure, have a striking appearance. The parish is small, and the soil remarkably unproductive, though much improved of late years, by the free use of lime. The houses, according to the parliamentary returns of 1800, amount to 161 in number. The inhabitants were estimated at 669. Meyrick's History, &c. of Cardiganshire, 4to. 1808.

LLANDAFF, *i. e.* the church upon the Taff, a city in the hundred of Kibbor, and county of Glamorgan, South Wales. It is watered by the river Taff, which falls into the Severn, about four miles below the town. The name of this place is supposed to be a corruption of the word *Llanar-daff*, signifying the church on the Taff, the walls of the cathedral burying-ground being close upon its banks. Llandaff, though a very ancient city in appearance, is only a straggling village, placed on an easy eminence. The parish includes the hamlets of Canton, Ely, Fair-er, Gabalfa, and Llandaff. The parish comprehends 2399 acres of land. It has no market; but has the advantage of a tolerably good harbour, which opens into the Bristol channel. This place is now chiefly supported by Cardiff, which is two miles W N W. It deserves notice principally on account of its cathedral-church, which is said to have been first founded here soon after the introduction of Christianity into Britain. *i. e.* A. D. 186. It was not, however, till the beginning of the sixth century, that Llandaff was raised to the dignity of a bishop's see, by Myric, king of the Silures, who endowed it with all the lands between the rivers Taff

and Elwy. The original church being destroyed at the time of the conquest, or at least its oldest part, the present was erected in the year 1120, by bishop Urban. Its situation is truly monastic, in a bottom surrounded by rising ground. According to Grose, it measures in length, from east to west, 203½ feet. The breadth of the body is 65 feet, and the height from the floor to the centre of the roof 119 feet. The west front is a beautiful relic of the Norman and pointed styles of architecture united. At the corners of this front formerly rose two magnificent towers, one of which is now nearly destroyed. That on the north-west, still remaining entire, is embellished with a profusion of sculpture. The entrance on this side is under a semi-circular arch, over which are three windows, with lancet-shaped arches. The interior contains several monuments of the bishops; also, one in honour of the lady Godiva, the celebrated patroness of the men of Coventry. A full description of this church, with views and details, will be found in N° 1. of Cooper's Architectural Reliques. Nothing can exceed the absurd and fantastical appearance of this edifice, when viewed as a whole. Beneath the towers has been ingrafted an Italian summer-house, with a Venetian window, also pilasters and flower-pot jars upon the parapet. The ecclesiastical establishment of this see consists of a bishop, as dean, an arch-deacon, a sub-dean, a chancellor, precentor, and nine prebendaries. The choral-service has long been discontinued; and the cathedral used as the parish church. A chapter-house, in the kitchen, and an office for the proctor general, have been erected in the church-yard, where the officers meet once a-year at Peter's-tide, for the auditing of accounts, &c. Two vicars are appointed by the chapter to serve Llandaff and Whitechurch alternately. The petty sessions for the hundred of Kibbor are holden at Llandaff. The bishop has no palace here, nor are there any established houses for other members of the church. The diocese contains about three-fourths of the county of Glamorgan, and all Monmouthshire, but seven parishes. A gate-way and a ruined tower, which formerly contained the great bell called Peter, now at Exeter, are the only remains of the bishop's palace. The names of the prelates of this see have been preserved by historians from the period of its erection, though with much uncertainty as to the dates of their consecrations and deaths, till the close of the ninth century. Llandaff, according to the parliamentary returns of 1801, contains 191 houses, and 860 inhabitants. Two fairs are held here annually, one on the 9th of February, and another on Whit-Sunday. Brown Willis has published an history and description of Llandaff cathedral in 1 vol. 8vo. See Malkin's Account of South Wales, 2 vols. 8vo. and Donovan's Tour through South Wales, &c. 2 vols. 8vo. Hoare's Edition of Giraldus Cambrensis, 2 vols. 4to. 1809.

LLANDEILO VAWR, a market-town and parish in the hundred of Penfedd, and county of Caermarthen, South Wales. The town is situated on the declivity of a hill, at the bottom of which flows the river Towy, or Tywi, giving name to one of the most delightful vales in the county. The town itself has very little to recommend it, the streets being extremely narrow, steep, and irregular. The church is an ancient low building, and consists of two aisles. The pillars which support the roof do not exceed five feet in height. A market, held here every Saturday, is well supplied with provisions. Llandeilo is 15 miles E. by N. from Caermarthen, and 202 W. by N. from London. No less than eight fairs are held annually in this town, and another at Fair-Pach, about one mile distant. The parish comprehends an area of about 16 miles from north to south, by eight miles

miles from east to west. About one-tenth part of this land is uncultivated. On an eminence about one mile distant from the town, to the S.W. stands the picturesque ruins of Dinevor, or Dinas-fawr castle, which commands some of the finest and most romantic views of the scenery of Newtonpark, and the extensive vale of Tywi. This castle was built by Rhys ap Theodore, in the reign of William the Conqueror. It seems to have been originally of a circular form, and strongly fortified by a double moat and rampart. This castle was for some time the royal residence of the princes of South Wales. South from it are the ruins of Cappel yr Ywn, standing between two round towers. It was formerly a chapel of ease to the mother-church. At some distance to the westward is Grongar-hill, which has been immortalized by the muse of Dyer. At a short distance, on a rugged hill, stand the mouldering fragments of Drulwyn-castell. About four miles S.E. of the town are the picturesque ruins of Craig-Cenen-castell, *i. e.* the castle on the rock by the Cenen. The situation is singularly romantic, being seated on an insulated rock, which was inaccessible on all sides but one. It is supposed to have been erected by Geronw, lord of Is-Cenen, who was one of the knights of king Arthur's round table. The well in this castle is considered a singular curiosity. The farm-house, called Cwrt Bryn y Beiridd, which lies about a mile to the south of this castle, was formerly a celebrated bardish residence. Here the river Llychwr takes its rise, issuing with a copious stream immediately from the solid rock. Close to this spring is a cavern, in some places so narrow, as hardly to permit a person to pass through, but in other parts extremely spacious, and exhibiting a variety of beautiful petrifications. At Llan-de-Faen, which lies to the south-west, at the distance of four miles, is a well formerly considered as very efficacious in paralytic and scorbutic affections. Besides this, there are other chalybeate springs in different parts of the parish; but none possess any peculiar medicinal properties. Near Llandeilo-vawr are Talieris-park, the seat of lord Robert Seymour; and Edwinstford, the seat of J. H. Williams, esq. The river Tywi, which, passing the town, meanders along the vale, abounds with excellent salmon-trout and eel. According to the history of Wales, by Carradoc of Llan-carnvan, the last decisive battle between the forces of Edward I. and Llewellyn, prince of Wales, was fought in this neighbourhood. The victory remained with the English, and put a final period to the independence of Wales. The inhabitants of Llandeilo, according to the parliamentary returns for 1801, are estimated at 647, and the houses at 141. Wyndham, Skrine, Malkin, Barber, and Sir Richard Hoare, in Giraldus Cambrensis, have given accounts of this town and its neighbourhood in their respective Tours.

LLANDOVERY, or LLAN-YM-DYFFUL, a market-town and parish of Llan-Dinod, and hundred of Penfedd, Caermarthenshire, South Wales. The town is situated on the river Brane, near its junction with the Towey, and consists of five streets, containing, according to Mr. Carlisle, about 800 inhabitants. The buildings of this town have a low and mean appearance. On a mound near the centre of the town, and surrounded by a deep trench, are the ruins of a small castle, built by Richard de Powers, and it is remarkable for the birth and residence of the celebrated Rees Pritchard, (Rhys Prytherch, well known throughout Wales as author of the "Vicar's Book," a collection of very simple poetry. This castle was besieged in 1116 by Gruffydd ap Rhys, who burnt the outer ward, and put a great part of the garrison to the sword; but his own troops, in effecting this object, sustained so considerable a loss, that he was compelled to raise the siege. The site of this castle is very remarkable, being an insulated rock of some elevation, totally uncon-

nected with any adjacent rising ground. A handsome stone bridge is here thrown across the river Brane. The church stands on an eminence at one end of the town. It does not possess any thing worthy of being particularly noticed. The market is held on Friday every week, and, considering the extent of the place, is one of the largest and best supplied in Wales.

Llandovery is undoubtedly a town of considerable antiquity: it rose upon the ruins of a Roman station, which was at or near Llan-Fair-ar-y-Brynn, about half a mile distant. That these celebrated conquerors had a fixed residence there, is sufficiently clear from the number of Roman bricks, earthen pots, coins, and other remains of antiquity, which have been discovered on that spot. This town was formerly a contributory borough to Caermarthen, but the privilege has been lost for a considerable period. It still, however, retains its charter, by virtue of which a bailiff is annually elected, as are likewise a recorder, a town-clerk, aldermen, and sergeants at mace; but their offices at present seem to be little more than nominal. The county magistrates hold here the petty sessions for the upper division of the hundred of Penfedd. It possesses no less than five benefit societies, three for men and two for women, which are said to be extremely advantageous to the subscribers.

The neighbourhood of Llandovery is distinguished by a most enchanting display of the more placid description of mountain scenery. The pass of Cwm-Dwr, which winds round the Black mountain to the east, is peculiarly fine. On a part of this mountain the decayed town of Trecate is situated; but it contains nothing worthy of attention, except the remains of a castle erected by Bernard de Newmarch, in the reign of William Rufus. On the summit of the Gaer hill is a Roman encampment, part of the fortifications of which are still tolerably entire; and on Pen y Craig an oval one, with three fosses and two vallums, supposed to be of British construction. A monumental stone, about six feet high, called Maen y Morynnion, is placed on an old Roman causeway which joins the road to Brecknock. It seems to have been richly sculptured. The words "Conjux ejus" are the only ones of the inscription that can now be distinguished. Carlisle's Typographical Dictionary of Wales, 4to. 1811. Skrine, Malkin, and Evans's Tours in South Wales.

LLANDRINDOD, or TRINITY-CHURCH, a village of South Wales, in Radnorshire, near which are medicinal springs, much frequented; 8 miles W. of New Radnor.

LLAN-ELLY, a market-town and parish in the hundred of Carnwylion, in Caermarthenshire, South Wales, contains, according to the parliamentary returns in 1801, 501 houses, and 2972 inhabitants. The market-days are Thursday and Saturday. The buildings of the town are irregularly situated upon a creek near the sea-shore. At the mouth of this creek is a small island, formed by the river Bury, where a monastery, founded by St. Piro, formerly stood. The church, dedicated to St. Elli, is an old structure, remarkable for its high, square, embattled tower. The inhabitants of this place are chiefly miners and sailors. The coal wrought in the vicinity is reckoned remarkably fine. The harbour is tolerably large, and is the controuling port both for Caernarvon and Kidwelly. Two fairs are held here annually: one on Ascension day, and the other on the 30th of September. The parish contains about 15,000 acres of land, of which nearly 3000 lie uncultivated and without cultivation. The hamlets are Berwich, Glynn, Hên Coed, Westflowe, and the Borough hamlet. At Berwich and at Ddewi the ruins of two chapels can still be distinguished. The chapel of St. John has been lately repaired by

by inscription, and is at present used as a meeting-house by the Methodists. Pembree-hill, a few miles distant from the town, commands one of the finest and most extensive marine views to be found in any part of Great Britain.

LLANES, a small sea-port town of Spain, in Asturias, near the North coast; 54 miles N.E. of Oviedo.

LLAN-GADOG VAWR, a market-town and parish in the hundred of Penfedd, and county of Caermarthen, South Wales. The town, which stands between the rivers Brane and Sawdde, is tolerably well built, but was formerly much more extensive than at present. It lies about 6 miles S.S.W. of Llandovery, and 100 W. by N. from London. A small manufacture of coarse woollens and stockings is carried on here, principally to supply the consumption of the town. The market-day is Thursday; and the fairs are held on the 12th of March, the last Thursday of May, 9th of July, the first Thursday after the 11th of September, and the second Thursday after the 11th of December. The ancient castle, mentioned by many tourists, has been for many years entirely demolished. A collegiate church is said to have been founded here, A.D. 1283, by Thomas Beck, bishop of St. David's, in honour of St. Maurice and his companion, and St. Thomas the Martyr. This distinction seems to have been enjoyed but a very short time, if it ever actually took place. The present church is dedicated to St. Cadog, and the living is a vicarage in the gift of the bishop mentioned above. Bledri, the son of Cedifor, the great lord of Gwydigada and Elfed, who died in 1116, was buried here. The parish contains three hamlets; the hamlet of Dyffryn Caead/Rhyfch, the hamlet of Gwynfe, and the hamlet above the Sawdde. The population, according to the parliamentary report of 1801, amounted to 1821 persons.

LLANGOLLEN, a market-town and parish, situated in the hundred of Chirk, and county of Denbigh, North Wales. The houses of the town have a mean appearance. According to the parliamentary returns for 1801 they amounted to 281, and the inhabitants to 1287. The church is nowise remarkable, excepting for the length of the name of its patron saint, *i. e.* St. Collen ap Gwynnawg ap Clydawg ap Cowdra ap Caradog Fruelifras ap Lley Merim ap Eynion Yrth ap Cunedda Wledig. The market is held here on Saturday every week, and there are four fairs annually. The ruins of Castell Dinas Brân nearly cover the summit of a vast conoid hill, which begins its ascent near the foot of the bridge opposite to the town. This is one of the primitive Welsh castles, but the name of its founder is unknown. The form of it is oblong, extending about 300 yards in breadth, and 150 in length. On one side of the hill, which is less steep than the others, deep trenches are cut through the solid rock. The materials composing this building are the common coarse stone of the country, interspersed with a few free-stone mouldings. In the reign of Henry III. this castle served as an asylum to the traitor Gryllfydd ap Madog, who, basely taking part with the enemies of his country, was compelled to secure himself in this aerial fastness. It afterwards became the residence of Mufamvay Vechan, the beautiful and accomplished mistress of Hoel ap Eynion, one of the most illustrious of the Welsh bards. It is remarkable that this castle stands at least 600 yards above the level of the sea: the two springs within its walls are never deficient in water. On the north-side of the hill may be seen a vast rock, called Craig Eglwyseg, or the Eagle's Rock; the strata of which are so placed upon one another as to form a series of steps parallel with the horizon, known to naturalists by the name of *Saxa sedilia*. The bridge at the bottom of the hill is one of the most beautiful and romantic in Wales, and is ge-

nerally reckoned among the wonders of the principality. The foundation is on the ledge of a rock. It consists of four arches, the centre one of which is 30 feet in diameter. Tradition informs us it was the work of Trevis, bishop of St. Afaph, in the year 1400. About two miles from the bridge stands the abbey of de Valle Crucis, one of the finest specimens of architectural antiquity in Wales. The western window has been adorned with a variety of sculptural ornaments, but most of them are entirely defaced. Concerning the etymology of the name of this abbey historians are not agreed; some deriving it from the buildings being in the form of a cross, and others from the circumstance of its monks having made a present of a part of the true cross to Edward I. At the distance of a quarter of a mile hence, is the remainder of a round column, called the pillar of Eliseg, which is perhaps one of the most ancient British pillars now existing. It was entire till the time of the great rebellion, when it was thrown down and broken by some ignorant fanatics, on account of its resemblance, in figure, to a cross. This pillar has, no doubt, been erected to perpetuate the memory of some celebrated chief. It stood on a great tumulus, and, when complete, measured 12 feet in height. The inscription was copied by Mr. Edward Llwyd, but it is now entirely illegible. From the shape of the letters in the copy taken by that great antiquary, it is concluded to have been written some time in the sixth century. The tumulus was opened some years back, when some bones were discovered placed between flat stones.

The beauties of the vale of Llangollen are celebrated both in prose and verse. It is watered by the river Deva, and has a canal from the Pont y Cryfylltan aqueduct running throughout its whole length to the Oernant slate-quarries. The low price of labour, and the great plenty of provisions and fuel, have lately induced several adventurers in the cotton manufacture to establish some extensive works in this neighbourhood. The great mail-road from London to Holyhead passes through both the vale and town. The parish is very extensive, and is divided into three portions, called Traian y Glynn, Traian Llangollen, and Traian Trevor; each of which contains several hamlets. We might have mentioned the romantic residence of two ladies, who have for many years lived together in the vicinity of this town. It is well known by all tourists. Pennant, Skrine, Bingley, Wyndham, Evans, Warner, and Hutton have given accounts of Llangollen, and of the principal places in its vicinity, in their respective tours in Wales.

LLANNERCH Y MEDD, a market-town, situated chiefly in the parish of Amlech, in the hundred of Twr Celyn, and county of Anglesea, North Wales. A market is held here on Wednesdays, and the fairs on the 5th of February, 25th of April, 6th of May, and Thursday after Trinity. This town owes its support principally to the circumstance of its being stationed in the neighbourhood of the Parys mountain. The petty sessions are held here. Aikin's Tour in North Wales.

LLANOS, Los, a town of Mexico, in the province of Mechoacan; 100 miles N.N.E. of Mechoacan.

LLANOS De Almeria, a town of Spain, in the province of Grenada, on the coast of the Mediterranean; 20 miles W.S.W. of Almeria.

LLAN RHAIADAR, in Mochmant, a parish consisting of 17 townships, situated partly in the hundred of Chirk, and county of Denbigh, and partly in the hundred of Llan-Fyllin, in Montgomeryshire, North Wales. It lies in a deep hollow, surrounded by lofty mountains. The petty sessions for the division of Cynllaeth and Mochmant are held in the village which gives name to the parish. William Morgan, D. D. an eminent divine, and the person who

who first translated the bible into Welsh, was vicar here, till translated to the see of Llandaff, by queen Elizabeth in the year 1595. The buildings of the village are ancient and irregular. The rectory is a sinecure in the patronage of the bishop of St. Asaph. According to the parliamentary returns for 1801, the whole parish contained a population of 1869 persons.

LLANRWST, a market-town and parish, situated in the western extremity of the hundred of Uwch Dulas, and county of Denbigh, North Wales. The town is watered by the river Conway, over which, at this place, is a noble bridge of three arches, built by the celebrated Inigo Jones in the year 1636. The market is on Tuesdays, and there are four fairs during the year. Here are held the petty sessions for the hundred. Mr. Burke calls this "the most charming spot in Wales." In the town is a good market-hall, and a richly endowed free-school. A small trade is carried on in harp-making, and it is the centre of all the business of the populous vale in which it stands. The church is supposed to have been built in 570, and is dedicated to St. Grwft, who was a bishop of London about the year 360. In this church is some curious carved work, said to have been brought from the neighbouring abbey of Maenan. Adjoining to it stands a chapel, erected by Sir Richard Wynne, after a design by the architect already mentioned. Here are a few monuments in honour of the Wynne family, which deserve the attention of the curious. They are brasses, each containing, besides the inscription, a portraiture of the person to whose memory they were engraved. An ancient monument of Howel Coytmore has been lately removed from the church to this place. Near it is a large stone coffin, supposed to be that of prince Llewelyn ap Ierwerth, who was denominated Llewelyn the Great. The high road from Shropshire to Holyhead passes through the town. In the neighbourhood stands Gwydw-house, an ancient mansion, consisting of an extensive pile of buildings, of irregular appearance, but sufficient to denote the great opulence and splendour of its former possessors. Immediately behind the house the ground rises rapidly to the foot of the perpendicular cliffs which form the western boundary of the valley. All this space is now covered with fine plantations of different kinds of trees. Half way up the rock, on an irregular plain of nearly five acres in extent, are the remains of a terrace, and a handsome domestic chapel, in the pointed style of architecture. About a mile from the town, at the hamlet of Mayne, is a spring in high repute for its medicinal virtues. Five miles to the south-east lies the ancient nunnery of Gwythwin, where St. Winefrid is said to have been buried. The box which contained the relics of this saint is still pointed out to strangers, but her chapel on the south-side is totally demolished. The church-yard contains four upright stones, one of which is in the shape of a prism, and bears an inscription now illegible. North of Llanrwst, at the distance of three miles, the abbey of Maenan formerly stood. Its site is now occupied by a large old house, built out of the ruins. The resident population of this parish, according to the parliamentary returns of 1801, amounted to 2549 persons. See the *Tours of Pennant, Wyndham, Aikin, Bingley, Skrine, Warner, Evans, and Hutton*: all of whom visited this part of Wales.

LLANSTEPHAN, a village in the hundred of Derllys, and county of Caermarthen, South Wales, is seated beneath a hill, in a woody vale; whence the situation is peculiarly picturesque and interesting. Here is a well, called St. Anthony's, which formerly was in high estimation for its medicinal

virtues; but it has not been much resorted to of late years. Here was formerly a castle, which is now in ruins. It is situated on an eminence, on the western side of the entrance of the navigable river Tywi, or Towey. Its broken walls enclose a large area; and furnished with several encircling earthen ramparts, appear to have possessed considerable strength. This castle is said to have been built by the sons of Uchred, prince of Merionethshire, A. D. 1138. There is a handsome modern house on the hill on which the castle stands. The parish of Llanllefhan, which includes the hamlets of Aliston, Laques, and Llan y Bre, contained, according to the return to parliament in 1801, a population of 974 persons, inhabiting 205 houses. *Carlisle's Topographical Dictionary of Wales*, 4to. 1811.

LLANTRISSANT, a borough and market-town in the hundred of Miskin, and county of Glamorgan, South Wales, is situated near the summit of a cleft in one of the high hills which abound in the vale of Glamorgan. The only access to it is by a steep circuitous road. One narrow irregular street, composed of poor habitations, makes up nearly the whole of this place. The church is a large Norman structure. The cemetery affords a very extensive prospect. Here was an ancient Norman castle, of which but little now remains, except the fragment of a circular tower; the vestiges of the outworks being nearly concealed by shrubs. Within the precincts of the castle are the town-hall and market-house, new buildings erected by the late earl of Bute. The borough is governed by a portreeve, and unites with Cardiff, Swansea, &c. in sending one member to parliament. Llantrissant is distant from Llandaff 10 miles, and from London 170: a weekly market is held on Friday, and three fairs annually. In the year 1801, the parish was returned as containing 376 houses, inhabited by 1715 persons. *Barber's Tour in South Wales*, 8vo.

LLANVYLLING, a market-town in the hundred to which it gives name, in the county of Montgomery, North Wales, is situated in a pleasant valley, near the river Cane, 15 miles from Montgomery, and 186 from London. The town is neat, and many of the houses are well built. It was first incorporated by Llewellyn ap Gryffydd, lord of Mecham and Mochnant, in the reign of Edward I.; and is governed by two bailiffs, chosen annually, who are justices of the peace during the time of office. Many Roman coins have been found here. Four fairs are held annually, and a weekly market on Tuesday. According to the population report of the year 1801, Llanvylling contained 444 houses, and 1394 inhabitants. *Pennant's Tour in Wales*, and *Skrine's Tour*.

LLANAVRTYD WELLS, a medicinal spring of South Wales, in the county of Brecon; 12 miles W. of Builth.

LLANYDLOES, a market-town in the hundred of the same name, and county of Montgomery, North Wales, is pleasantly situated near the bank of the river Severn, 13 miles from Newtown, and 180 from London. Several of the streets are spacious, but the buildings are irregular, and chiefly of lath and plaster. The church is a neat edifice, being supported by six arches, the pillars of which have capitals of palm-leaves, and are said to have been brought from Cwmber Abbey. About the town are several very extensive sheep-walks; and a number of persons are constantly employed in the neighbouring slate quarries. The parish consists of the townships of Brithdir, Cil-Machen, Glynn-Hafren-Is-Coed, Manleodd, Merfodion, Treffin, and Yltrad Dunod. The petty sessions for the hundred are holden here. Llanvdyloes was formerly a contributory borough to Montgomery, but was disfranchised with Pool and Llan-

Yllin. The town however has still the nominal appendages of a mayor, and his subordinate officers. A considerable manufactory of flannels is carried on here. Pennant, Evans, Bingley, and Skrine describe this place in their neighbourhood in their respective tours in North Wales.

LIMATA, a town of Peru, in the diocese of Lima; 90 miles from Lima.

LILAUGHARNE, LLAUGHARN, Lalebarn, or Laugharne, a market-town, sea-port, and parish, in the hundred of Derlis, Caermarthenshire, Wales. The town is situated at the mouth of the river Coran, and is one of the most frequented towns in the principality. The church is a large handsome building, in very excellent condition. Towards the south end of the town, and close upon the bay of Caermarthen, stand the ruins of an old castle, which is said to have been erected, or at least re-built, by Guido de Brian, in the reign of Henry III. The remains of the gateway, which is covered with a profusion of ivy, and various other parts of it, are still in good preservation. The corporation of Llaugharne consists of a portreeve, a recorder, an indefinite number of aldermen, two common attorneys, four councillors, and 76 burgesses. The market is held on Fridays, and there are two fairs annually, but these are very inconsiderable. This was the birth-place of a celebrated political writer and divine, Dr Josiah Tucker, who died in 1799.

At a short distance from the town are the vestiges of a ruin, now called Roches castle. This building, according to tradition, was formerly a monastery, but when it was built, or by what order of monks, is wholly unknown. The parish church is said anciently to have stood on the farm named Crafeland, i. e. Christ's land, but no traces of such a building can now be discovered. In the year 1801, this town contained 1484 inhabitants.

LLECH, the Welsh name for a kind of monumental stone found in that country. See **PILLAR**.

LLENDILAFAYA, a town of Spain, in the province of Asturia; 8 miles S.W. of Oviedo.

LLERENA, a town of Spain, in the province of Estramadura, belonging to the knights of the order of St. Jago, by whom it was founded; 53 miles E. of Cordova. N. lat. 38 7'. W. long. 5 59'.—Also, a town of Mexico, in the province of Zacatecas; 80 miles N.N.W. of Zacatecas. N. lat. 23 48'. W. long. 104 46'.

LLIRIA. See **LIRIA**.

LLIVIA, a town of Spain, in Catalonia, in the Pyrenees, near the source of the Segre, anciently called "Julia Libyca;" 6 miles N.E. of Puycerda.

LLOBREGAT, a river of Spain, in Catalonia, which runs into the Mediterranean, about 9 miles W. from Barcelona.

LOMSA, a town of the duchy of Warlaw, on the Narew; 70 miles N.N.E. of Warlaw.

LORENTE DON BERNARDO, in *Biography*, a Spanish painter, who was in favour at the court of Philip V., and employed to paint the infant Don Felipe. From the prospect of preferment this circumstance led forth to him, he was diverted by a decided turn for solitude; which made him fly the court, and in the sequel obtained for him the name of Pintor de las Pastoras, the painter of the shepherds, from the number of madonnas which he painted, arrayed in their garb, and surrounded by flocks. He died in 1757, at the age of 72.

LORET, in *Geography*, a town of Spain, on the S.E. coast of Catalonia; 20 miles N.E. of Mataro. N. lat. 43° 42'. E. long. 4 42'.

LOWITSCH, a town of the duchy of Warlaw; 24 miles N.W. of Rava.

LLOYD, WILLIAM, in *Biography*, an English prelate, was born at Tilehurst, in Berkshire, in 1627. His father, rector of his native place, took great pains in the education of his son, who repaid his attention by a most rapid progress in the learned languages. He was not quite twelve years of age when he was entered a student of Oriel-college, Oxford, whence he removed, in 1640, to a scholarship in Jesus-college. He was ordained in 1656, and, after the restoration, he obtained, in a very short time, considerable preferment in the church, till at length, in 1680, he was promoted to the see of St. Asaph. In 1684, he published his "History of the Government of the Church, as it was in Great Britain and Ireland, when they first received the Christian Religion." In 1688, bishop Lloyd was one of the six bishops who, together with archbishop Sancroft, were committed to the Tower for presenting a petition to king James II., against that prince's declaration for suspending the laws in favour of the Papists, which the clergy were enjoined to read in the churches. Their triumphant acquittal is well known to our readers. About the close of the same year, being known to concur very zealously in the revolution, he was made almoner to king William III., and, in 1692, was translated to the see of Lichfield and Coventry. In 1699, he published "A Chronological Account of the Life of Pythagoras, and of other famous Men, his Contemporaries: with an Epistle to the Rev. Dr. Bentley, &c." In 1699, he was translated to the bishopric of Worcester. Having, some time after this, been charged with an improper interference in the county election, he was dismissed from the office of almoner. He died at Hartlebury-castle in the year 1717, when he had attained to the ninety-first year of his age. According to bishop Burnet, Dr. Lloyd "was a great critic in the Greek and Latin authors, but chiefly in the scriptures. He was an exact historian, and the most punctual in matters of chronology. As much, however, as he was set on learning, he had never neglected his pastoral care. He was a holy, humble, and patient man, ever ready to do good when he saw a proper opportunity; even his love of study did not divert him from that." He was author of a great number of publications, the titles of which are given in the Biographia Britannica: and he left several pieces behind him in an unfinished state; among these was "A System of Chronology," out of which his chaplain, Mr. Benjamin Marshall, was said to have composed his Chronological Tables. He was supposed to have had a principal share in the "Series Chronologica Olympiadum, Istmiadum, Nemeadum, &c." published by his son at Oxford in 1700. He engaged bishop Burnet to undertake his "History of the Reformation," furnished him with a curious collection of facts and observations: and he assisted Dr. Wilkins in composing his "Essay towards a real Character, and a philosophical Language." Biog. Brit.

LLOYD, ROBERT, son of Dr. Peirson Lloyd, was one of the ushers of Westminster-school. We have already, under the article **CHURCHILL**, referred to this unfortunate young man, who is known chiefly as an author, by a poem, entitled "The Actor," which not only exhibited proofs of great judgment in the subject he was treating of, but had also the merit of smooth verification and strength of poetry. He was some time at the university of Cambridge, where he took the degree of M.A. After he quitted his place as usher at Westminster-school, he relied entirely on his pen for subsistence: being of a thoughtless and very extravagant disposition, he got deeply into debt, and was in consequence thrown into

into the Fleet prison, where he depended almost wholly on the bounty of his friend Churchill, whose kindness to him continued undiminished during all his necessities. On the death of his benefactor, Mr. Lloyd sunk into a state of despondency, which put an end to his existence in 1764. Mr. Wilkes says, that "Lloyd was mild and affable in private life, of gentle manners, and very engaging conversation. He was an excellent scholar, and an easy natural poet. His peculiar excellence was the dressing up an old thought in a new, neat, and trim manner. He was contented to scamper round the foot of Parnassus on his little Welsh pony, which seems never to have tired. He left the fury of the winged steed, and the daring heights of the sacred mountain, to the sublime genius of his friend Churchill." His works were published in 2 vols. 8vo. in 1774.

LOYD, NICHOLAS, an English divine, who was rector of St. Mary Newington, Surrey, where he died in 1680, at the age of 49. He compiled an historical, geographical, and poetical dictionary, which was printed at Oxford in 1673, in folio, and again in 1695, in 4to.

LOYD'S *Lake*, in *Geography*, a bay on the S. coast of East Florida. N. lat. 25 18. W. long. 80 50'.

LLUCH MAYER, a town of the island of Majorca, situated in the middle of a large plain, at the end of which is a mountain standing by itself, called La Randa. This town was built in the reign of James II. in the year 1300: the population amounts to about 3500 persons. The streets and houses are very regularly built; it has one parish church, consecrated to the archangel St. Michael.

LLULLA *and Chibos*, a jurisdiction of the diocese of Truxillo, in South America, lying S. of Chachapayas, and E. of the Cordillera of the Andes; low, warm, and moist, and covered with woods, so that a great part of it is uninhabited. It borders on the river of Moyabamba, which, commencing its course from these southern provinces of Peru, forms the river of the Amazons. The principal commodity of this country is tobacco, which, with a particular kind of almonds called "Andes," and a few other fruits natural to its climate, form the commerce carried on by this province with the others.

LLYN SAVADAN, or *Savahan Pool*, a lake of South Wales, in Brecknockshire; 4 miles E. of Brecknock. This lake is larger than any in Wales, except that of Bala, being two miles in length, and, in some places, one mile broad. The river Llanwy passes through this lake, and finds its way to the Wye, in a direction nearly due north. It is observed not to mix its waters with those of the lake in its passage; and the separation is understood to be so complete, that unless immediately after heavy storms, the fish of the river are not found in the lake, nor those of the lake in the river. The depth of Llyn Savadon is said to be about thirteen fathoms. The ancient tradition of a city being drowned, so universally applied to such bodies of water, is too trivial to deserve further notice.

LLYWARCH AP LLYWELYN, in *Biography*, an ancient Welsh bard, who flourished from about 1100 to 1220. Many of his pieces are in the Welsh Archaeology, and contain several historical notices of value.

LLYWELYN AP GRUFFYDD, the last sovereign of Wales, who reigned from A.D. 1254, to 1282. He was a brave prince, and resisted the ambition of Edward I. king of England a long time, but he at last fell, and with him the independence of the Welsh as a distinct nation.

LLYWELYN SIOM, an eminent poet of Glamorgan, who collected the system of Bardism, which is preserved. He presided at several meetings of the bards, and died in the year 1616.

LLYWELYN, THOMAS, a Welsh nonconformist divine of the Baptist denomination, was a native of Monmouthshire, and died in 1706. He published a history of the different editions of the Welsh bible.

LO, *Str.* in *Geography*, a town of France, and principal place of a district, in the department of the Channel, of which it is the capital, seated on the Vere, surrounded with walls, and defended by a citadel, which has some manufactures of cloth, serges, and leather. The place contains 6987, and the canton 11,707 inhabitants, on a territory of 90 kilometres, in 11 communes. N. lat. 49 7'. W. long. 1 1'.

LOACH, in *Ichthyology*, the English name of a fish, called also the *groundling*, and by the Germans the *spork* or *sworling*. It is a species of the *Cobitis*. See *Cobitis Baicalula*.

LOAD, or LODGE, in *Mining*. See LOPE.

LOAD is also used for nine duties of ore, each duty being about half a hundred weight.

LOAD, *Myhr*, among *Miners*. See MASTER-*load*.

LOAD, *Training a*. See TRAINING.

LOAD *Water-line*, in a *Ship*, is the deepest line of floatation, or when all her cargo is taken in.

LOADING. See CARGO and LADING.

LOADMANAGE, in *Maritime Affairs*: the hire is sometimes so called, which the pilot of a ship receives of a master, for conducting a ship up the river, or into port.

LOADSTONE. See MAGNET.

LOADSTONE, *Flating*, an instrument invented and so called by Mr. Boyle, which he used to discover whether guineas or other coins were counterfeit, by putting the instrument, with the piece of coin to be tried and fastened to the bottom of it, into a tall glass or other vessel of water: marks being so made on the slender metalline pipe, which forms the upper part of the instrument, that the hollow ball which made the lower part of it, would sink much lower, at least two inches, if the coin be true gold than if it be not: and according as the water reaches to one or other of the aforesaid marks, an estimate may be made, whether the piece of coin, if counterfeit, be made of tin, brass, copper, silver, or lead. The instrument might be applied to any coins, either of gold or silver, provided that they were of any considerable bulk. Birch's Hist. of the Royal Society, vol. iii. p. 115.

LOAM, derived from the German word *Lime*, and anciently signifying a viscid earth, in *Natural History*, a class of compound or mixed earths, composed of dissimilar particles, hard, stiff, dense, harsh, and rough to the touch, not easily ductile while moist, readily diffusible in water, and usually composed of sand and a tough viscid clay.

Hill comprehends under this class two genera. 1. The *thrausmicæ*; and, 2. The *glischromicæ*. The first are composed of sand and a less viscid clay, and are of a friable or crumbly nature; the second are composed of sand and a more viscid clay, and are of a more tough and viscid texture.

Da Costa distinguishes them by their colour into black and white, which are not acted upon by acids; yellow loams, some of which are not acted upon by acids; and other alkaline, brown loams, some acted upon by acids, to which class belongs the Windsor loam, so well known and so much used for making bricks, building furnaces, lutes, &c. a d others alkaline; and the green loams not acted upon by acids.

According to Woodward, loam consists of clay, mixed with fine sand, or of clay with a superabundance of sand; and Mr. Bergman, having analysed some loam found in the

neighbourhood of London, and considered as very excellent, found it to consist of 87 *per cent.* of a reddish-grey sand, as fine as meal, and 13 of argil. Supposing, therefore, clay to consist, as it most frequently does, of 30 *per cent.* of argil, and 70 of fine sand, we shall find, says Kirwan, that loam of the best kind contains an excess of sand amounting to 17 *per cent.*; if the excess of sand be greater, it will form what is called a *sandy loam*; if smaller, *clayey loam*. Mr. Bergman found nothing calcareous in the loam; when it contains any, it so far inclines to the nature of marle, and this *marlaceous loam* may be either *sandy* or *clayey*, according as the proportion above indicated is exceeded on either side. But loams most frequently contain also a portion of calx of iron, and this calx is more or less oxygenated; a circumstance which produces a considerable variety in the colour, and probably also in the vegetative powers of this earth: if its proportion be considerable, *vi.* 4 or 5 *per cent.* they often contain also some proportion of vitriolic acid. The colour of loam frequently proceeds from that of the calces of iron contained in it, but more frequently from its sandy part. Gravel, which is a coarser sort of sand, either of a calcareous or siliceous nature, is often mixed with loams, and also pebbles, whence new distinctions arise of importance to agriculture. Kirwan's *Elem. of Mineralogy*, vol. i. See **MOULD** and **SOIL**.

LOAM is also used for a sort of mortar made of this earth, by tempering it with water, straw, &c.

LOAMY SOIL, in *Agriculture*, that sort of soil into which loam enters in a considerable proportion. These soils are distinguished by many different names and colours. See **SOIL**.

LOAN-BANKS, or *Lending-houses*, establishments which may be traced to an ancient origin, formed and supported by humane persons, with a view of lending money to the poor for a certain period, on pledges, without interest. Thus, we are told, the emperor Augustus converted into a fund the surplus of the money which arose to the state from the confiscated property of criminals, and lent sums from it, without interest, to those who could pledge value equal to double the amount. (Suet. Vit. Augusti, cap. 41.) Tiberius also advanced a large capital, from which those were supplied with money for three years, who could give security in lands equivalent to twice the value. (Suet. Vit. Tiberii, c. 48. Tacit. Annal. vi. 17. Dio Cassius, c. viii. 21.) Alexander Severus reduced the interest of money by lending money at a low rate, and advancing sums to the poor without interest to purchase lands, and agreeing to receive payment from the produce of them. (Zel. Lamprid. Vit. Alex. Severi, cap. 21.) These examples of the ancients were followed in modern Italy. In order to collect money, the popes conferred upon those who would contribute towards that object many fictitious advantages, which at any rate cost them nothing. At first, money was lent to the poor for a certain time without interest, provided they could deposit pledges of proper value. At length the pontiffs resolved to allow the lending-houses to receive interest, not for the whole capitals which they lent, but only for a part, merely that they might raise as much money as might be sufficient to defray their expences. In process of time, it was thought proper, for the purpose of their having sufficient stock in hand, to give to those who should advance them money a moderate interest, which was prudently concealed by blending it with the unavoidable expences of the establishment. The lending-houses, therefore, gave and received interest. But in order to avoid the odious name, the interest that was received was said to be "pro indemnitate;" and this is the expression made use of in the papal bull. The pope declared

the holy mountains of piety, as they were called, to be legal; and threatened those with his vengeance who dared to entertain any farther doubts on the subject. All the cities now hastened to establish lending-houses; and their example was at length followed in other countries. The origin of lending-houses, in the strict sense of the term, is referred to the time of pope Pius II. or Paul II., who filled the papal chair from 1454 to 1471. The greater part of the lending-houses in Italy was established in the fifteenth and following centuries by certain Minorites. Notwithstanding the manifest advantages with which lending-houses were attended, and though many of them had been sanctioned by the infallible court of Rome, many, but chiefly Dominicans, exclaimed against these institutions, which they did not call *montes pietatis*, but *impietatis*. As this dispute was revived with much warmth in the beginning of the 16th century, it was at length terminated by pope Leo X., who, in the council of the Lateran, declared by a papal bull, that lending-houses were legal and useful; that all doubts to the contrary were sinful; and that those who should write against them would be in a state of excommunication. The council of Trent also, by a decree, acknowledged their legality, and confirmed them. See *Mounts of Piety*. See also **LOMBARDS** and **BANK**.

LOANDA, in *Geography*, an island in the Atlantic, near the coast of Angola, about 12 miles long, and one wide, separated from the continent by a narrow channel, which forms a good harbour. The soil does not produce grain; but fruits, such as oranges, figs, &c. are plentiful. It contains seven or eight villages, and on the coast are found shell-fish, called "zimbi," used for money by the natives, like cowries in India. S. lat. 8° 50'.

LOANDA, or *St. Paul de Loanda*, a sea port town of Africa, in the kingdom of Angola, the see of a bishop, and capital of a fertile province called Loanda, in possession of the Portuguese; containing several churches and convents, and about 5000 inhabitants, of whom 1000 are whites, and the rest blacks or mulattoes. The country abounds in cattle and sheep; Indian corn, millet, manioc, and fruits. S. lat. 8° 53'. E. long. 13° 22'.

LOANGHILLY, a town of Africa, in Loango; the usual burying place of the emperor; 10 miles S. of Loango.

LOANGO, a country or kingdom of Africa, situated on the W. coast towards the Atlantic, and bounded on the N. by Benin, on the E. by Anzico, and on the S. by Congo. Its climate is hotter, but not less healthy and pleasant than that of Congo and Angola, nor is its soil less fertile. The inhabitants, instead of cultivating the land, content themselves with bread and fish, and such fruits, greens, and pulse, as the soil naturally produces. Cocoas, oranges, and lemons are not much cultivated; but sugar-canes, cassia, and tobacco, as well as the palm, banana, cotton and pimento trees, grow here plentifully. They have also a great variety of roots, herbs, fruits, grain, and other vegetables, of which they make bread, and which they use for food. They have few quadrupeds for domestic use except goats and hogs, but poultry and various sorts of game are abundant: among the wild beasts they have the zebra, and a great number of elephants, whose teeth they exchange with the Europeans for iron. The natives, who are called Bramas, are tall, stout, and well formed, and though formerly cannibals, are of late much improved in their manners. They practise circumcision, are addicted to trade among themselves, and are friendly and hospitable in their mutual intercourse. They are fond of females and jealous of their wives. Their dress consists chiefly of cloth manufactured by

by themselves; and they are fond of ornaments about their necks, legs, and wrists, which they form of beads of coral, ivory, shells of a beautiful hue, chains of copper, tin, or iron, obtained from Europe. Polygamy is allowed among them; their rich men having 12 or more wives, and the poor not fewer than three. Of a Supreme Being, their notions are very imperfect and confused. Their worship is addressed to demons, domestic and rural; and to these they ascribe great influence. To their monarchs they attribute a kind of supernatural and unlimited power. The foreign commerce of the country consists chiefly in slaves; and they likewise sell considerable quantities of ivory, tin, lead, iron, and copper. The kingdom of Loango, separated from Congo, of which it was formerly a part, is divided into four principal provinces, *viz.* Lovangiri, Louango-Mongo, Kilongo, and Piri. The first is fertile and well inhabited; the second, lying N.E. of the former, is spacious and productive, particularly of palm-trees, the oil of which they extract in great quantities; and the inhabitants employ themselves in working a variety of linen and cloth; the third is a maritime province, and is the largest and the most populous of the four; its plains are extensive and fertile, and they are sheltered at a distance by ridges of high mountains; the trade of the inhabitants, who are rude and unpolished, consists in elephants' teeth; the last province, north of Kilongo and Louango-Mongo, is low and flat, but abounds with variety of fruits and other trees, and is well peopled and cultivated; the inhabitants are peaceable and strangers to war. They have plenty of cattle, and of wild and tame fowl, and take great pleasure in hunting. Their food is supplied by the game they take, and the milk of their cattle. In all these provinces there are many towns and villages.

LOANGO, a city of Africa, and capital of the above-mentioned country, situated on a river, which forms a bay at its mouth, about six miles from the coast of the Atlantic. The natives call it "Borai," or "Boori." It is very spacious and airy, as the houses are not contiguous to one another. The streets are wide and clean, and lined with palm-trees, bananas, and bacavas, which shelter the houses both before and behind. The palace adjoins to a square in the centre of the city, and of itself forms another square, one and a half mile in compass, surrounded with a palisade of stately palm-trees. Besides the public buildings of which it consists, it is occupied by the houses of the king's women, ten in number, and each capable of accommodating seven or eight of them. At a small distance is a market place, which supplies purchasers every day with meal, poultry, fish, wine, corn and oil, as well as palm-cloth; and in the market-place is a famous temple and mokisso, or idol, called "Mokisso a Loango," which has been held in great veneration both by the kings and their subjects. The houses are of an oblong shape, flat in the middle part of the roof, and each house is fenced round with a hedge of palm-twigs, canes, or bulrushes.

The bay of Loango, though upon the whole good, is incommoded by a bank on the N. side of its entrance, running half a league along the coast, and having not more than two and a half fathoms of water. The numerous and large rivers that flow from the continent, occasion such rapid and strong currents towards the north during almost the whole year, that it is very difficult to weather them, and gain a southern course. The only months in which they may be stemmed with safety are January, February, March, and April; during the other months of the year the currents flow so strong, that even coasters must keep at least 10 or 12 leagues off the land. S. lat. $4^{\circ} 40'$. E. long. $10^{\circ} 25'$.

LOANGO, a river of Africa, which runs into the Atlantic, S. lat. $10^{\circ} 30'$.

LOANO, or LOVANO, a town of Genoa, near the sea; six miles S.S.W. of Finale.

LOANS, GOVERNMENT. See STOCKS.

LOAR, or LOARRE, in *Geography*, a town of Spain, in Aragon; 13 miles S. of Jaca.

LOARDEGA, a town of Hindoostan, in Bahar; 40 miles S. of Palamow.

LOBARIA, in *Natural History*, a genus of the Vermes mollusca class and order: Body lobate, convex above, flat below. There is only one species, *viz.* quadriloba, characterized as having a tail with four lobes. It is found in the northern seas.

LOBATUM FOLIUM, in *Botany*, a leaf the outline of whose segments is curved. See LEAF.

LOBAU, in *Geography*, a town of Prussia, in the territory of Culm; 44 miles E. of Culm.

LOBAU, or *Liele*, one of the most ancient towns in the province of Upper Lusatia, containing two churches, three chapels, an hospital, and a Latin school, and trading chiefly in linen and thread; 10 miles S.W. of Gorlitz. N. lat. $51^{\circ} 7'$. E. long. $14^{\circ} 46'$.

LOBB, THEOPHILUS, in *Biography*, a physician of considerable reputation about the middle of the last century, practised his profession in London, and left several works on medical topics. He died on the 19th of May, 1763, in the eighty-fifth year of his age. The following are the titles of his publications. "Treatise of the Small-pox," London, 1731, 1748, 8vo.; which was translated into French in 1749. "Rational Method of curing Fevers, deduced from the Structure of the Human Body," *ibid.* 1734, 8vo.; in this work he adopted the doctrines of Boerhaave. "Medical Practice in curing Fevers," *ibid.* 1735, 8vo. "A Practical Treatise on painful Dilempers, with some effectual Methods of curing them," *ibid.* 1739. "A Treatise on Solvents of the Stone, and on curing the Stone and the Gout by Aliments," *ibid.* 1739. This work passed through several editions, and was translated into Latin and French. The author considered the matter of urinary calculi and of gout as of an alkaline nature, and vegetable acids as the remedy. "Letters concerning the Plague and other contagious Dilempers," *ibid.* 1745. "A Compendium of the Practice of Physic," *ibid.* 1747. Besides these works, he was the author of several papers printed in the Gentleman's Magazine, and of one or more tracts on religious subjects in the latter part of his life. Eloy Dict. Hist. Gent. Mag.

LOBBY, in *Architecture*, is a small hall or waiting-room: it is also an entrance into a principal apartment, where there is a considerable space between that and a portico or vestibule, and the length or dimensions will not allow it to be considered as a vestibule or an anti-room. See ANTI-CHAMBER.

LOBBY, in a *Ship*, an apartment close before the captain's cabin.

LOBBY, in *Agriculture*, a sort of narrow confined place, formed either by hedges and trees, or other kinds of fencing, near to the farm-yard, for the purpose of confining livestock. It is observed by Mr. Marshall, in his *Minutes of Agriculture in the Midland Counties*, that "every farmery ought to have a lobby and a cross appending to it, serving as a double fence; thereby preventing stock from running over, poaching, and injuring the farm; the latter for calves, a saddle horse, and invalids. He found the convenience of a lobby in Surrey, and the want of one in Norfolk, and in this

this district; he can foresee the use of that which he is forming, with a screen of planting; embosoming the entire farmery, in such a manner as to shelter it effectually from the north and east winds."

LOBE, or LOBUS, in *Anatomy*, an epithet applied to the more or less separate parts, of which the glands of the body are composed. Thus we have lobes of the brain, lungs, liver, &c.

LOBE is also used for the tip of the ear; which is more fat and fleshy than any other part thereof.

Du Laurent says, that the word *lobe*, in this last sense, comes from the Greek, *λοβος*, to *shame*, or *be ashamed*; this part of the ear being said to blush when the person is ashamed.

LOBE is also used in speaking of fruits and grains.

Thus the bean consists of two equal parts, called lobes, which compose the body thereof, and are encompassed with the other skin. And all other grains, even the smallest, are divided, like the bean, into the two lobes, or equal parts; as Dr. Grew has shewn in his *Anatomy of Plants*. See LOBUS.

LOBEDA, in *Geography*, a town of Germany in the principality of Eisenach; three miles S.S.E. of Jena.

LOBEDIUN, a town of Russia, in the government of Tambov; 100 miles W.N.W. of Tambov. N. lat. 53° 28'. E. long. 38° 50'.

LOBESUN, a town of Westphalia, in the duchy of Magdeburg; 25 miles N. of Leipzig.

LOBEIRA, VASCO, in *Biograph*, author of "*Amadis of Gaul*," was born at Porta about the middle of the fourteenth century. He was knighted upon the field of battle at Aljubarrota by king Joao I. in the year 1386, and died at Elvas, where he possessed a good estate. According to Mr. Southey nothing more has been collected by the Portuguese biographers of Lobeira. It has been questioned whether he was the author of the *Amadis de Gaul*, and whether that poem was not written in France rather than in Portugal; to which the translator replies, "Some weight must be allowed to the authority of the Portuguese writers, who have all, with the exception of Cardoza, attributed it to Lobeira as an original production." "The romance," he farther adds, "is not older than Lobeira's age; for it refers to the English claim upon the crown of France, and represents Windsor as the most splendid court, and the king of England as the most powerful king in Christendom. It was written in a country remote from England; for Windsor is called an island, and the adventures who cross from France make Bristol their port. Many other such instances of geographical ignorance could be mentioned; mistakes which might easily be made by a Portuguese, but not by a Frenchman. It was written in Portugal, for many of the names are Portuguese. Better proofs of time and place cannot be required." Of the poem Mr. S. says, it may be safely affirmed that it contains nothing which, in the age in which it was written, would be regarded as impossible, scarcely any thing that would be thought exaggerated. The actions of Amadis, and the importance of a single chief, would not appear incredible to a people who had then living among them their own hero, Nuno Alvares Pereira, whose military exploits were as extraordinary, and as important to his own character. To a nation who knew this man, and knew also that it was chiefly owing to his courage that they existed as a separate people, the character of Amadis would not appear exaggerated. Amadis has been considered as the model of a perfect knight. "Truly," says sir Philip Sidney, "I have known men, that even with reading Amadis de Gaul, which,

God knows, wanteth much of a perfect poesie, have found their hearts moved to the exercise of courttesy, liberality, and especially courage."

LOBEL, or L'OBEL, MATTHIAS DE, a botanist nearly contemporary with Clusius, whose wooden cuts, for the most part, re-appeared in his works, was not, as some have thought, an Englishman, but born, in 1538, at Lisse in Flanders, where his father practised in the law. He acquired in his youth an ardent love of plants, and had good opportunities of gratifying his taste, and advancing his knowledge, at Montpellier, where he studied physic under the learned Rondelet, or Rondeletius. During his residence there, he found opportunities of making some botanical excursions over the south of France. At Narbonne he became acquainted with Pena, afterwards his fellow labourer in the *Adversaria*, the first edition of which was published, in small folio, at London, in 1570, and dedicated to queen Elizabeth. The few cuts dispersed through this volume are mostly original, but inferior in style and accuracy, as well as in size, to those of Clusius. Before the publication of the *Adversaria*, our author had extended his travels to Switzerland, the Tyrol, some parts of Germany and Italy; had settled as a physician at Antwerp, afterwards at Delft; and had been appointed physician to the illustrious William prince of Orange, and to the States of Holland. Dr. Pulteney has not been able to ascertain the time of Lobel's removal to England, but justly concludes it to have been before 1750; indeed, most probably, some years earlier, as he mentions in this edition of the *Adversaria*, p. 92, having long ago received from Dr. Turner seeds of the Sea Kale, *Gracile maritima*, of which he there exhibits an indifferent cut, mentioning it as a plant whose flowery tops might be eaten, though much inferior to the cultivated kinds of the same tribe. It appears by this, that the young sprouts, now known to be so excellent for the table, had not then been tried.

The aim of the authors of the *Adversaria* was to investigate the botany and *materia medica* of the ancients, and especially of Dioscorides. They therefore frequently criticise Matthioli, the most celebrated commentator of the Greek writer, for it is scarcely possible for different people to pursue this intricate and obscure path long without disagreement. Indeed half a score commentators on the plants of Dioscorides might all exercise their ingenuity, in most cases, with equal skill, without any body being able to decide which of them was nearest the truth. The *Adversaria* was reprinted at Antwerp in 1576, the dedication being, of course, there suppressed. New title-pages had been printed to help the sale of the original, in 1571 and 1572. Some copies of the Antwerp impression appear to have been made up into a new edition at London in 1605, an ample *Pharmacopoeia*, the foundation of which was from Rondeletius, being prefixed, and an appendix to the *Adversaria* subjoined. This volume is dedicated to Edward lord Zouch, whom Lobel had attended, on his embassy to Denmark, in 1592, and he calls himself, in the title, botanist to king James I. Dr. Pulteney observes, after Haller, that this work exhibits some traces of a natural distribution of plants, inasmuch at least as they are thrown together into a number of tribes or orders, according to their habits or flowers; but this is done without any remarks, and with so little precision, that it can only be said the method of Lobel is better than that of Dodonæus, in which there is no consistent principle at all. His work is much more valuable for the various remarks which it contains, and for the accounts of new plants, discovered by himself in England or elsewhere. On the subject

of British natives indeed, Ray accuses him of having made several mistakes, from having trusted too much to his memory.

The *Stirpium Historia* of this author, a volume in small folio similar to his *Adversaria*, was published at Antwerp in 1576. This is much less copious in matter, the pages being mostly occupied with wooden cuts, which are those of Clusius, borrowed for the present occasion by the printer, Plantin. An impression of these cuts, of an oblong shape, was struck off, with names only, in 1581, and another in 1591. Linnæus possessed both. This publication is in very general use, and well known by the title of Lobel's *Icones*. It is, when complete, accompanied by an index in seven languages.

Lobel seems to have had a very large work in contemplation, which he intended to call *Stirpium Illustrationes*. This he did not live to complete. A fragment of it was published in quarto, without plates, by Dr. W. How, in 1655, making 170 pages, besides a caustic preface of the author, aimed chiefly at Gerarde, whom he doubtless comprehends among the "*prodii pharmaceutii*," charged with robbing the most experienced physicians of their honours. The body of the work is interperfed with notes of Dr. How's against Parkinson, who is said to have made dishonest use, in his *Theatrum Botanicum*, of some papers of Lobel, that fell into his hands. It must be allowed that such authors are justly censured for translating and interweaving descriptions, remarks, and places of growth, from foreign works, which apply to the plants of other countries. This fault is not dissimilar from what we have censured in a more modern writer; see LIGHTFOOT, and the botanical article FLORA. But the style of Lobel's preface is properly reprobated by Dr. Pulteney, who blames him for this gross abuse of Gerarde after his death, though he had formerly on every occasion extolled him. The botanical contents of this fragment are, however, very honourable to Lobel, for the number of new plants therein mentioned.

Our author laboured to an advanced age in the pursuit of his favourite study, and procured from his correspondents abroad, many new plants for the gardens of his friends. He had the superintendence of a garden at Hackney, cultivated at the expense of lord Zouch; and appears to have resided, in the decline of life, at Highgate, where he had a daughter, married to a Mr. James Coel. His wife is recorded as having assisted him in his botanical researches. He died in 1616, aged 78. Lobel's works. Haller's Bibl. Bot. Pulteney's Sketches.

LOBEL, a drolling, blind, fiddling, Bohemian Jew, the first master, on the violin, of the celebrated Benda, first violin to Frederic II. king of Prussia, during the whole reign of that musical prince. See BENDA, and Burney's German Tour, vol. ii.

LOBELIA, in *Botany*, so called in honour of Matthias de Lobel; see that article. The plant to which Plumier originally applied the name, is now the *Scavola* of Linnæus. When the latter, at the suggestion of Jacquin, discovered that he and other botanists had confounded, under this original *Lobelia*, a vast number of species generically distinct from it, but which were then become much better known than itself by the name in question, he judged it much less inconvenient to keep this name for them, and to give the genus of Plumier a new one. It is hoped the same measure would be adopted, should any botanist ascertain the original *Magnolia* of Plumier, to be really distinct in generic characters from all the other species so called, of which there is said to be some suspicion.—Linn. Gen. 456. Schreb. 596. Willd. Sp. Pl. v. 1. 937. Mart. Mill. Dict. v. 3. Sm.

Fl. Brit. 242. Ait. Hort. Kew. ed. 2. v. 1. 356. Juss. 165. Lamarek Illustr. t. 724. (Rapuntium; Tournef. t. 51. Gærtn. t. 30.)—Class and order, *Pentandria Monogynia*. (Syngenesia Monogamia; Linn.) Nat. Ord. *Campanaceæ*, Linn. Juss.

Gen. Ch. *Cal.* Perianth of one leaf, surrounding the germen, in five deep, nearly equal, withering segments; the two superior ones most directed upwards. *Cor.* of one petal, irregular, slightly ringent; tube cylindrical, longer than the calyx, divided lengthwise at the upper side; limb in five deep lanceolate segments, of which the two uppermost are smallest, most reflexed, and most deeply separated, constituting the upper lip; the three lowermost more spreading, and generally largest. *Stam.* Filaments five, awl-shaped, the length of the tube of the corolla, united upwards; anthers united into an oblong, somewhat oblique and curved, cylinder, separating into five parts at the base. *Pist.* Germen more than half inferior, pointed; style cylindrical, the length of the filaments; stigma obtuse, bifid. *Peric.* Capsule ovate, or roundish, of two or three cells, and two or three valves, bursting at the top, encompassed by the calyx; the partitions contrary to the valves. *Seeds* numerous, minute, smooth. *Receptacle* conical.

Eff. Ch. Calyx in five segments, crowning the germen. Corolla of one petal, irregular. Anthers cohering, incurved. Capsule half inferior, of two or three cells.

So much uncertainty attends the characters of some plants which have been referred to *Lobelia*, that we can hardly guess with any degree of correctness at the number of species. The 14th edition of the *Systema Vegetabilium* exhibits the latest view that Linnæus or his son took of the genus, and there 42 species are enumerated, of which however the 21st, *levigata*, and 25th, *surinamensis*, are one and the same, and the 40, which is *parvifolia* (not *parviflora*) of Bergius, is *Lightfootia oxycochoides*; see LIGHTFOOTIA. Three others, *Phytoloma, luteola*, and *volvulidis*, go along with *Cyphia, cardamines*, and *incisa*, of Thunberg's Prod. 39, to form the genus *CYPHIA*, Berg. Cap. 173. Willd. Sp. Pl. v. 1. 952. Ait. Hort. Kew. ed. 2. v. 1. 362, of which we have spoken in its place, and which perhaps, when we consider its having five distinct petals, with linear and straight, as well as separate, anthers, may be allowed to constitute a tolerably good, though not a very natural, genus. Willdenow, retaining this genus, has still 48 *Lobelia*, disposed in three, not very correct, sections, of each of which we shall mention a few examples. Two species only are natives of Britain.

SECT. 1. *Leaves entire.*

L. Dortmannia. Water Lobelia. Linn. Sp. Pl. 1318. Eng. Bot. t. 140. Fl. Dan. t. 39. (Dortmannia lacutris, floribus sparsis pediculis; Rudd. Act. Upsl. for 1720. 67. f. 2. Gladiolus lacutris; Ger. em. 105.)—Leaves linear, entire, of two parallel cells. Stem nearly naked.—Found in the clear shallow parts of lakes, in the colder parts of Europe, growing in the pure gravelly bottom, and raising the flowering part of its stem only above the surface. The root is perennial, composed of numerous, long, white, simple fibres. Herb smooth, milky when wounded. Radical leaves numerous, entirely immersed, linear, recurved, nearly cylindrical, though flattish on the upper side, obtuse, two or three inches long, very remarkable for confiding internally of two cavities, separated by a longitudinal partition. Stem solitary, erect, round, hollow, almost leafless, bearing a loose cluster of pendulous blue flowers in July and August, often overflowed by sudden floods. Clusus received this plant from a Mr. Dortmann, and has represented it in his *Cure Posteriores*, 40; but the cut, reprinted in Johnson's edition

LOBELIA.

edition of Gerard, is justly criticised by Rudbeck; for the germen is represented superior, the stamens totally erroneously, and the corolla by no means well.

Sect. 2. *Stem erect. Leaves cut or serrated.*

L. Tupa. Willow-leaved Lobelia. Linn. Sp. Pl. 1318. (*Rapuntium spicatum*, foliis acutis, vulgò *Tupa*; Feuille. It. v. 2. 739 t. 29.)—Leaves decurrent, lanceolate, finely serrated. Cluster spiked. Stem hollow. Feuillée gathered this plant on the mountains of Chili, in 37 degrees south latitude; (not 65, as in Bot. Mag. 1325.) He speaks of it as one of the most active of poisons, the smell of the flowers causing severe vomitings, and the milk of the plant, if by any accident it touches the eyes, occasioning blindness. The root is a foot and a half long, apparently perennial. Stem as tall as a man, hollow, five-sided, terminating in a spike of large, blood-red, stalked flowers, with a lanceolate bractea at the base of each partial stalk. Leaves decurrent for the space of 2½ inches, the rest of their length, about seven inches, elliptic-lanceolate, acute, finely serrated, minutely downy; reticulated with veins beneath. Feuillée describes the serratures, but does not figure them.

L. gigantea. Gigantic Lobelia. Sims in Curt. Mag. t. 1325. (*L. Tupa*; Dryand. in Ait. Hort. Kew. ed. 2. v. 1. 357.)—Leaves sessile, lanceolate, finely serrated. Flowers axillary, solitary, stalked. Stem shrubby, solid.—Our specimen of this plant was gathered by Mr Menzies near Valparaiso in Chili, in latitude 33½ south, whence Dr. Brandt is said also to have brought seeds to Messrs. Lee and Kennedy, in whose conservatory the shrubby stem is 15 or 16 feet high, solid, and round. Leaves sessile, lanceolate, more or less serrated, scarcely reticulated beneath. Flowers dull orange, on simple, solitary, axillary stalks, much shorter than the leaves. These characters have, in our opinion, justified Dr. Sims in making it distinct from the last, to which it seems moreover inferior in virulence.

L. affurgens. Purple Jamaica Lobelia. Linn. Sp. Pl. 1321. Andr. Repof. t. 553. Leaves elliptic-lanceolate, tapering at both ends, sharply toothed, somewhat decurrent. Cluster compound, terminal, downy.—Native of Jamaica. It flowers in the latter part of summer in our stove, making a handsome appearance, though its purplish colour is less striking than the scarlet of the following.

L. cardinalis. Scarlet Lobelia. Linn. Sp. Pl. 1320. Curt. Mag. t. 320.—Leaves broadly-lanceolate, serrated. Spike terminal; the flowers turned one way.—Native of North America. Hardy in our gardens, in a strong moist soil, flowering in August and September. The root is perennial. Stems three feet high, leafy. Flowers of a moist rich and vivid scarlet.

L. urens. Acid Lobelia. Linn. Sp. Pl. 1321. Curt. Lond. fasc. 6. t. 63. Engl. Bot. t. 953.—Stem nearly erect. Lower leaves obovate, finely toothed; upper lanceolate, serrated. Flowers racemose.—Native of France, Spain, and some few parts of Devonshire, on gravelly bushy commons. This is perennial, flowering in August and September. Its habit is slender, delicate, and smooth. Stem 18 to 24 inches high, milky. Leaves feathered. Flowers small, blue, numerous, in long weak clusters. Segments of the calyx bristle-shaped, rough, as long as the tube of the flower.

Sect. 3. *Stem mostly decumbent. Leaves somewhat cut.*

L. Laurentia. Italian Annual Lobelia. Linn. Sp. Pl. 1321. (*Laurentia annua minima*, flore ceruleo; Mich. Gen. 18 t. 14.)—Stem prostrate, branched. Leaves lanceolate-oval, crenate. Stalks solitary, axillary, single-flowered, very long.—Native of Italy. A little delicate annual species, sent to Kew in 1778, by M. Thoun. It blof-

fomed in the green-house in July. The flowers are blue, very minute.

L. setacea. Bristle-stalked Lobelia. Sm. Prodr. Fl. Græc. Sibth. v. 1. 145. Fl. Græc. ined. t. 221. (*L. tenella*; Bivon. Cent. 1. 53. t. 2.)—Radical leaves spatulate, wavy; those of the stem bristle-shaped. Stems perfectly simple, single-flowered, erect.—Native of boggy places in Crete, Cyprus, and Sicily. Root annual. Leaves spatulate, on long slender radical stalks, chine, wavy, smooth, somewhat like those of a daisy. The little slender stems bear two small bristle-like leaves, and one elegant blue flower. The stems appear to be erect, but on account of the close affinity of the present species to *L. Laurentia*, they cannot be distinguished. They are indeed confounded by Willdenow, and by Boeckner in his t. 27, where both are well drawn, as one species. Our *setacea* is *Rapuntium creticum minimum*, bellidis folio, flore maculato; Tourn. Cor. 9.

L. lutea. Yellow Lobelia. Linn. Sp. Pl. 1322. Curt. Mag. t. 1319.—Stems ascending. Leaves lanceolate, serrated. Flowers reversed, in short spikes.—Native of the Cape of Good Hope. It flowers here in the green-house, and is remarkable for its golden flowers, whose position, as Dr. Sims observes, is reversed, their tube very short, and the posture of their two smaller segments, arched over the stamens, very peculiar.

Numerous new species of *Lobelia* are to be added to Willdenow's list, from the discoveries in New Holland. These are usually of a smooth delicate habit. See Labillardiere, t. 71—74, and Brown's *Prodronus*, v. 1. 562. The latter defines 20 species from that country, none of them in Willdenow.

LOBELIA, in Gardening, comprehends plants of the herbaceous and under-shrubby perennial kind, of which the species usually cultivated are the scarlet lobelia, or cardinal's flower (*L. cardinalis*;) the blue lobelia, or cardinal's flower (*L. siphilitica*;) the long-flowered lobelia (*L. longiflora*;) the pine-leaved lobelia (*L. pinifolia*;) and the bladder-podded lobelia (*L. inflata*.)

Method of Culture.—The first and second kinds may be increased by seed, cuttings of their stalks, and parting the roots. The seeds should be sown in autumn, or early in spring, in a warm border, or in pots or boxes, so as to be moved to different situations in different seasons, to have shelter from frost, and shade from the mid-day sun in summer. Those sown in autumn generally come up more freely the following spring than those which are sown in that season. They should have shelter in hard frosts, either under a frame or awning of mats, but be fully exposed in mild weather, giving occasional waterings in the spring and summer. When the plants have attained two or three inches growth, they should be pricked out in separate small pots of rich earth, giving water, and placing them in the shade till fresh rooted, repeating the waterings occasionally in hot dry weather, and shifting them into larger pots as they may require; in winter moving them into a frame to have occasional shelter from inclement weather; and in the spring following some of them may be turned out into the full ground about March, when they will flower the ensuing summer. Some should also be retained in pots to be moved under shelter in winter, as a reserve in case those in the open air should be killed by the frost.

And as the plants generally flower in the greatest perfection the first and second year of their blowing, it is proper to raise a new supply of them every year or two in order to have them flower in the utmost perfection every year.

Where the second mode is in use, the cuttings of the young stalks should be divided into lengths of five or six inches, and

and be planted in an easterly border, two parts deep, being covered down with hand-glasses, and watered occasionally. They mostly emit roots, and form young plants in a month or six weeks, when the glasses should be taken away, and the plants managed as the others.

And these hardy forts sometimes afford off-sets from their sides at bottom, which may be separated in autumn, and potted for young plants, being managed as the seedlings.

Each of the three last forts may also be raised by seeds procured from abroad, which should be sown in pots of light sandy earth in the autumn, and plunged in the bark-bed; and when the plants are three inches high, planted in separate pots, being replunged in the bark-bed, giving water and occasional shade till they are fresh rooted. They must remain constantly in the hot-house, and have frequent moderate waterings given them.

The first two forts have a fine appearance in the borders and clumps of pleasure-grounds, where they will succeed when protected in winter from frosts and other injuries.

And all the tender forts afford a fine variety in hot-house collections.

LOBELIA *Siphilitica*, *Blue Lobelia*, or *Cardinal Flower*, in the *Materia Medica*, is a native of Virginia, and flowers from August till October. Every part of the plant abounds with a milky juice, and has a rank smell. The root, which is the part prescribed for medicinal use, in taste resembles tobacco, and is apt to excite vomiting. It derived the appellation of *siphilitica* from its efficacy in the cure of syphilis, according to the experience of the North American Indians, who considered it as a specific in that disease, and who long kept it a secret. But the secret was purchased by sir William Johnson, and has been since published by different authors. The method of employing this medicine is stated as follows: a decoction is made of a handful of the roots in three measures of water. Of this half a measure is taken in the morning fasting, and repeated in the evening; and the dose is gradually increased till its purgative effects become too violent, when the decoction is to be intermitted for a day or two, and then renewed till a perfect cure is effected. During the use of this medicine, a proper regimen is to be enjoined, and the ulcers are also to be frequently washed with the decoction, or if deep and foul, to be sprinkled with the powder of the inner bark of the New Jersey tea-tree (*Ceanothus Americanus*.) Although the plant thus used is said to cure the disease in a very short time, yet the antisyphilitic powers of the lobelia have not been confirmed by any instances of European practice. Woodv. Med. Bot.

LOBENSTEIN, in *Geography*, a town of Saxony, and chief place of a lordship, on the Lemnitz, in the county of Reussen; 26 miles N. of Bayreuth. N. lat. 50° 21'. E. long. 11° 50'.

LOBERA, a town of Spain, in Aragon; 20 miles W.S.W. of Jaca.

LOBES, a town of Bohemia, in the circle of Boleslaw; 9 miles W.N.W. of Jung-Buntzel.—Also, one of the smaller Canary islands, between Lancerotta and Fortaventura. N. lat. 28° 50'. W. long. 13° 40'.

LOBES of the Ear, *Boring of*. To bore or perforate the lobes of the ears, you must first of all mark the place with a spot of ink. About the middle is generally the best situation for the aperture. The lobe of the ear is to be extended with the left fore-finger and thumb, and the perforation made exactly where the dot is, with a large common sewing needle. The ring being now introduced, and gently moved about a few times every day until the margin of the puncture is healed, will hinder the little hole

from becoming impervious. See *Hist. of Surgery*, vol. ii. p. 5.

LOBINEAU, GUY-ALEXIS, in *Biography*, was born at Rennes in 1666, entered among the Benedictines of St. Maur in his seventeenth year, and devoted his life and talents to study. He died in the year 1727. His principal works are "L'Histoire de Bretagne," two vols. folio, to which he gave the finishing hand, it having been composed by Father le Gallois: "L'Histoire de Deux Conquêtes d'Espagne par les Maures," which is a translation from the Spanish, and is probably little more than a romance. "Histoire de Paris," 5 vols. folio: this work was begun and much advanced by father Febblin, and put into the hands of Lobineau to finish. "L'Histoire des Saints de Bretagne." He translated the "Strategems of Polyannus" from the Greek, and made versions of some of Aristophanes' comedies. Moreri.

LOBITH, in *Geography*, a town of the duchy of Clèves; 5 miles N.W. of Emmerick.

LOBKOWITZ, PRINCE, in *Biography*, deserves well to be remembered among illustrious dilettanti in music. He was in England at the same time as the mysterious count St. Germaine, from 1746 to 1748; and from congenial tastes in music, they were seldom asunder. This prince, who was uncle to the charming and accomplished madame Thune at Vienna, was no less remarkable for his musical talents, than the beauty and dignity of his person. We have seen and heard at Vienna many of his musical compositions, chiefly for the German flute, which, from their correctness, would not have disgraced an eminent professor. The termination of this gallant prince's career was melancholy: after distinguishing himself in the army, as well as by his accomplishments and good taste in the fine arts, he lost his faculties; and was seized with a dark and gloomy despondency, in which he lingered during the remainder of his miserable existence.

LOBKOWITZ, BOLESLAS DE HASSENSTEIN, *Baron de*, a Bohemian nobleman and man of letters. After travelling into various countries, and bearing arms with reputation, he embraced the ecclesiastical state, and was employed in public affairs. He died in 1510. His poems were first printed at Prague in 1563, and again in 1570. Moreri.

LOBLOLLO BAY, in *Geography*, a bay of the island of Antigua, on the W. coast.

LOBLOLLY-BAY, in *Botany*. See *GORDONIA*.

LOBLOLLY, a sea-faring dnb, otherwise called *luggs*.

LOBLOSOW, in *Geography*, a town of Poland, in R. of Russia; 36 miles S.E. of Hahel.

LOBO, JEROME, in *Biography*, a Jesuit missionary, born at Lisbon in 1593, entered among the Jesuits in his thirteenth year, and in 1622 he went out as one of their missionaries to the East Indies. After passing some time at Goa, he sailed to the coast of Africa, and penetrated into Abyssinia, where he resided some years, subject to much danger and many hardships and sufferings: on his return he was shipwrecked and narrowly escaped destruction. He promoted the interest of the Abyssinian mission at Madrid and Rome, and, notwithstanding the calamities to which he had been subjected, he took a second voyage to the Indies. He returned to Lisbon in 1658, and was made rector of the college of Coimbra, where he died in 1678, at the age of 84. He was author of "An Historical Account of Abyssinia," containing much curious and valuable information. It was translated from the Portuguese language into the French by the Abbé le Grand, with additions, which translation was abridged by Dr Samuel Johnson. Moreri.

LOBO, RODRIGUEZ FRANCIS, a Portuguese poet, was born

at Estramadura. He was author of a comedy called "Euphrosyne," which is a great favourite among his countrymen. He was likewise the author of a folio volume of poems printed in 1721. Moreri.

LORO, in *Geography*, a town on the S. coast of the island of Lugon. N. lat. 13° 40'. E. long. 121° 15'.

LOBON, a town of Spain, in the province of Estramadura; 13 miles W. of Merida.

LOBOS, a small island in the Atlantic, near the coast of Africa. N. lat. 21° 20'.—Also, a small island at the mouth of La Plata river; 15 miles S.W. of Cape St. Maria. N. lat. 35°.—Also, a small island in the gulf of Mexico, on the coast of Gualeca. N. lat. 22° 28'.—Also, island in the Pacific ocean, near the coast of Peru, surrounded with rock; about twelve miles from each other, in S. lat. 6° 25' and 6° 45'. They are also called "Sea-Wolves," or "Seals' islands."—Also, a cluster of small islands in the South Pacific ocean, near the coast of Chili. S. lat. 52° 20'.

LOBOS Key, or *Sail Key*, a small island among the Bahamas. N. lat. 23° 45'. W. long. 77° 34'.

LOBRES, a town of Spain, in the province of Grenada; 7 miles N. of Motril.

LOBS, in *Mining*, are steps that ascend or descend within the mines, as flairs up to and down from a chamber.

LOBSKOL, PELANSKOL, in *Geography*, a town of Russia, in the government of Olonetz, near the lake Sig; 52 miles W.N.W. of Povenetz.

LOBSTADT, a town of Saxony, in the circle of Leipzig; 10 miles S.S.E. of Leipzig.

LOBSTER, in *Zoology*, a species of the squilla, according to some writers; but in the Linnaean system a species of the cancer. See *CANCER Gammarus*.

LOBULUS, in *Anatomy*, a diminutive from *lobus*, is a small lobe, and denotes more minute divisions of glandular bodies, than those which form lobes; as, for example, the lobuli of the lungs. Lobulus auris is that part of the external ear which is pierced for ear-rings. (See *EAR* and *LOBES*) Lobulus Spigelii is a small portion of the liver. See *LIVER*.

LOBULUS, in *Botany*, a little lobe, a term suggested by Dr. Smith, for what has usually, but erroneously, been called the auricle, in some species of *Jungermannia*: see that article.

LOBURG, in *Geography*, a town in the duchy of Magdeburg; 22 miles E. of Magdeburg.

LOBUS, in *Botany*, a lobe, a principal division of a leaf, the margins of which are in some degree rounded. The term is also used for the divisions of the petals, or any other suitable part. A capsule is sometimes said to be lobed, there being scarcely any other way of describing, in English, a triaccous or tetraccous fruit.

LOCAGNANO, in *Geography*, a town of the island of Corsica; 12 miles N. of Bastia.

LOCAL, something supposed to be tied or annexed to some particular place.

Thus, in *Law*, a thing is said to be local, *i. e.* annexed or fixed to the freehold. An action of trespass for battery, &c. is transitory, not local; that is, it is not necessary, that the place where battery was committed should be set down as material in the declaration; or if it be set down, the defendant cannot traverse it, by saying, he did not commit the battery in the place mentioned in the declaration, and to avoid the action.

LOCAL, *Physic*. See *CHORE*.

LOCAL Colour, a technical term in the art of *Painting*, wherein, however, it has two meanings. The one is the

actual colour of an object intended for imitation; the other alludes to that colour in conjunction with the situation the object which possesses it fills in a picture; wherein it must be more or less subject to shadows, and the regulations of aerial perspective; which latter diminishes the force of colours according to their distance from the eye, by the intervention of that of the atmosphere.

It is a difficult but a necessary part of the art to maintain local colours in objects and yet throw them into shade, and still more to support it in the gradations from light to dark. A degree of cool colour intervenes in nature, the admixture of which in the substances used in painting too often destroys the local or real colour, so that painters have often had recourse to their shadow-colour alone, and by mixing that with the positive colour, trust to its effect for harmony, and omit the greater delicacies of nature. But Titian, Vandyke, Correggio, and sir J. Reynolds, ventured to attempt the full support of the colour of the body, and succeeded, particularly the two latter, whom the artist will do well to study on this head.

LOCAL Customs, are those peculiar to some lordship, or other district, and not agreeable to the general customs of the country. See *CUSTOM*.

LOCAL, or *Artificial Memory*. See *MEMORY*.

LOCAL Motion. See *MOTION*.

LOCAL Problem, in *Mathematics*, is such an one as is capable of an infinite number of different solutions; because the point that is to solve it, may be indifferently taken within a certain extent; *e. gr.* any where in such a line within such a plane figure, &c. which is called a *geometrical locus*.

A local problem may be either *simple*, as when the point sought is in a right line; *plane*, as when the point sought is in the circumference of a circle; *solid*, as when the point required is in the circumference of a conic section; or *surfsolid*, as when the point is in the perimeter of a line of a higher kind, as the geometers call it.

LOCAL Trespass, in *Law*. See *TRESPASS*.

LOCANA, in *Geography*, a town of France, in the department of the Dora, on the Orco, in a valley, called the "Valley of Locana;" 21 miles S. of Aosta.

LOCARNO, one of the Italian bailliages of Switzerland, ceded to the Swiss cantons by Maximilian Sforza, duke of Milan, in the year 1512, and governed by a bailiff whose office continues two years; about 15 miles in length and about 12 in breadth. It is situated on the N.W. coast of the lake Maggiore, is fertile in grain and fruits, and contains 49 parishes, and 30,000 inhabitants. By the peace of Lunéville it was ceded to the Cisalpine republic, now the kingdom of Italy.

LOCARNO, the capital of the bailliage of the same name, a small, open, well-built, market town, agreeably situated in a fertile plain, near the N.W. border of Locarno, or Maggiore lake, and containing about 1500 inhabitants. Part of the town is built on piazzas in form of a crescent with two wings; in front is a row of trees and the public walk; the old part of the town is dirty, and the streets narrow. It contains three convents, and a small Franciscan monastery, perched on a rock overhanging the valley, and commanding a superb view of the lake and its magnificent boundaries. The canopy in the church of the Capuchins deserves mention on account of its beautiful execution; it is of straw-work, and almost rivals velvet and gold fringe. Locarno was once situated on the lake, and had a port capable of receiving large barks; at present it stands at the distance of a quarter of a mile; a circumstance which is owing to the accumulation of sand brought down by the

torrent Maggia. The environs of the town abound in wine, fruit, and pastures. It is now annexed to and included in the department of Verbano. N. lat. $45^{\circ} 59'$. E. long. $8^{\circ} 35'$.

LOCARNO, *Lake*, or *Lago Maggiore*. See LAKE.

LOCATE, a town of Italy, in the department of the Olena; 6 miles S. of Milan.

LOCATELLI, PIETRO, in *Biography*, a native of Bergamo, and one of the greatest performers on the violin in Europe, during the early part of the last century; but no less remarkable for caprice in his compositions, than for execution and a full tone in his performance. He published twelve grand concertos for violins, and much music for other instruments, at Amsterdam, where he resided from 1744 to 1764. Few could play his concertos but himself; yet there was "more method in his madness," than in that of Vivaldi; sometimes a solidity and good taste, particularly in his slow movements, not inferior to the adagios of Tartini. In 1772, we were very much surprised to find the blind organist and Canonier Potholt at Amsterdam possessed of a taste so delicate and modern in a place where little other music was encouraged or listened to than "the jingling of bells and of ducats," till that excellent performer told us that Locatelli, the famous player on the violin, who had lived many years in that city, and died in 1764, used to give him instructions, and to encourage his musical studies by allowing him the advantage of being always a hearer at his public concerts as well as private performances. This, in some measure, helped us to account for his taste and fancy; for Locatelli was possessed of a great deal of both; and though he delighted in capricious difficulties, which his hand could as easily execute as his head conceive; yet he had a fund of knowledge in the principles of harmony, that rendered such wild flights agreeable, as, in less skilful hands, would have been insupportable. Foreigners who travelled through Holland, and were curious to hear Locatelli perform, were previously apprised, that the remuneration expected was fixed at two golden ducats for himself, and a silver ducat to the person who accompanied him.

LOCATION, in the *Civil Law*, an act by which any thing is let out, on rent.

The second title of the nineteenth book of the Digest is on the subject of location and conduction. Location and conduction are relative terms, and are used as well for the action of him that lets, as for that of him who takes on that letting.

LOCATION, *Tacit*, is, when the person who takes, continues on the premises beyond the term of his lease; which by the civil law he is allowed to do, at least for the space of a year, on the same terms.

LOCCO, in *Geography*, a town of Naples, in Abruzzo Citra, on the Pescara; 10 miles N. of Sulmona.

LOCH, in the *Materia Medica*, a name given by Avicenna and others to the gum lac. They call it also *kekem* and *lenkem*, and are too apt to confound it with the cancanum, funderach, and other gums, with which they made their several sorts of varnish.

LOCH, or *Lobech*, in *Pharmacy*, a composition of a middle confidence between a syrup and a soft electuary; chiefly used for diseases of the lungs.

The word is originally Arabic; but continues still in use among the apothecaries.

The Latins call it *linctus*, and the Greeks *λεχμα*, because the manner of taking it is by licking.

LOCH, in *Geography*, a name given in Scotland to a lake and also to a bay.

LOCH Alarick, a lake in the county of Perth; 10 miles

S. of George's town:—L. *Alfarrig*, a lake in the county of Inverness; 14 miles N.W. of Fort Augustus:—L. *Ana-cat*, a lake in the county of Perth; 11 miles S.E. of George's town:—L. *Anffronmun*, a lake in the county of Perth; four miles N.W. of George's town:—L. *Aichig*, a lake in the county of Inverness, 10 miles long and one broad; 12 miles N. of Fort William:—L. *Arven*, a lake in the S.W. part of Banffshire; 21 miles S. of Inveraven:—L. *Awe*, a lake in the county of Argyle, 30 miles long, and from a mile to two wide, shaded with many small woody isles, one of which bears the ruins of a monastery, and another those of an ancient fortress, the residence of the Campbells of Lochawe, afterwards Dukes of Argyle:—L. *Baa*, a lake on the island of Mull, communicating with loch Nagaul to the N.:—L. *Barnero*, a lake or inlet of the sea, on the N.W. coast of the island of Lewis; 11 miles W. of Stornaway:—L. *Broom*, a bay on the W. coast of Scotland, seven miles long and two broad, communicating with L. *More*, its mouth being in N. lat. $57^{\circ} 36'$. W. long. $5^{\circ} 13'$:—L. *Little Broom*, a bay on the W. coast of Scotland, eight miles long and one broad; eight miles S.E. of Udrigil Head, N. lat. $57^{\circ} 52'$. W. long. $5^{\circ} 16'$:—L. *Broom*, a town of Scotland, in the county of Ross, at the S. end of L. Broom lake; 25 miles W.N.W. of Dingwall:—L. *Castle Semple*, a lake in the county of Renfrew; six miles S.W. of Paisley:—L. *Catherine*, a lake in the S.W. part of the county of Perth, about six miles in length; 20 miles W.S.W. of Crieff:—L. *Dalreoch*, a lake in the county of Ayr; 10 miles S.S.E. of Ayr:—L. *Damb*, a lake in the county of Perth; seven miles S. of George's town:—L. *Dee*, a lake in the county of Kirkcubright; 12 miles N.W. of New Galloway:—L. *Derculoch*, a lake of Perth; seven miles S. of Blair Athol:—L. *Dirantadlin*, a lake in the counties of Argyle and Perth; seven miles N.W. of George's town:—L. *Doine*, a lake of Perth; 20 miles W.S.W. of Crieff:—L. *Druinard*, a lake on the N.W. side of the island of Ilay:—L. *Drumelthy*, a lake of Perth; seven miles N.W. of Coupar:—L. *Duntelchah*, a lake in the county of Inverness; 20 miles N.E. of Fort Augustus:—L. *Eil*, a lake of Inverness, eight miles long and one broad, near Fort William:—L. *Enoch*, a lake in the county of Kirkcubright; 14 miles N.W. of New Galloway:—L. *Ericht*, a lake in the county of Inverness, 12 miles long and half a mile wide; four miles N. of George's town:—L. *Erriboll*, a capacious and safe bay on the N. coast of Scotland; three miles W. of Whitenhead, its mouth being in N. lat. $58^{\circ} 32'$. W. long. $4^{\circ} 29'$:—L. *Ersey*, a lake in Arran island; five miles N.W. of Brodick:—L. *Effan*, a lake of Perth; 18 miles S. of George's town:—L. *Etive*, a bay on the W. coast of Scotland, 20 miles long and about one broad; 15 miles N. of Inverary, N. lat. $36^{\circ} 26'$. W. long. $5^{\circ} 5'$:—L. *Fainiff*, a lake in the N.W. part of the county of Ross; 16 miles W. of Dingwall:—L. *Fine*, a bay in the county of Argyle, 34 miles long, and from one to four and six broad, extending from about six miles N.E. of Inverary to the river Clyde; its mouth being in N. lat. $55^{\circ} 50'$. W. long. $5^{\circ} 8'$:—L. *Fintarlin*, a lake in the county of Dumfries; seven miles N.W. of Lochmaben:—L. *Fitz*, a lake in the county of Fife; three miles N.N.E. of Dumfries:—L. *Frenchy*, a lake of Perth; nine miles N. of Crieff:—L. *Garry*, a lake of Perth; nine miles N.E. of George's town:—L. *Garvie*, a lake in the county of Ross; 10 miles W. of Dingwall:—L. *Gogh*, a lake which branches off to the N.W. from loch Long, N. lat. $56^{\circ} 8'$. W. long. 5° :—L. *Heck*, a lake in the county of Argyle, between loch Long and loch Fine:—L. *Inver*, a lake in the county of Kirkcubright; five miles N. of New Galloway:—L. *Kennmoor*, a lake

lake at the union of the Ken and Dee, five miles long and half a mile wide:—*L. Kingmoor*, a lake in the county of Selkirk; 11 miles S.S.W. of Selkirk:—*L. Laggan*, a lake of Inverness, eight miles long and half a mile wide; 10 miles S.E. of Fort Augustus:—*L. Laxerston*, a lake in the county of Kincardine; nine miles N.N.E. of Stonehaven:—*L. Leadmore*, a lake in the county of Ross; 24 miles W.N.W. of Dornoch:—*L. Lee*, a lake in the county of Angus; 11 miles N.N.W. of Beechin:—*L. Leven*, a bay on the E. coast of Scotland, in Inverness, 10 miles long and half a mile wide; nine miles S. of Fort William, its mouth being in N. lat. 56° 40'. W. long. 5° 20':—*Allo*, a lake of the same name, situated in the county of Kinross. Though inferior to loch Lomond, not only in extent but in beauty of scenery, still it must be allowed to present to the eye a noble expanse of water, interspersed with a variety of fruitful and pleasant islands. This lake varies in size considerably at different seasons. It is bounded on the east by the Lomond-hills, on the south by the hill of Balnearthie, and on the west by the plain of Kinross. The trout of loch Leven are of a large size, and bear a strong resemblance, both in taste and appearance, to the salmon. They are regularly brought to the Edinburgh markets, where they find a ready sale, being considered extremely delicate. The red colour of their flesh undoubtedly arises from their feeding chiefly on a small shell fish of a very deep tinge, which abounds in the bottom of the loch. A variety of other fish are likewise caught here. Eels are particularly abundant. These, in the month of September, generally migrate towards the sea in great numbers by the channel of the Leven river, which takes its rise from the lake. It is remarkable that they never proceed in their migration except during the night.

Loch Leven deserves particular attention on account of the many distinguished remains of antiquity which either adorn its islands or its banks. The ruins of the castle of loch Leven are placed upon an island nearly in the centre of the loch. Its original foundation is unknown, for though tradition says it was built by Congal, son of Dongart, king of the Picts, yet very little credit can be given to this account. The first notice taken of it in history occurs in the year 1334, when it was besieged by sir John de Sterling, an English officer, commanding a party of Scots who had joined the English army. But what principally renders this castle famous in Scottish history, is the confinement here of the unfortunate queen Mary, by the confederate lords to whom she surrendered herself prisoner, after having parted with Bothwell at Carberry. Being placed in the custody of the wife of Douglas of loch Leven, a woman of rude manners, and an inveterate enemy to the queen, she suffered all the miseries of a rigorous captivity. In this castle she remained for several months almost forgotten, till the haughty conduct of the regent having estranged the minds of many of the confederates, they resolved to rescue her and themselves from his tyranny and oppression. With this view several attempts were made to effect her release, but all of them were rendered abortive by the vigilance of her keeper. Now, however, at last prevailed over every obstacle, Mary, conscious of possessing those bewitching charms which seldom fail in securing a deep interest in the breast of ambitious youth, resolved to employ them in captivating the heart of George Douglas, her keeper's brother. She treated him with the most marked distinction, and even allowed him to enter in the night during his sleep. The temptation was too great to be resisted. Having engaged some accomplices, they contrived to secure the keys one evening, when the family were at their devotions, and opening the gates, al-

lowed the queen and her lover to escape by a boat which lay ready to receive them. As soon as they reached the shore the queen was met with the utmost joy by lord Seaton and sir James Hamilton, with whom she immediately fled to Niddrie, in East Lothian.

On another, and the largest island in the lake, the priory founded by Brudo, the last but one of the Pictish kings, formerly stood. Its ruins are still visible. Portmahomack-mo-nastery was situated on the eastern bank of the loch; only a few fragments of it remain. To the east are the ruins of the ancient tower or castle of Arnot, which was possessed by a family of that name for upwards of 600 years. For-syth's Beauties of Scotland:—*L. Lays*, a lake in the county of Kincardine; 11 miles N.W. of Stonehaven:—*L. Lochy*, a lake of Inverness, between Fort William and Fort Augustus, 10 miles long, and more than one wide, communicating with loch Eil, loch Linnhe, and loch Arneig:—*L. Lomond*, a lake in the county of Argyle, 17 miles long, and from one to four wide, with several small islands on the broadest part, which are supposed to form part of the Grampian chain, that terminates here on the W. communicating with the Clyde, by a river which joins the Clyde at Dunbarton; 24 miles W. of Stirling; its S. extremity being in N. lat. 56° 3'. W. long. 4° 30'. At the time of the earthquake in Lisbon in the year 1755, the waters of this lake were agitated in a singular manner (see LOMOND):—*L. Loyal*, a lake in the county of Sutherland, five miles long; two miles S. of Tongue:—*L. Luichart*, a lake in the county of Ross; 11 miles W. of Dingwall:—*L. Lydeoch*, a lake of Perth; five miles W. of George's town:—*L. Lyon*, a lake of Perth; 10 miles S.W. of George's town:—*L. Maudy*, a lake of Inverness; five miles long, and half a mile wide; 17 miles N.N.W. of Fort Augustus:—*L. Mabaake*, a lake of Perth; five miles N.W. of Dunblane:—*L. Montath*, a lake in the vicinity of L. Lomond, about five miles in circumference, with two woody isles, one presenting the ruins of a monastery, the other those of a castle of the old earls of Monteth:—*L. Merk*, a lake of Perth; seven miles N. of Blair Athol:—*L. Mickly*, a lake of Inverness; 13 miles N.N.E. of Fort Augustus:—*L. Milford*, or *Melfort*, a safe road or harbour, on the W. coast of Scotland, much frequented by herrings. N. lat. 56° 16'. W. long. 5° 32':—*L. Mean*, a lake in the N.W. part of the county of Kircudbright; 18 miles N.W. of New Galloway:—*L. Mocheburn*, a lake in the county of Wigton; seven miles W. of Wigton:—*L. Monar*, a lake in the county of Ross; six miles long and half a mile wide:—*L. Moarn*, a lake in the N.W. part of the county of Ross; nine miles N. of Dingwall:—*L. Moy*, a lake of Inverness, near a town of the same name; nine miles S.E. of Inverness:—*L. Naver*, a lake in the N. part of Scotland, 12 miles in circumference; 28 miles N.N.W. of Dornoch:—*L. Nall*, a lake of Argyle; 17 miles N.W. of Inverary:—*L. Ness*, a lake of Inverness; 22 miles long and one broad, between Fort Augustus and the Frith of Murray, into which its waters are discharged. This lake was affected at the time of the earthquake at Lisbon: on account of its great depth, from 60 to 135 fathoms, it never freezes:—*L. Oich*, a lake of Inverness; four miles long, and a quarter of a mile wide, communicating with loch Ness; four miles S.W. of Fort Augustus:—*L. Oochan*, a lake of Inverness; nine miles W.N.W. of George's town:—*L. Orr*, a lake in the county of Fife; six miles N.E. of Dunsinane:—*L. Orent*, a lake in the county of Caithness; six miles S. of Thurlo:—*L. Pautoch*, a lake of Inverness; 12 miles N. of George's town:—*L. Quich*, a lake of Inverness; 16 miles N. of Fort William:—*L. Rannoch*, a lake of Perth; about eight miles

miles long, E. of George's town:—*L. Rutton*, a lake in Kircudbright; four miles S.E. of Dumfries:—*L. Skin*, a lake in the N. part of the county of Sutherland; 12 miles long and $1\frac{1}{2}$ wide; 13 miles W.N.W. of Dornoch:—*L. Skene*, a lake in the county of Aberdeen; five miles S. of Kintore:—*L. Skieck*, a lake of Perth; six miles N.W. of Dunkeld:—*L. Tay*, a lake of Perth, which is a grand and beautiful expanse of water, of such length as rather to resemble a noble river, abounding with fish, and terminating in an island, on which are seen the ruins of a priory; having in its eastern extremity the capital mansion and plantations of the earl of Braidalben; 24 miles N.W. of Perth:—*L. Tollie*, a lake in Argyle; 11 miles N.N.E. of Glenorchy:—*L. Troig*, a lake of Inverness; 14 miles E. of Fort William:—*L. Tuml*, a lake of Perth; five miles S. of Blair Athol:—*L. Turret*, a lake of Perth; five miles N.N.W. of Crieff:—*L. Jack*, a lake of Perth; three miles S.S.W. of Blair Athol:—*L. Talcen*, a lake of Perth; six miles E. of Blair Athol:—*L. Tull*, a lake of Perth; 17 miles W. of Crieff:—*L. Urine*, a lake in the county of Ross; six miles long, and half a mile wide; 25 miles W.N.W. of Dingwall:—*L. Trestachan*, a lake in the S.W. part of Aberdeenshire; seven miles S. of Castleton of Braemar:—*L. Ull*, a lake of Ross; two miles W. of Dingwall:—*L. Watten*, a lake in Caithness; seven miles W. of Wick:—*L. Ythan*, a lake on the W. coast of Scotland, on the N. side of Loch Feriden.

LOCHABER, a district of Scotland, in the county of Inverness; about 40 miles long and 25 broad, of which the chief place is Fort William. This is one of the most dreary, mountainous, and barren districts in Scotland, thinly inhabited, with the houses wretched. The chief produce is black cattle, with very large flocks of sheep. Here prince Charles erected his standard in 1745, upon his landing from France, with seven officers, and arms for 2000 men.

LOCHE, or *Sea-Loche*, a name used in some parts of England for the *myxela*, called in other places, particularly in Cornwall, the *whiffle-fish*. See *GADUS MYXELA*.

LOCHEM, in *Geography*, a town of Holland, in the department of Guelderland, on the Borkel; 10 miles E. of Zutphen.

LOCHER Moss, a morass of Scotland, in the county of Dumfries; 10 miles long and three broad, which must have been formerly a forest, on account of the oak trees that are dug up in it; and as canoes and anchors have been also found here, it must have been once covered with sea.

LOCHES, a town of France, and principal place of a district, in the department of the Indre and Loire; 21 miles S.S.E. of Tours. The place contains 4342, and the canton 14,701 inhabitants, on a territory of 385 kilometres, in 18 communes. The castle, seated on a rock in this town, was formerly an important fortification. It had four ranges of subterraneous passages, running over one another, in the uppermost of which, Louis Stroz, duke of Milan, was imprisoned for 10 years, and where he died. Its large tower contains two cages or moveable rooms, with strong oak gates, covered with iron; and in one of these cardinal Balzo, bishop of Angers, was confined by Lewis XII. At a convent near the town, an edict was passed in 1576, in favour of the Protestants; but it was soon after violated by the queen regent, Catherine de Medicis. N. lat. 47° 7'. E. long. 0° 34'.

LOCHIA, in *Midwifery*, a discharge of blood from the uterus of women, occurring after the expulsion of the placenta, and continuing four, five, or more days. See *LABOUR*, *Natural*.

LOCHIAL FEVERS, a term used by medical writers

to express such fevers as arise from suppressions or diminutions of the lochial discharges in lying-in women, or from any other irregularities during the time of that discharge.

LOCHMABEN, in *Geography*, a town and royal borough, situated in the county of Dumfries, and district of Annandale, Scotland. It is supposed to have derived its name from the number of small lochs in its vicinity. This borough, according to tradition, received its original charter from king Robert Bruce, whose paternal estate was the lordship of Annandale. It is certain at least, that this monarch bestowed upon it a considerable portion of lands from his own property. The oldest charter extant is a writ of *novodamus*, by James VI., dated 16th July, 1612; which assigns as a reason for the renewal, the destruction of the town and its records by the English, during some of their inroads. Lochmaben has undoubtedly been formerly of more importance than at present. The borough-roads and town community are very extensive, and for the most part fenced off at a very trifling annual rent. The government of the town is vested in a provost, three bailies, a dean of guild, a treasurer, and nine common-council-men. Coarse linen is the staple production of this place; 60,000 yards being annually manufactured here and in the neighbourhood for the English market. The coal used for fuel is brought chiefly from Cumberland. Annan, Dumfries, Kirkcudbright, Sanquhar, and this town, join in sending one member to parliament.

The parish of Lochmaben extends about ten miles along the banks of the Annan, which possesses a very valuable salmon fishery, almost contiguous to the town. Several smaller streams flow into this river, all of which are abundantly supplied with trout. In the largest of the lochs, which present a truly beautiful sheet of water, a great variety of fish are caught. The fishermen assert, that there are 15 or 16 different kinds fit for the table. Among these is one called the vendice, or vendace, some say from Vendois in France, as being brought thence by one of the Jameses. This story, however, does not seem very probable, as it is found by experience, that this fish dies the instant it is touched. Besides, it has in vain been attempted to transport it to other lochs in the neighbourhood. The vendice is about the size of a herring, and resembles it both in external appearance and anatomical structure. In taste and flavour it is extremely delicate, so that it is reckoned among the most delicious fish that swims. It lies generally in the deepest parts of the loch, and is caught with the net.

Upon a peninsula which stretches out into this loch stands a castle, originally built by Robert de Bruce, the first of that name who swayed the Scottish sceptre. It was a place of great strength previous to the introduction of fire-arms, and could still be made so, if its fortifications were raised anew according to the principles of modern warfare. The original buildings of the castle seem to have occupied about an acre of ground. The walls were twelve feet in diameter. Three ditches surround the whole at different distances. The area contained within the outermost wall may be about 13 acres. The inner one passes through a part of the castle, within which there was a place for the security of the boats, either from the effects of the weather or an enemy. While Scotland was a distinct kingdom from England, this fort was the frontier garrison against Carlisle. The marquess of Annandale, among his other titles, assumes that of constable, or hereditary keeper of the castle of Lochmaben. To this office was attached a salary of 300*l.* Scotch, along with the fishings of the lochs. For the maintenance of the troops composing the garrison, the government had likewise what was called a *laird-a-mart*, or *lairdiner mart*.

mart cow, which was one of the best fat cows from every parish in Annandale. Very little of the cattle now remains, it having been completely pillaged of its materials for the construction and ornament of many of the houses in the neighbourhood.

Between this castle and the Kirk-lochs, close to the town, are the vestiges of another fort of more ancient date. Tradition reports that the stones were removed to assist in building another castle, probably that in the loch. The situation of this castle is fine, and commands a beautiful prospect over an extensive plain. It was originally the residence of the Bruce family, before they ascended the throne of Scotland. It is said that king Robert I. was born here.

Contiguous to the castle first mentioned, on the banks of the Annan, lies a large tract of fertile land, called the Four-towns, as comprehending four populous villages. These lands were originally granted by one of the Scottish monarchs to his household servants, and the property of each being very small, bare possession was declared a sufficient title. When any part of this property is transferred, it is only necessary to mark the transaction in the books of the lord of the barony. In measuring the lands of this district, an ell, called the barony ell, is made use of, which contains 42 inches, whereas the common ell of the country is only 38 inches.

Lochmaben and its vicinity derive no small degree of celebrity, as the scene of some of the heroic actions of the renowned sir William Wallace. According to the population report of 1801, this parish contained 499 houses, and 2053 inhabitants.

LOCHNEV, a town of Sweden, in the province of Smaland; 60 miles N. of Calmar.

LOCHSTETT, a town of Prussia, in the province of Smaland, near which are the ruins of a castle, in which was a dungeon, that served for a prison; four miles N. of Pillau.

LOCHVITZE, a town of Russia, in the government of Tchernigov, on the Sufa; 96 miles S.E. of Tchernigov. N. lat. 50° 20'. E. long. 28° 14'.

LOCIS COMMUNIBUS. See COMMUNIBUS.

LOCK, MATTHEW, in *Biography*, organist and composer to his majesty Charles II.; was a native of Exeter, and a chorister in the cathedral of that city, while William Wake was organist there. He had afterwards instructions in music from Edward Gibbons, and had so much distinguished himself as a professor of abilities, that we are told in the continuation of sir Richard Baker's chronicle, he was appointed to compose the music for the public entry of the king at the restoration, and captain Henry Cook for his coronation.

But he seems first to have appeared as an author in 1657, during the interregnum, by the publication of his "little consort of three parts for viols or violins, consisting of ravans, ayres, corants, farabands, in two several varieties, the first twenty of which are for two trebles and a base."

Some of his compositions appear in the second part of John Playford's continuation of Hilton's "Catch that catch can," in 1667. Of which publication, the second part contains "Dialogues, Glee, Ayres, and Ballads, of two, three, and four voices," among which we find the most pleasing of Lock's compositions; "Never trouble thyself about times or their turnings," a glee for three voices.

Lock was the first who attempted dramatic music for the English stage, if we except the masques that were performed at court, and at the houses of the nobility, in the time of Charles I., and during the reign of Charles II. When musical dramas were first attempted, which Dryden calls heroic

plays and dramatic operas, Lock was employed to set most of them; "Circe," written by sir William Davenant's son, Dr. Davenant, was set by Bannister; but the *semi-operas*, as they were called, the *Tempest*, *Macbeth*, and *Psyche*, translated from the French of Moliere by Shadwell, were set to music by Lock. The *Tempest* and *Psyche* were performed in 1673, with music, dancing, and splendid scenes, but not printed till 1675, when it was published with the following title: "The English Opera; or the vocal Music in *Psyche*, with the instrumental therein intermixed. To which is added the instrumental Music in the *Tempest*. By Matthew Lock, composer in ordinary to his Majesty, and Organist to the Queen." This publication is dedicated to James duke of Monmouth. There is a preface of some length by the composer, Matthew Lock, which, like his music, is rough and nervous, exactly corresponding with the idea which is generated of his private character, by the perusal of his controversy with Salmon, and the sight of his picture in the music-school at Oxford. It is written with that natural petulance which probably gave birth to most of the quarrels in which he was involved. He begins with a complaint of the tendency of his brother musicians "to peck and carp at other men's conceptions, low mean favour may be their own. And expecting to fall under the lash of some soft-headed or hard-hearted composer," he sets about removing "the few blocks at which they may take occasion to stumble," with a degree of indignation that implies an irascible spirit under no great governance. The first objection which he thinks likely to be made, is to the word opera, to which he answers, that it is a word borrowed from the Italian, who by it distinguished this kind of drama from their comedies, which, after a plan is laid, is spoken extempore; whereas this is not only designed, but written with art and industry; and afterwards set to suitable music. In which idea he has produced the following compositions, which, for the most part, are "in their nature soft, easy, and, as far as his abilities could reach, agreeable to the design of the poet. For in them there is ballad to single air, counterpoint, recitative, fugue, canon, and chromatic music, which variety, without vanity be it said, was never in court or theatre, till now presented, in this nation." He confesses, however, that something had been attempted before in this way of composition, but more by himself than any other. And adds, "that the author of the drama prudently considering, that though Italy was and is the great academy of the world for music and this species of entertainment, yet as this piece was to be performed in England, which is entitled to no such praise, he mixed it with interlocutor, as more proper to our genius."

He concludes his peevish preface by confessing, that "the instrumental music before and between the acts, and the entries in the acts of *Psyche*, were omitted by the consent of the author, Signor Gio. Baptista Draghi; and that the tunes of the entries and dances in the *Tempest* (the dances being changed) were omitted for the same reason."

Here we have a short history of these early attempts at dramatic music on our stage, in which, as in the most successful representations of this kind in later times, the chief part of the dialogue was spoken, and recitative, or musical declamation, which seems to be the true criterion and characteristic of Italian operas, but seldom used, unless merely to introduce some particular airs and choruses: as in the modern *Comus*, the air, "On ev'ry hill, in ev'ry dale," is preceded by the short recitative "How gentle was my Damon's air."

Upon examining this music, it appears to have been very much composed on Lulli's model. The melody is neither recitative

recitative nor air, but partaking of both, with a change of measure as frequent as in any old French opera which we ever saw.

Lock had genius and abilities in harmony sufficient to have surpassed his model, or to have cast his movements in a mould of his own making; but such was the passion of Charles II. and consequently of his court at this time, for every thing French, that in all probability Lock was instructed to imitate Cambert and Lulli. His music for the witches in Macbeth, which, when produced in 1674, was as smooth and airy as any of the time, has now obtained, by age, that wild and savage cast which is admirably suited to the infernal characters that are supposed to perform it.

In the third introductory music to the Tempest, which is called a *curtain tune*, probably from the curtain being first drawn up during the performance of this species of overture, he has, for the first time that is come to our knowledge, introduced the use of *crescendo* (louder by degrees,) with *diminuendo*, and *lento*, under the words *soft* and *slow by degrees*. No other instruments are mentioned in the score of his opera of *Psyche*, than *violins* for the ritornels; and yet, so slow was the progress of that instrument during the last century, that in a general catalogue of music in 1701, scarce any compositions appear to have been printed for its use.

This musician was of so irascible a disposition, that he seems never to have been without a quarrel or two on his hands. For his furious attack on Salmon, for proposing to reduce all the clefs in music to one, (see SALMON and CLEF,) he had a quarrel with the gentlemen of the Chapel Royal, early in Charles II.'s reign. Being composer in ordinary to the king, he produced for the Chapel Royal a morning service, in which he set the prayer after each of the ten commandments, to different music from that to which the singers had been long accustomed, which was deemed an unpardonable innovation, and on the first day of April 1666, at the performance of it before the king, there was a disturbance and an obstruction for some time to the performance. To convince the public that it was not from the meaness or inaccuracy of the composition, that this impediment to its performance happened, Lock thought it necessary to print the whole service; and it came abroad, in score, on a single sheet, with a long and laboured vindication, by way of preface, under the following title; "Modern church-musick pre-accused, censured and obstructed in its performance before his majesty."

Lock was long suspected of being a Roman Catholic, and it is probable that this new service, by leaning a little more towards the mass, than the service of the Protestant cathedral, may have given offence to some zealous members of the church of England.

The public were indebted to Lock for the first rules that were ever published in England, for a *basso continuo*, or *thorough-bass*; these rules he gave to the world, in a book entitled "Melothesia," London, oblong 4to. 1673. It is dedicated to Roger l'Estrange, esq. afterwards sir Roger l'Estrange, an ingenious man, a good musician, and an encourager of its professors. It contains, besides the thorough-bass rules, some lessons for the harpsichord and organ by Lock himself, and others. He was author likewise of several songs printed in "The Treasury of Music," "The Theatre of Music," and other collections of songs. In the latter of these is a dialogue. "When death shall part us from these kids," which, with Dr. Blow's "Go, perjured man," was ranked among the best vocal compositions of the time.

It is presumed, that when he was appointed composer in ordinary to the king, he was professionally a member of the church of England; but it is certain that he went over to

the Romish communion afterwards, and became organist to queen Catherine of Portugal, the consort of Charles II. and died a Papist in 1677.

Lock, a well-known instrument for securing doors and preventing them from being opened, except by means of the key adapted to it. A common lock consists of a strong bolt, which must be fitted in a proper box or case affixed to the door, and inclosing it on all sides, to defend it from violence, that it cannot be withdrawn, except by the application of the key, which should enter the lock by a small key-hole, and be surrounded by numerous wards, that occasion the passage the key passes through, in turning round to move the bolt, to be very crooked and intricate, and thus preventing the introduction of any instrument or false key to withdraw the bolt. The third part of the lock is the tumbler, which is a catch or click holding the bolt from being withdrawn, except the tumbler is first removed by the key, which is done at the same time it shoots the bolt. This common lock cannot be made perfectly secure from being picked or opened without the right key, from the circumstance that the wards, though they may be variously disposed, so as to require a very crooked key, must be always left fixed in the lock, and their figure may be taken by introducing a small false key, covered with wax or other plastic substance, and receiving the impression of the wards, from which information a false or skeleton key may be made, that will enter the lock and withdraw the bolt; or, if it will only raise up the tumbler, the bolt may sometimes be forced back by other means. Another reason of the insufficiency of the common lock is, that the variations capable of being made in the arrangement of the wards are not sufficient to produce the required number of locks without having great numbers exactly alike, and their keys capable of opening each other reciprocally; from which circumstance they become but an imperfect security, as any ill-disposed person may, by furnishing himself with a great variety of old keys, be enabled to open almost any common lock; particularly if these keys are filed away to skeletons, that is, leaving as little as possible of the solid part of the key, which will then have a greater chance of passing in between the intricate wards.

To produce a lock which would be free from these objections has been the study of many ingenious mechanics, whose various locks have different properties and advantages. We have devoted *Plate XXI. Miscellany*, to the explanation of two capital locks, one by Mr. Thomas Rowntree, which is an improvement upon the common tumbler-lock, and another by Mr. Joseph Bramah, which is on an entirely different principle.

Mr. Rowntree's lock is represented in *figs. 5, 6, 7, and 8*; in these the following parts are those of the common lock: A A is the plate which incloses the whole mechanism, and fastens it to the door; B B, *fig. 6*, is the bolt, which is guided in its motion by sliding under two bridges C, D, screwed to the main plate; E, E, are four pillars which support a plate to cover the works: this plate has the key-hole in it; F, &c. are the circular wards surrounding the centre pin; and a, *fig. 6*, is the key which, in turning round, acts in a notch *r* in the bolt, and shoots it forwards or backwards; G is the tumbler: it is a plate situated beneath the bolt and moving on a centre pin at *d*. See also *fig. 8*, which is a separate view of the tumbler; it has a catch *e* projecting upwards from it, which enters the notches *f* or *g*, *fig. 6*, in the bolt, and thus firmly retains the bolt; the former when it is locked, and the latter when it is drawn back. H is a spring which presses the tumbler forwards; the key *a*, in turning round, acts first against the part *c* of the tumbler, and raises

raises it so as to remove the catch *c* from the notches *f* or *g*, and then the key enters the notch *r* in the bolt, and moves it. In this, which is the common lock, it will be seen there is no security, except what arises from the intricacy of the wards *F* surrounding the key; for a false key, or any other instrument which is of the same length as *a*, will, if it can pass the wards, raise the tumbler and draw back the bolt. Mr. Rowntree has, by applying an ingenious contrivance to this lock, rendered it so secure, that it will be nearly impossible to pick or open it with any other than the true key. To the tumbler he has added a piece of metal *b*, *figs.* 7 and 8, called its *fin*, fixed to its lower side. When the tumbler is locked in the notches *f*, *g*, of the bolt, the fin applies itself to a cluster of small wheels *I*, *figs.* 5 and 8, all fitted on one centre pin beneath the tumbler: the edges of these wheels stop the fin *b*, and prevent the tumbler being raised; but each wheel has a notch *i*, *fig.* 8, cut in its circumference, and when they are all placed, so that every notch is turned to the side opposite the fin of the tumbler, and forming one notch through the whole cluster of wheels, then the fin is at liberty to enter this notch, allowing the tumbler to rise: but when the tumbler is down, and the plain edges of all or any of the wheels are presented to the fin, the tumbler cannot be raised unless the wheels are first put into the right position above-mentioned: this is done by a number of levers *K*, *figs.* 5 and 7, all centred on one pin at *k*. At the opposite end each has a tooth *m*, entering a notch in the wheel belonging to it, so that when any lever is pressed outwards it turns its wheel round. The levers are pressed towards the key by a spring *n* applied to each, and in this state they rest against a pin *o* fixed in the plate. The wheels are now disarranged completely, every one presenting its plain edge to the fin, but every one requiring a different degree of motion to bring the notch round to the proper position. When the key is introduced and turned round, it first operates upon the curved part *p*, *q*, *fig.* 5, of the levers *K*, and raising them, turns all the circles *I* at once into the proper position. The key, in turning farther round, operates on the part *e*, *fig.* 6, of the tumbler, now at liberty to move, and by raising it releases the bolt, and in turning still further round, it raises the notch *r* of the bolt, as in *fig.* 6, and shoots it. The key is cut into steps of different lengths, as shewn at *v*, *u*, in *fig.* 1: each step operates on its respective lever *K* in a different degree, and turns its circle *I* the proper quantity. The notch at *s* acts upon the tumbler, and the plain part *t* moves the bolt. In this lock there is no possibility of picking it, for if all the levers except one were raised the proper quantity, that one would detain the tumbler as effectually as the whole number; and a false key, besides having the wards as *R*, must have all the notches *v*, *u*, of the exact depth, neither greater nor less, or it will not open the lock, even if one alone is incorrect. If the key is lost, when a new one is made, the maker takes out the levers *K* and circles *I*, and arranging them in a new order, one upon the other, making the new key to fit the new arrangement, and then the old key will not open the lock; though none of the parts are altered, but only their arrangement. The same may be done if it be suspected that an impression has been fraudently taken from the key to make a false one by.

The locks invented by Mr. Joseph Bramah display great ingenuity, and demand a particular description, having been in very general use for many years past, and greatly admired. He obtained a patent for his invention in 1784, and established a manufactory of them, in which he employed a number of ingenious tools and engines for the fabrication of the different parts. One of Mr. Bramah's simplest forms of a lock for a drawer, or for a door, is represented in *figs.* 1, 2, 3, 4. *Plate*

XXII. *Miscellany*, in which *A* represents the bolt, fitted to slide on the metal plate *BBC*, by passing through a hole in the side *C*, which is turned up, as shewn in *fig.* 3: the other end of the bolt is guided by passing under proper grooves in the lower side of the circular box *DD*, which is screwed to the plate *B* to confine the bolt down. It contains the whole mechanism of the lock, consisting of an interior cylinder or barrel *EE*, shewn in the section *fig.* 3, with its appendages in perspective in *fig.* 4. This barrel is fitted to turn round within the box *DD*, the upper end *aa* being received into a cavity exactly fitting it, and the middle encompassed by a circular ring of steel plate *bb*, screwed into the box as shewn in *fig.* 3, and one-half shewn at *b*, *fig.* 4. The ring enters a circular groove formed round the barrel, and thus confines it from having any other motion than a rotation on its axis, and this only by the aid of the key *R*, as will be explained. The barrel has a hole through its centre, which is closed at bottom by a circular plate *F*, screwed to it, and supporting the central pin *G*, which occupies the centre of the hole through the barrel: this centre pin guides the key in entering the lock. When the barrel *EE* is turned round by the key, it shoots the bolt *A*, by an ingenious contrivance, explained in *fig.* 2, an aperture being cut through the plate *BBC* to exhibit it. The plate *F*, on the lower end of the barrel *E*, has a pin *f* projecting from it: this pin enters a curved opening, at a small distance from the centre, and therefore describes a circle when the barrel is turned round, cut through the bolt *A*, as is shewn by the dark curve *F* in *fig.* 2. In the position there shewn the bolt is withdrawn, and the pin *f*, resting against the solid part of the groove, prevents the barrel being turned round any farther in the direction from *F* to *f*: but by the application of the key, the barrel may be turned in the other direction from *f* to *F*, in which course it passes round in a circular part of the groove, and therefore produces no motion of the bolt *A*, until the pin *f* strikes the straight part *g* of the groove, and acts against it to throw the bolt forwards: and when the barrel has made a complete circuit, and the pin *f* is again come to the same position it was at first, the bolt is shot out as at *fig.* 1, and the pin is resting in the hollow *h*, which prevents it moving any farther in the same direction. When the barrel is turned back again, the pin *f* acts against the notch *i* and the curved part *k* of the groove, and withdraws the bolt into the position of *fig.* 2: now the pin *f*, either when the bolt is shot out or in, is in a right line with the centre of the barrel *E*, to which it is fixed, and the direction of the bolt's motion. By this means, no force whatever applied to drive back the bolt can have the least tendency to turn the barrel round, and strain the mechanism which prevents its motion, unless the parts are first put into a particular arrangement, by the application of the key. The interior mechanism must be explained by *fig.* 4, in which *l*, *m*, *n*, represent small steel sliders, which are fitted into proper grooves or flits, made in the substance of the barrel *E*. Of these there are six in number, arranged round the barrel, and projecting a little from its exterior surface in the small part. These sliders are received in notches *y*, *z*, in the fixed steel ring *bb*, before described; and thus effectually detain the barrel at six points from being turned round, except it is first unlocked by the key *R* being introduced at the key-hole *H*, and the sliders pressed down by it, so as to bring the notches (of which each slider has one, as at *r* *fig.* 4) all opposite the steel plate *bb*, and then the barrel may be turned round. When the key is absent, the sliders are raised up by a brass ring *v* sliding on the central pin *G*, and lifted up by a spiral spring *w*. The key has six notches cut in the end of it, as shewn at *S*, which is an end view: each notch in the key includes one of the six sliders *l*, *m*, *n*, and

and the key, being forced down into the key-hole H, depresses all the sliders at once, until the projecting leaf *t* of the key stops upon the bottom of the recess *x*, cut in the upper edge of the barrel. In this position the sliders are depressed, so that the notch *r* made in each slider comes exactly opposite the steel ring *b b*, and the barrel is at liberty to turn round all the sliders, being by this means removed, or at least relieved, from the steel ring, which, as before mentioned, embraces a groove cut round the barrel, but which cannot turn round therein unless the sliders are also moved by the key, that the notches cut in them coincide with the groove cut round the barrel, and then it can turn freely round. The key, having thus relieved the barrel by being thrust in as far as it can go, obtains a hold of the barrel to turn it round, by the leaf *t* entering the recess *x*, which it exactly fills up, so as to form a continuation of the circular top of the barrel: but as soon as the key is turned round with the barrel a small quantity, its leaf is caught beneath the circular cavity in the top of the box D, and thus the key is prevented from being thrown out by the spiral spring *w*, until it has been turned quite round, and locked or unlocked the bolt: then the leaf of the key coming opposite the enlargement *z*, *fig. 1*, of the key-hole H, the spring throws the key out and raises all the sliders, that they may interlock with the steel plate *b b*, and prevent the barrel from turning, unless the key is again put in, (its leaf being opposite the aperture *z* of the key-hole,) and being thrust forwards as far as it will go, the barrel will turn round very easily; and when it has made a complete circuit, the lock is opened, and the key thrown out of the key-hole by the spring.

The security of this ingenious lock from being picked, or opened by a false key, depends upon a circumstance not yet mentioned, which is, that the notches in the six sliders are so made, that every one requires to be depressed a different quantity to bring them all at once opposite the steel ring, in which position alone the barrel can be moved. For this reason the six notches in the key are all of different depths, correspondent to the positions of the notches in their respective sliders; and unless each notch in the key is of the proper depth, the lock cannot be opened, for any one being too deep, that slider will not be pressed low enough to relieve the barrel, and will hold it fast, though all the others may be correct: on the other hand, any notch not being of sufficient depth, the slider it acts upon will be pressed too far, and in this case the notch in it, having passed by the steel ring, will lock the barrel as effectually as though it was not far enough. Thus this lock admits of an immense number of combinations: 1st, in the number of the sliders; 2^{dly}, the depths of the different notches in the key; and 3^{dly}, the arrangement of these sliders. The combination of these three changes admits such an immense number of varieties of locks, that it never need happen that two locks should be made to open by the same key. Any of Mr. Bramah's locks may be arranged so as to require a new and different key in case the original should be lost or stolen: for this purpose the lock must be opened, and the sliders taken out and changed into different grooves: a new key must now be made, with the grooves of the same depth of the original key, but arranged in a different order, corresponding with the new arrangement of the sliders. The old key will not now open the lock.

To pick a lock of this kind is perhaps impossible; because, though the sliders are exposed to the examination of any person, yet no information can be obtained of the depth of each of the sliders required to be depressed; for, unless they are all together pressed down, the barrel cannot be turned in the least, and without turning it, no guess can be made

by pressing down any one slider of the depth at which the notch in it will be opposite the steel ring. Another great advantage of these locks is, that from the circumstance before explained, of the bolt having no action to turn the barrel, though the barrel has a great power to shoot the bolt, a strong lock may have but a very small key. For instance, the bolt of the lock, in the plate which is drawn its full size, is of great strength, while the key R is so small, that it may always be carried suspended to the watch chain, and then it will not be in danger of being lost or mislaid, as one may happen to lose a key, and give opportunity for ill disposed persons to make a false key from it, unknown to the owner.

A lock invented by Mr. Stanbury, an American gentleman, has great merit. To explain it, we must suppose that a flat circular plate is fitted to turn round upon the centre pin for the key, and that this plate, when turned round, shoots the bolt, which may be done by various means. The locking part consists of four, six, or more small steel pins, which are received in holes made very near each other, through both the circular turning plate, and the fixed plate beneath it. By these pins the circular plate is held fast from turning. The key has the same number of pins, and arranged in the same position and distance as the pins in the plate. The key being introduced, it is pressed forwards against the circular plate, and turned round till the pins in it come over the pins in the circular plate, and the pressure of the hand forces the pins out of the circular plate, the pins in the key occupying the place of them. The plate is now relieved, and the key has hold of the plate to turn it round and open the lock. Each pin is provided with a spring behind the fixed plate to force it forwards. The difficulty of making a false key to this lock is very great; as any error in the number, size, position, or length of the pins, will prevent it from opening the lock. To avoid the danger of impressions being taken, many marks are stamped upon the circular plate, which are exactly the same as the marks of the real pins: thus an impression taken from it would only mislead.

Mr. Stanbury has also made an ingenious improvement upon the common spring door-lock. The handle which opens the spring catch for fastening the door, instead of requiring to be turned round, is made so that it withdraws the spring catch, by pushing the handle on one side of the door and pulling it on the other. This method is extremely convenient; for pressing the handle releases the lock, and continuing the pressure opens the door, and pulling the handle on the other side has the same effect. A person with his hands full may open such a door by only leaning against the handle.

Lock, or *Weir*, in *Inland Navigation*, the general name for all those works of wood and stone, made to confine and raise the water of a river: the banks also which are made to divert the course of the river, are called by these names in some places. But the term *lock*, or *pond-lock*, is more particularly appropriated to express a contrivance, consisting of two gates, or pairs of gates, called the lock-gates, and a chamber between, in which the water may be made to coincide with the upper or lower canal, according as the upper or lower gates communicating with it are opened; by which means boats are raised or depressed from one level or reach of a canal to another. See *Plate V. Canals*.

Lock of Water, is the measure equal to the content of the chamber of the locks, by which the consumption of water on a canal is estimated.

Lock-keeper, a person who attends the locks to take

care of them, and to assist the boatmen in passing through them.

Lock-paddles are the small sluices that serve to fill and empty the locks.

Lock-fills are the angular pieces of timber, (*b, b*, *Plate V. Canals, fig. 36.*) at the bottom of the lock, against which the gates shut.

* *Lock-rollers*, or *Paddle-rollers*, are the over-falls behind the upper gates, (*a, a*, *Plate V. fig. 37.*) by which the water of the upper pound is let down through the paddle-holes into the chamber of the lock.

To *Lock*, in *Fencing*, is to seize your adversary's sword-arm, by twining your left arm round it, after you close your parade, shell to shell, in order to disarm him.

LOCKARTSBURG, in *Geography*, a town of America, in Luzerne county, Pennsylvania, situated on an isthmus, formed by the confluence of the Susquehanna and Tioga rivers, about a mile above their junction.

LOCKE, JOHN, in *Biography*, one of the greatest philosophers and most powerful writers that ever adorned this country, was born at Wrington, in Somersetshire, on the 29th of August 1632. His father was a gentleman of strict probity and economy, and he possessed a handsome fortune. He took great pains in the education of his son; and, when he was of a proper age, sent him to Westminster school, where he continued till the year 1651, when he was entered a student of Christ-church college, in the university of Oxford. Here he was distinguished above all his contemporaries, and was considered to be the most ingenious young man in the college. It appears, however, that he was disgusted with the method of study prescribed to him, which was after the manner of the Peripatetics; and it is said, that the books which first gave him a relish for the study of philosophy were those written by Des Cartes. Having taken his degrees in arts in 1655 and 1658, Mr. Locke for some time closely applied himself to the study of physic; and it is certain that, for a short time, he followed it as a profession. In the year 1664 he accepted an offer to go abroad, as secretary to sir William Swan, envoy from Charles II. to the elector of Brandenburg; but returning to England again within less than a year, he resumed his studies at Oxford with renewed vigour, applying himself particularly to natural philosophy. In 1666 he was accidentally introduced to the acquaintance of lord Ashley, afterwards earl of Shaftesbury, in the capacity of a medical practitioner, during the absence of the physician who regularly attended his lordship. When the noble lord left Oxford to go to Sunning Hill, he made Mr. Locke promise him a visit there, which promise he performed in 1667. Having secured him as an inmate, lord Ashley suffered himself to be governed entirely by his advice, and became so much attached to him, that he would not suffer him to practise medicine out of his own family, except in the case of some particular friends; and perceiving that the great abilities of Mr. Locke were calculated to render him eminently serviceable to the world in other departments of knowledge, urged him to apply his talents to state affairs and political subjects. To these Mr. Locke was naturally inclined, and succeeded so well, that lord Ashley began to consult him on all occasions. He was now introduced to the society of some of the most eminent men of letters, who were all delighted with his conversation. In the year 1668, Mr. Locke accompanied the earl and countess of Northumberland in a tour to France, and returned in the same way with the lady, while his lordship set off to Italy, with an intention of visiting Rome. This nobleman, however, died on his journey, and Mr. Locke accompanied the countess to England, and again took up

his residence at lord Ashley's. His lordship, at that period chancellor of the exchequer, having, in conjunction with other noble lords, obtained a grant of Carolina in North America, employed Mr. Locke to draw up a constitution for that province. In executing this task, he had formed articles relative to religion and public worship on those enlarged principles of toleration, which were agreeable to his own enlightened views upon that subject. The clergy, however, jealous of a diminution of their powers, caused an additional clause to be inserted, securing the countenance and support of the state only to the exercise of religion according to the discipline of the established church. Mr. Locke, notwithstanding his connection with lord Ashley, made frequent visits to Oxford, though he was at the same time engaged to inspect the education of his lordship's eldest son, an office which he executed with the greatest care, and to the entire satisfaction of his employer. To Mr. Locke, likewise, was confided the important charge of selecting a wife for the young man. This was a task of great difficulty, as the father determined he should only marry a lady of good family, of an agreeable temper, a fine person, and, above all, of good education and excellent understanding. Notwithstanding the difficulties attending such a commission, Mr. Locke undertook it, and executed it to the perfect satisfaction of all parties. The eldest son by this marriage, afterwards the author of the "Characteristics," was committed to the care of Mr. Locke in his education, and gave evidence to the world of the master-hand which had directed and guided his genius. In 1670 Mr. Locke began to form the plan of his "Essay on Human Understanding;" but he was too much engaged by his patron to make much progress in the work. In 1672, lord Ashley was created earl of Shaftesbury, and appointed to the high dignity of lord high chancellor of England. His lordship immediately made him his secretary of the presentations; but he held that place only till the end of the following year, when the earl was obliged to resign the great seal. After this, lord Shaftesbury was president of the board of trade, and Mr. Locke was appointed secretary to the same. The commission being dissolved in 1674, he was again at leisure, was admitted to the degree of bachelor of physic, and began to turn his attention to that faculty, as the means of future support. He was at this time in the highest estimation with several persons of eminence in the medical profession: Dr. Sydenham, among other, speaking of him, says, "If we consider his genius, and penetrating and exact judgment, or the strictness of his morals, he has scarcely any superior, and few equals now living." In 1675, Mr. Locke sought relief from a pulmonary complaint by travelling to the south of France, where he became acquainted with the earl of Pembroke, to whom he communicated his plan of writing the "Essay on Human Understanding." He afterwards settled at Paris, where he obtained the friendship of several men of letters. In 1679 the earl of Shaftesbury, being restored to favour at court, and made president of the council, sent to request that Mr. Locke would return home without delay. He instantly complied; but within six months that nobleman was again displaced, for refusing his concurrence with the designs of the court, which aimed at the establishment of popery and arbitrary power; and in 1682, he found it necessary to retire to the continent, to avoid a prosecution for high treason, on account of offences charged upon him, probably without the colour of reason or truth. Mr. Locke, whose character was above all suspicion, remained steadily attached to his patron, following him into Holland; and upon his lordship's death, which happened soon afterwards, he did not think it safe to return to his native

native country, where his intimate connection with lord Shaftesbury had created him some powerful and malignant enemies. Their malice pursued him to the utmost extent of their means; and the dean of Christ-church had orders from the king to eject Mr. Locke from his student's place, which was accordingly done. On the accession of James II., William Penn, the quaker, who was the friend of Locke in his adversity, used his interest with the king to procure a pardon for him: and would have obtained it, had not Mr. Locke declined the acceptance of such an offer, declaring that he had no occasion for a pardon, having never been guilty of any crime. In 1685, when the duke of Monmouth and his party were making preparations in Holland for his rash and unfortunate enterprize, the English envoy at the Hague demanded that Mr. Locke, among others, should be given up, on suspicion of his being actively engaged in the undertaking. This suspicion, though entirely groundless, obliged him to lie concealed nearly a year; till it was rendered perfectly evident, even to his enemies and their spies, that he had no concern whatever in the business. Towards the end of the year 1686 he appeared again in public, and soon afterwards was the principal agent in forming a literary society at Amsterdam, of which Limborch, Le Clerc, and other learned men were members, who met together weekly for conversation upon subjects of universal learning. In the following year he finished his great work, the "Essay concerning Human Understanding," which had been the principal object of his attention several years, and which proves how well he spent the period of his exile from England. That the public might be apprized of the outlines of his plan, he himself made an abridgment of it, which his friend Le Clerc translated into French, and inserted in one of his "Bibliothèques." This abridgment was so highly approved by the literati of that period, and by those who were sincerely attached to truth and just principles, that they took every opportunity of expressing the strongest desire to see the complete work in its original state. During his concealment, he wrote his "Letter concerning Toleration," which was first published in the Latin language at Gouda, in 1689, and entitled "Epistola de Tolerantia ad clarissimum Virum T. A. R. P. T. O. L. A. Scripserat P. A. P. O. J. L. A." The former of these sets of letters were intended to signify Theologie apud Remonstrantes Professorem, Tyrannidis Oforem Limburgium Amstelodamensem; and the latter, Pacis Amico, Persecutionis Ofore, Johanne Locke, Anglo. This letter he afterwards translated into English, and published in London in the year 1690. It was speedily translated into the Dutch and French languages, and has been exceedingly popular with liberal people of all countries from that period to the present. It has been frequently reprinted in forms adapted for general circulation, and has been distributed by persons of fortune and rank, among whom may be mentioned, in our own country, his grace the late duke of Grafton. This epistle, though so highly approved, was severely attacked by a clergyman of Oxford, who wrote three pamphlets against it; two of which Mr. Locke answered, defending and justifying his principles with invincible strength of argument: and though he was in a declining state of health, when his antagonist, after twelve years' silence, published his third pamphlet against it, yet he began a reply to him in a "Fourth Letter concerning Toleration." Though this was not finished, yet the fragment has been published in Desmaizeaux's edition of his works.

To return, however, to the narrative of Mr. Locke's life, in the order of time. The revolution of 1688 opened a way for his return into his own country, whither he came

in the same fleet which conveyed the prince of Orange; and upon the restoration of public liberty, he did not hesitate to assert his own private rights, and accordingly put in his claim to the student's place in the college of Christ's-church, of which he had been unjustly deprived. For the sake of peace, he was advised to desist from his claim. As he was considered to be a sufferer for the principles of the revolution, he might have obtained some very considerable post under government: but he contented himself with that of "Commissioner of Appeals," worth about 200*l.* *per annum*. In the year 1689, Mr. Locke had an offer to go abroad in a public character; but he declined the honour and advantages attached to such a situation, on account of the infirm state of his health: and in the following year he published his "Essay," which has given him an immortal reputation; and which, at the time, though it had many enemies, was styled "one of the noblest, most useful, and most original books the world ever saw." Those who disliked every thing like innovation, opposed the progress of our philosopher's principles as laid down in his "Essay." It was even proposed, at a meeting of the heads of the houses of the university of Oxford, to censure and discourage the reading of it; and after long and warm debates among themselves, it was agreed that each individual, at the head of a college, should endeavour to prevent it from being read by the students: a sure method of rendering every spirited young man anxious to peruse it, and even imbibing its principles. The old and the prejudiced were afraid of the light which was diffusing itself in the world, but they could not restrain its effects: the attacks of Mr. Locke's various opponents did but increase his reputation, and render his principles more generally studied and adopted. Mr. Locke's next publication was his "Two Treatises on Government;" in which he vindicated the principles upon which "the Revolution" was founded, and completely demolished sir Robert Filmer's false principles; pointing out, at the same time, the true origin, extent, and end of civil government. About this period, the public coin of the kingdom was known to be in a very bad and depreciated state, having, by being clipped and sweated, lost one-third of its weight. The magnitude of this evil, and the mischief which it threatened, called for the attention of parliament; and Mr. Locke, with the view of assisting those who were at the head of affairs to form a right understanding of this matter, and to excite them to rectify such abuses, printed a tract, entitled "Some Considerations of the Consequences of lowering the Interest, and raising the Value of Money." He had warned the public of their danger, and said, "the nation was in greater danger from a secret unobserved abuse, than from all those other evils of which persons were generally so apprehensive; and that if care was not taken to rectify the coin, that irregularity alone would prove fatal to us, though we should succeed in every thing else." Mr. Locke published other tracts on the same subject, by which he convinced the world that he was as able to reason on trade and business as on the most abstract questions of science. He was accordingly consulted by the ministry relative to a new coinage of silver. With the earl of Pembroke, then lord keeper of the privy seal, he was accustomed to hold weekly conferences; and he was in habits of intimacy and friendship with the earl of Peterborough, at whose house, at Fulham, he always met with a hospitable and kind reception, when the delicacy of his health obliged him to quit the metropolis. He was afterwards obliged to leave London entirely, and accepted of the generous offer of sir Francis Masham, at Oates in Essex, to become a resident in his house, where he spent the remainder of his life. Here he

was received on his own terms, that he might have his entire liberty, and look upon himself as at his own home; and here he chiefly pursued his future studies, being seldom absent, because the air of London grew more and more troublesome to him. In 1693 he published his "Thoughts on Education," which he improved in some subsequent editions; and in 1695 he was appointed, by the king, one of the "Commissioners of Trade and Plantations," which obliged him to be more frequently in London than he had been for some time past. In the same year he published his excellent treatise, entitled "The Reasonableness of Christianity as delivered in the Scriptures;" of which he afterwards published a vindication, in answer to a scurrilous attack by Dr. Edwards, entitled "Socinianism unmasked." Scarcely was Mr. Locke disengaged from this controversy, before he was drawn into another, occasioned by the publication of Mr. Toland's "Christianity not mysterious," in which he endeavoured to prove "that there is nothing in the Christian religion not only contrary to reason, but even nothing above it;" and in explaining his notions, he made use of several arguments from Mr. Locke's "Essay." About the same time, several treatises were published by some Unitarian writers, maintaining that there was nothing in the Christian religion but what was rational and intelligible, which sentiment had been advanced by Mr. Locke. The use which was made of his writings in these instances, determined Dr. Stillingfleet, bishop of Worcester, to make an attack upon the author, in his "Defence of the Doctrine of the Trinity," published in 1697. Mr. Locke wrote an answer, and the controversy was carried on till the death of the bishop: The candid of every party admitted that Mr. Locke was too powerful for the learned prelate, and M. Le Clerc, speaking of the discussion, says, "Every body admired the strength of Mr. Locke's reasonings, and his great clearness and exactness, not only in explaining his own notions, but in confuting those of his adversary. Nor were men of understanding less surprised, that so learned a man as the bishop should engage in a controversy, in which he had all the disadvantages possible: for he was by no means able to maintain his opinions against Mr. Locke, whose reasonings he neither understood, nor the subject itself about which he disputed." And an Irish prelate writing to Mr. Molyneux, the intimate friend of Mr. Locke, thus expresses himself on the subject: "I am wholly of your opinion, that he has laid the great bishop on his back; but it is with so much gentleness, as if he were afraid not only of hurting him, but even of spoiling or tumbling his clothes. Indeed, I cannot tell which I most admire; the great civility and good manners in his book, or the forcibleness and clearness of his reasoning." Never, perhaps, was a controversy managed with so much skill and art on one side, nor on the other, so unjustly, confusedly, or so little to the credit of the author. The tracts on this controversy were the last which Mr. Locke committed to press: he grew infirm more from disease than great age, and he determined to resign his office of "Commissioner of Trade, &c.," but he acquainted no person of his intention till he had given his commission into the king's own hand. His majesty pressed him to continue in the post, though he should be unable to perform its duties; but Mr. Locke could not be induced to make such a compromise, and he insisted upon first resigning the emoluments of a place that he felt himself incapable of filling. From this time, which was the year 1701, he lived altogether at Oates in Essex, and applied himself, without interruption, entirely to the study of the holy scriptures; and in the employment he found so much pleasure, that he regretted his not having devoted more of his time to it in the former part of his life; and he replied, in

answer to a young gentleman, who asked what was the shortest and surest way for a person to attain a true knowledge of the Christian religion? "Let him study the holy scripture, especially the New Testament. It has God for its author; salvation for its end; and truth, without any mixture of error, for its matter." In 1703 he suffered much from an asthmatic disorder, but the pangs of bodily complaint were alleviated by the kind attentions of lady Masham, who was the daughter of the learned Cudworth: still he foresaw that his dissolution was not far distant, and he could anticipate it without dread, and speak of it with perfect calmness and composure. Though few men had need of so little preparation for the important change as Mr. Locke, yet he felt it right to receive the sacrament at home, in company with some friends, being unable to go to church. When the ceremony was finished, he told the minister, "that he was in perfect charity with all men, and in a sincere communion with the church of Christ, by what name soever it might be distinguished." He lived some months after this, which he spent in acts of piety and devotion: when he was meditating on the wisdom and goodness of the Creator, he could not forbear crying out, "Oh the depth of the riches of the goodness and knowledge of God!" what he felt himself on this subject he was anxious to infuse into the hearts of others. On the day previously to his departure he said, "he had lived long enough, and was thankful that he had enjoyed a happy life; but that, after all, he looked upon this life to be nothing but vanity," or, as he expresses a similar sentiment, in a letter which he left behind him for his friend Mr. Anthony Collins, one that "affords no solid satisfaction but in the consciousness of doing well, and in the hopes of another life." He had no rest that night, and begged in the morning to be carried into his study, where, being placed in an easy chair, he had a refreshing sleep for a considerable time. He then requested his valuable friend, lady Masham, to read aloud some of the psalms, to which he appeared exceedingly attentive, till feeling, probably, the approach of the last messenger, he begged her to desist, and in a few minutes expired, on the 28th of October 1704, in the 73d year of his age. He was interred in the church of Oates, where there is a monument erected to his memory, with a Latin inscription, which he had prepared for the purpose.

Such was the end of as illustrious a philosopher as ever adorned our country: celebrated not only by his wisdom, but by his piety and virtue, by his love of truth, and diligence in the pursuit of it, and by a noble ardour in defence of the civil and religious rights of mankind. That Mr. Locke possessed a noble and lofty mind, superior to prejudice, and capable, by its native energy, of exploring the truth, even in the regions of the intellectual world before unknown; that his judgment was accurate and profound; that his imagination was vigorous; and that he was well furnished with the ornaments of elegant learning, were there no other proofs, might be concluded from his great and immortal work, "The Essay concerning Human Understanding." Though we cannot agree with the learned author of the "Diversions of Purley," "that Mr. Locke never did advance a single step beyond the origin of Ideas and the composition of Terms;" yet it must be admitted, that this was the main object of his essay, though not at first perceived by Mr. Locke himself, as he acknowledges: but he adds, "when I began to examine the extent and certainty of our knowledge, I found it had to near a connection with words, that makes their force and manner of signification were first well observed, there could be very little said clearly and pertinently concerning knowledge, which being conversant about truth, had constantly to do with propositions. And though it terminated in things,

yet it was for the most part so much by the intervention of words, that they seemed scarce separable from our general knowledge." And again, "I am apt to imagine, that were the imperfections of language, as the instrument of knowledge, more thoroughly weighed, a great many of the controversies that make such a noise in the world, would of themselves cease, and the way to knowledge, and perhaps peace too, lie a great deal opener than it does." Hence the author, just referred to, assumes, "that the more Mr. Locke reflected and searched into the human understanding, the more he was convinced of the necessity of an attention to language, and of the inseparable connection between words and knowledge. He says, moreover, that it was a lucky mistake which Mr. Locke made when he called his book "An Essay on the Human Understanding." For some part of the inestimable benefit of that book has, merely on account of its title, reached to thousands more than, I fear, it would have done, had he called it (what it is merely) A Grammatical Essay, or a treatise on words, or on language. The human mind, or the human understanding, appears to be a grand and noble theme, and all men, even the most insufficient, conceive that to be a proper object for their contemplation, while enquiries into the nature of language are supposed to be beneath the concern of their exalted understanding." We shall now quote Dr. Enfield's opinion of this great work. "Discarding," says he, "all systematic theories, he has, from actual experience and observation, delineated the features, and described the operations of the human mind, with a degree of precision and minuteness not to be found in Plato, Aristotle, or Des Cartes. After clearing the way by setting aside the whole doctrine of innate notions, and principles both speculative and practical, the author traces all ideas to two sources, sensation and reflection: treats at large of the nature of ideas, simple and complex; of the operation of the human understanding in forming, distinguishing, compounding, and associating them; of the manner in which words are applied as representations of ideas; of the difficulties and obstructions in the search after truth, which arise from the imperfection of these signs; and of the nature, reality, kinds, degrees, casual hindrances, and necessary limits of human knowledge." Mr. Locke's "Two Treatises of Government," will render his memory dear to the enlightened friends of civil and religious freedom: his letters on toleration, and his commentaries on St. Paul's epistles, are likewise held in high estimation.

Mr. Locke's private character cannot be wholly overlooked: he possessed a great knowledge of the world, and was intimately conversant in the business of it. He was prudent without cunning, and he engaged men's esteem by his probity. Averse from all mean compliances, his wisdom, his experience, and his gentle manners, gained him the respect of his inferiors, the esteem of his equals, the friendship and confidence of those of higher quality. He was remarkable for the ease and politeness of his behaviour; and those who only knew him by his writings, and who had conceived him to be a reserved man, were surprised, if they happened to be introduced to him, to find him extremely affable, good-humoured, and complaisant. Dr. Isaac Watts describes him as having a soul wide as the sea; calm as night, bright as day. And the same author has a fine ode in his lyric poems, written on occasion of Mr. Locke's dangerous illness, some time after he had retired to study the scriptures, of which we shall quote the first stanza.

"And must the man of wondrous mind,
Now his rich thoughts are just refin'd,
Forfake our longing eyes?"

Reason at length submits to wear
The wings of faith; and lo! they rear
Her chariot high, and nobly bear
Her prophet to the skies."

Among the honours paid to the memory of Mr. Locke, that of queen Caroline, consort of George II. ought not to be overlooked, for that princess, having erected a pavilion in Richmond park, devoted to, or in honour of, philosophy, placed in it Mr. Locke's bust, with those of Bacon, Newton, and Clarke, as the four chief of the English philosophers. He left behind him several MSS., from which his executors, Sir Peter King and Anthony Collins, esq. published, in 1705, his paraphrase and notes upon St. Paul's epistle to the Galatians, which were soon followed by those upon the Corinthians, Romans, and Ephesians, with an essay prefixed, "For the understanding of St. Paul's epistles, by consulting St. Paul himself." In the following year the posthumous works of Mr. Locke were published, comprising a treatise "On the Conduct of the Understanding," intended as a supplement to the "Essay;" "An Examination of Malebranche's Opinion of seeing all Things in God." In 1708, some familiar letters between Mr. Locke and several of his friends were published. All the works of this great man have been collected, and frequently reprinted in different sizes; in three vols. folio, in four volumes quarto, and lately in ten volumes 8vo. Biog. Brit. Life prefixed to Mr. Locke's works. Enfield's Hist. of Phil.

LOCKE, in *Geography*, a town of Prussia, in Ermeland; 11 miles from Heilsberg.

LOCKE, a military town of America, in Milton township, New York, in Onondago county; 13 miles N.E. of the S. end of Cayuga lake.

LOCKENITZ, a town and castle of Brandenburg, in the Ucker Mark; 16 miles N.E. of Prenzlau.

LOCKER, in a *Ship*, a kind of box or chest made along the side of a ship, to put or stow any thing in.

LOCKER, *Gozolans*. See HELLERBORN, and TROLLIUS.

LOCKER *Shot*, in *Sea Language*. See GARLAND.

LOCKERBIE, in *Geography*, a market town situated in the parish of Drydale, Dumfriesshire, Scotland. It is pleasantly seated on the river Annan, at the distance of 12 miles from the county town. It consists chiefly of one regular street, half a mile in length from north to south, and this is intersected, at right angles, by another street of inferior extent. According to the parliamentary returns of 1801, the whole parish contained 322 houses and 1607 inhabitants. The buildings in the town are chiefly of recent date. The parish church stands on an eminence at the head of the principal street. Two lakes formerly almost encircled the town. It has two fairs and ten markets during the year, at which upwards of 20,000 limbs are annually sold; the greater part of which are principally sent into England. A considerable quantity of linen and woollen cloths are likewise purchased for the same part of the kingdom.

LOCKEREN, a town of France, in the department of the Scheldt, and chief place of a canton in the district of Termonde. The place contains 11,041, and the canton 15,093 inhabitants, on a territory of 77 kilometres, in three communes.

LOCKHART, a town of North Carolina, in Albemarle Sound; 38 miles E.S.E. of Halifax. N. lat. 36° 2'. W. long. 76° 56'.

LOCKI, or LAKE, as the true orthography may be almost indifferently pronounced, is a name of Lakshmi, the consort of the Hindoo deity Vishnu. See LAKSHMI.

LOCKING-UP, or LOCKING-down, denotes the operation of passing boats up or down through locks.

LOCKING.

LOCKING of Wheels, in *Rural Economy*, the means of lessening them so as to prevent their running too swiftly upon the horses, when coming down steep hills. This is effected in various ways; as by chains, sledges, friction, bars, &c. See **CAUT**, **WHEEL**, and **WAGON**.

LOCKMAN, in the Isle of Man, the officer who executes the orders of the government, much like our undersheriff.

LOCKS, in the *Manège*, in French called *entravens*, are pieces of leather two fingers broad, turned round, and fluffed on the inside, to prevent their hurting the palfren of a horse, round which they are clipped. An *entrance* is composed of two *entravens* joined by an iron chain, seven or eight inches long.

LOCKSPIT, among *Miners*, is the small cut or trench, made with a space of about a foot wide, to mark out the first lines of a work.

LOCKTEWACKI, in *Ceresius*, a town of Swedish Lapland, on a lake; 65 miles W.N.W. of Pitea.

LOCLE, a town, or rather village, of Switzerland, in the principality of Neuchâtel. La Chaux de Fond, another large handsome village lying in a broad valley which reaches to Franche Comte, is connected with Locle by a range of pleasing cottages, skirting both sides of the road. Both these villages, together with the districts belonging to them, contain about 6000 inhabitants, distinguished for their skill and industry in the mechanical arts. They carry on an extensive traffic in lace, stockings, cutlery, and other articles of their own manufacture; but particularly excel in watch-making, and every branch of clock-work. All sorts of workmen necessary for the completion of that business, such as painters, enamellers, engravers, and gilders, are found in these villages; where, upon an average, about 10,000 watches are annually made. Several inhabitants of these villages have invented useful mathematical and astronomical instruments. The son of Droz, afterwards a resident at Paris, exhibited in England several automatical figures of surprising construction: one played upon the harpsichord, another drew landscapes, and a third copied any word presented to it, or wrote down whatever was dictated by any of the company.

LOCMAN, a mountain of Persia, in the province of Khorasan; 15 miles W. of Maruerud.

LOCMINE, a town of France, in the department of Morbihan, and chief place of a canton, in the district of Pontivy; 10 miles S. of Pontivy. The place contains 6429, and the canton 11,253 inhabitants, on a territory of 250 kil. metres, in seven communes.

LOCO POROS NO, a town of Naples, in the province of Bari; 11 miles S.S.E. of Monopoli.

LOCONGAI, a town of Upper Siam; 60 miles N. of Perseon.

LOCRI, **LOCRIANS**, in *Ancient Geography*, a people who are said to have derived their name from an ancient hero called "Locris," or "Locros," whose son Opis founded a town under his own name. These people formed four distinct colonies, with appropriate surnames, the three first of which, viz. *Locri ozoli*, *Locri epizephyrii*, and *Locri opuntiani*, were settled in Greece: the fourth division, denominated *epizephyrii*, inhabited Magna Græcia, near the promontory of Zephyrium. The *ozoli* occupied a considerable extent of country W. of the Phocide, along the gulf of Corinth. The *epizephyrii* derived their name from mount Cronion, about which they dwelt; the *Mabre* gulf being on the E., mount Oeta on the N., the Phocide on the W., and the *Locri opuntiani* on the S., whose territory was of small extent. The *epizephyrii* were situated near the promontory of Zephyrium, and were distributed into two classes, distinguished by

their name and their situation. One division embarked on the gulf of Corinth, and the other on the *Ægean* sea. It is therefore possible that a colony of one of these branches might establish themselves in this part of Italy. Their town, "*Locri Epizephyrii*," was situated on a hill near the above-mentioned promontory. Some say that it was founded at the same time with *Cyzicus*, under the reign of *Tullus Hostilius*, but *Strabo* dates its origin a little after *Crotona* and *Syracuse*, about the year 757 before our era. It was very flourishing, when *Dionysius the younger*, having been driven from *Syracus*, practised there all sorts of violence. But the *Locrians*, having recovered their liberty, expelled the garrison and took ample vengeance of the tyrant. *Ephorus*, says *Strabo*, reports, that *Zaleucus* formed the laws of the *Locrians* from those of *Crete*, *Sparta*, and *Athens*, one of which established a conformity of punishment to crimes, whereas before they were arbitrary and depended upon the will of the judge. The *Locrians* had built upon the coast a temple of *Proserpine*, which was pillaged by *Pyrrius* when he carried his arms into Italy. The town was not better treated by the Roman garrison, under the orders of *Flaminius*. In the year 539 of Rome the *Locrians*, having devoted themselves to the *Brutians* and *Carthaginians*, by this conduct incurred the Roman republic; so that they sent troops against them and took their city in the year 549. A little after, however, they recovered their liberty. The sequel of the history of the *Locrians* is not known; but an instance of their valour has been recorded which deserves to be mentioned. In a war between them and the *Crotoniates*, 10,000 *Locrians*, with a few additional troops, defeated 130,000 of the enemy near the river *Sagra*; an event so marvellous, that it became proverbial in giving attestation to a fact thought incredible. *Allegro non è la Sagra*; i. e. it is more true than the battle of *Sagra*.

Locri, or *Locres*, *Motta di Buazzaro*, a town of Italy, in *Brutium*. It was founded, as we have already mentioned in the preceding article, by a colony of Greeks called *Locrians*.

LOCRIAN, in *Ancient Music*, the seventh species of the diapason. It was also called *hypochoriant*, and *common*.

LOCULAMENTUM, in *Botany*, denotes a cell or partition, in a seed-pod, for the seed of a plant.

In some plants we only find one loculamentum in a pod; in some others two, three, or more.

LOCUS, **PLACE**, in the general sense. See **PLACE**.

Locus, among *Ancient Musicians*, was used to signify the interval between one degree of acuteness or gravity of sound and another. The Greeks used the word $\tau\epsilon\tau\alpha$ in the same sense, for the space through which the voice moved. See **MOTION**.

This motion the Greeks distinguished into two kinds; one continued, $\tau\epsilon\tau\alpha$, the other disjoint, $\tau\epsilon\tau\alpha\sigma\epsilon\sigma\epsilon\sigma$. Instances of the first kind are in speaking; of the second, in singing; and this they called melodic motion, or what was adapted to singing. *Locutus* in like manner divides sounds of unequal pitch, $\tau\epsilon\tau\alpha\sigma\epsilon\sigma\epsilon\sigma$, into continued and discrete, and says the first kind are improper, and the second proper, for harmony.

Aristides Quintilianus interposes a third kind of motion between the two here mentioned, such as that of a person reciting a poem.

Locus, in *Rhetoric*, a topic, or head, whence arguments are brought to prove the question in hand. Some of these are called *communis*, or common topics, as being common to all sorts of argument; thus, whether a thing be possible or impossible, more or less than something else, &c.

Besides these, three others are mentioned by rhetoricians, *judicial*,

justum, utile, and honestum; to which some add *jucundum*; but Vossius will have this last to be comprehended under *utile*. See TOPIC.

Locus geometricus denotes a line, by which a local or indeterminate problem is solved. See LOCAL PROBLEM.

If a point vary its position, according to some determinate law, it will describe a line, which is called its *locus*: or a locus is a line, any point of which may equally solve an indeterminate problem.

This, if a right line suffice for the construction of the equation, is called *locus ad rectum*: if a circle, *locus ad circumferentiam*; if a parabola, *locus ad parabolam*; if an ellipsis, *locus ad ellipsem*; and so of the rest of the conic sections.

The loci of such equations as are right lines, or circles, the ancients called *plane loci*; and of those that are parabolas, hyperbolas, &c. *solid loci*.

Apollonius of Perga wrote two books on *plane loci*, in which the object was, to find the conditions under which a point, varying in its position, is yet limited to have a right line, or a circle given in position. These books are lost, but attempts have been made at restorations by Schooten, Fermat, and R. Simson; the treatise "De Locis Planis," of the latter geometer, published at Glasgow, 1749, is a very excellent performance, in all respects worthy of its celebrated author. Besides the above-mentioned writers, the doctrine of loci has been treated of by various other mathematicians, as Craig, Maclaurin, Des Cartes, De l'Hôpital, &c. the latter of whom has two chapters on this subject in his *Conic Sections*. Leslie in his *Geometry* has also a chapter on plane loci, which contains several of the most simple and interesting propositions of this kind.

Before we proceed to investigate the loci of the higher orders, it will be proper to state a few of the principal properties and uses of plane or geometrical loci; in doing which, however, we must necessarily confine ourselves to those only of the most general description, as the limits of this article will not admit of a minute and particular investigation.

PROP. I.

If a straight line, drawn through a given point to a straight line given in position, be divided in a given ratio, the locus of the point of section is a right line given in position. *Plate XII. Analysis, fig. 1.*

Let the point A, and the straight line B D, be given in position, and let A B, limited by these, be cut in a given ratio at C; this point will be in a straight line given in position.

Analysis.—From A, let fall the perpendicular A D upon B D; and through C draw C E parallel to B D; then $AC : AB :: AE : AD$, and, consequently, the ratio of A E to A D is given; but A D is given both in position and magnitude, and hence A E and the point E are also given, and therefore C E, which is perpendicular to A D, is given in position.

Compassion.—Let fall the perpendicular A D, which divides E in the given ratio, and erect the perpendicular C E, so shall this straight line be the locus required. For C E being parallel to B D, $AC : AB :: AE : AD$; that is, in the given ratio.

PROP. II.

If a straight line, drawn through a given point to the circumference of a given circle, be divided in a given ratio, the locus of the point of section will also be the circumference of a given circle. *Fig. 2.*

Let A B, terminating in a given circumference, be cut in a given ratio, the segment A C will likewise terminate in a given circumference.

Analysis.—Join A with D, the centre of the given circle; and draw C E parallel to B D; then it is evident that $AC : AB :: AE : AD$; whence the ratio of A E to A D being given, A E and the point E are given. Again, since $AC : AB :: CE : BD$, the ratio of C E to B D is given, and consequently C E is given in magnitude. Wherefore the one extremity E being given, the other extremity of C E must trace the circumference of a given circle.

Compassion.—Join A D, and divide it at E in the given ratio, and in the same ratio make D B to the radius E C, with which and from the centre E describe a circle.

For draw A B cutting both circumferences, and join C E and B D. Because $CE : BD :: AE : AD$, alternately $CE : AE :: BD : AD$; wherefore the triangles C A E and B A D, having likewise a common angle, are similar; and consequently, $AC : CB :: AE : AD$, that is, in the given ratio.

PROP. III.

If through a given point two straight lines be drawn in a given ratio, and containing a given angle; should the one terminate in a given circumference, the other will also terminate in a given circumference. *Fig. 3.*

Let the angle C A B, its vertex A, and the ratio of its sides be given; if A B be limited by a given circle, the locus of C will also be a given circle.

Analysis.—Join A with D, the centre of the given circle; draw A E at the given angle with A D, and in the given ratio; and join D B and E C. Because the point A and the centre D are given, the straight line A D is given; and since the angle D A E, being equal to B A C, is given; A E is given in position. But A D being to A E in the given ratio, A E must be given also in magnitude, and consequently the point E is given. Again, the whole angle B A C being equal to D A E, the part B A D is equal to C A E, and because $AB : AC :: AD : AE$, alternately $AB : AD :: AC : AE$; wherefore the triangles A D B and A E C are similar, and hence $AB : BD :: AC : CE$, or alternately, $AB : AC :: BD : CE$; consequently the fourth term C E is given in magnitude; and its extremity E being given, the other must lie in a given circumference.

Compassion.—Having drawn A E at the given angle with A D, make A D to A E in the given ratio; and in the same ratio let D B be made to E C; a circle described from the centre D with the distance E C is the locus required.

For $AD : AE :: DB : EC$, and alternately, $AD : DB :: AE : EC$. But the angle B A D is equal to C A E; because the whole B A C is equal to D A E; consequently the triangles A D B and A E C are similar; and $AB : AD :: AC : AE$, or alternately, $AB : AC :: AD : AE$; that is, in the given ratio.

PROP. IV.

The middle point of a given straight line, which is placed between the sides of a right angle, lies in the circumference of a given circle. *Fig. 4.*

Let A D be placed in the right angle E D F, touching E D and D F, the locus of its bisection C is a given circle.

Analysis.—Join D C; then because the base of the triangle A D B is bisected in C, a circle described from C as a centre, and with the radius A C, or C B, will pass through the point D; for the angle A D B being a right angle, it necessarily

necessarily falls in the circumference of the semicircle ADE ; consequently AC , CB and CD , are all equal to each other. But AC , being half of AB , is given, therefore DC is also given, whence the locus of the point of bisection C is a circle described from D with the radius DC .

Construction.—From D , with a distance equal to half the given line, describe a circle; this is the locus required.

For draw the radius DC , make $AC = DC$, and produce AC to B . Because $AC = DC$, the angle $ADC = DAC$; but the angles DAC and DBC are together equal to a right angle, and therefore equal to ADC and BDC ; whence the angle DBE is equal to the angle BDC , and consequently, the side DC is equal to BC . The segments AC , BC are thus each of them equal to DC , and hence AB is itself double DC , or is equal to the given straight line.

PROP. V.

If from two given points there be inflected two straight lines in a given unequal ratio, the locus of their point of concurrence is a given circle.

Let AC and BC , drawn from the points A and B , have a given ratio, but not that of equality; then will C , the point of concurrence, be in the circumference of a given circle. *Fig. 5.*

Analysis.—Draw CD , making the angle BCD equal to BAC ; and meeting AB produced in D . The triangles DAC and DCB , having the angle at D common, and the angles at A and C equal, are evidently similar; and hence $AD : AC :: CD : CB$, and alternately, $AD : CD :: AC : CB$, that is, in the given ratio; but $AD : CD :: CD : BD$, and consequently, AD is to BD in the duplicate of the given ratio AD to CD , and which is therefore likewise given. Consequently BD , and the point D , are given; and BD being thence given, its extremity C must lie in the circumference of a circle described with that radius.

Construction.—Divide AB in the given ratio in E , and in the same ratio make ED to BD ; the circle described from the centre D , and with the radius DE , is the locus required.

For since $AE : EB :: ED : BD$, it follows that $AD : ED :: CD : ED$, or as $CD : BD$; hence the triangles DAC and DCB , thus having their sides, which contain their common angle D , proportional, are similar; and therefore $AC : AD :: BC : CD$, or alternately, $AC : BC :: AD : CD$ or DE , that is, in the given ratio.

PROP. VI.

If two straight lines, containing a given rectangle, be drawn from a given point at a given angle: should the one terminate in a straight line given in position, the other will terminate in the circumference of a given circle. *Fig. 6.*

Let the point A , the angle BAC , and the rectangle under its sides BA , AC , be given; if the direction BD be given, then will the locus of C be a given circle.

Analysis.—From A let fall the perpendicular AD upon BD : draw AE , to contain with AD an angle equal to the given angle, and a rectangle equal to the given space, and join CE .

Since AD is evidently given in position and magnitude, AE is likewise given in position and magnitude; and the rectangle $AD \times AE$ being equal to $AB \times AC$, therefore $AD : AB :: AC : AE$; but the angle DAE is equal to BAC , and hence DAB is equal to EAC . Wherefore the triangles ABD , AEC , having each an

equal angle, and the sides containing it proportional, are similar; and consequently the angle ACE is equal to the right angle ADB . Whence the locus C is a circle, having AE for its diameter.

Construction.—Having let fall the perpendicular AD , draw AE , making the angle DAE equal to the given angle, and the rectangles DA , AE , equal to the given space. On AE as a diameter describe a circle; this is the locus required. For join CE , and the triangles DAB , EAC , being right-angled at D and C , and having the vertical angles at A equal, are evidently similar; and consequently $AD : AB :: AC : AE$; and hence the rectangle $AB \times AC = AD \times AE$, that is, it is equal to the given space.

The foregoing proposition we have drawn with little variation from the chapter on loci given by professor Leslie in his *Geometry*, and several of the following propositions are likewise derived from the same source.

7. If a straight line drawn from a given point to a straight line given in position, contain a given rectangle, the locus of its point of section will be a given circle.

8. If two straight lines in a given ratio, and containing a given angle, terminate in two diverging lines, which are given in position, the locus of their vertex will likewise be a right line given in position.

9. If from two points there be drawn two straight lines, of whose squares the difference is given, the locus of their point of concurrence will be a right line given in position: or, which is the same, if the base of a triangle, and the difference of the squares of the two sides be given, the vertex of the triangle will fall in a right line given in position.

10. If the base and vertical angle of a triangle be given, the locus of its vertex will be the circumference of a given circle.

11. If the difference of the sides, and the radius of the inscribed circle of a triangle be given, the locus of its vertex is a right line given in position.

12. If two given unequal perpendiculars be drawn to a right line given in position, and their opposite extremities be joined, the locus of the point of intersection will be a right line given in position.

13. If in any triangle the base be given, and the sum of the squares of the other two sides, the locus of the vertex is a given circumference.

14. If from given points there be drawn straight lines, whose squares are together equal to a given space, their point of concurrence will terminate in the circumference of a given circle.

15. If right lines be drawn from a given point to cut a given circle, and from the points of intersection there be taken, upon these lines, on either side, lines in a constant given ratio to the distance between the respective points of intersection and the given point; the locus of the points so determined, will be a circle.

16. If two circles cut each other, and through either point of intersection a right line be drawn, cutting both the circles, then, if a right line be always taken thereon from one of those points in a given ratio to the part intercepted between the circles, the locus of the points so determined will be a circle.

17. If the circles cut each other as above, and a right line be drawn through either intersection, cutting both the circles, then if a right line be always taken thereon from one of those points in a given ratio to the part between the other point and intersection, the locus of the point so determined will be a circle.

18. If triangles be inscribed in a given segment of a circle, and from the vertex on either side (produced if necessary) there be taken, either way, a right line always in a constant ratio to either of the sides, or to their sum, or difference, the loci of the points so described will be circles.

The above contain many of the most simple cases of geometrical loci; and we will now shew the application of them to the construction of certain geometrical problems.

Of the Construction of geometrical Problems.

PROB. I.

Having given the base, perpendicular, and vertical angle of a plane triangle; it is required to construct it. *Fig. 7.*

Analysis.—Suppose the thing done, and let ABC represent the proposed triangle, of which the base AB , the perpendicular CD , and vertical angle ACB , are given; then it is obvious, in the first place, that the locus of the vertex will be the right line CF , drawn parallel to AB , at the given perpendicular distance. Also, since the angle ACB is given, the locus of the vertex will be in the circumference of the circle ACB , described upon AB , capable of containing the given angle ACB ; and consequently, at either point where the line and circle intersect each other, will be the vertex of the triangle required.

Construction.—On the given base AB describe a circle that shall contain the given vertical angle. And parallel to AB , and at a distance equal to the given perpendicular, draw the right line FCE ; join AC , CB , so is ACB the triangle required. For, the point C being in the segment ACB , the angle ACB is equal to the given vertical angle; and being also in the line FCE , the perpendicular CD is equal to the given perpendicular, and the base AB is equal to the given base.

If the right line cut the circle in one point, it will also cut it in two points, and therefore in this case there are two triangles which answer the conditions of the problem; but if it touches the circle only, then there is but one such triangle; and if the line FCE falls above the circle, then the problem is impossible.

PROB. II.

Having given the perimeter of a right-angled triangle, and the perpendicular let fall from the right angle to the opposite side, to construct it. *Fig. 8.*

Analysis.—Suppose the thing done, and let ACB be the proposed triangle; produce the line AB both ways to D and E , making $AD = AC$, and $CB = BE$; then will DE represent the perimeter which is given by the question; join DE and CE . Then because $DA = AC$, the angle $ADC = DCA$; but the angle CAB is equal to the two angles ADC and DCA , or it is equal to double the angle DCA : in the same manner it may be shewn that the angle ABC is equal to double the angle BCE ; but the angles CAB and ABC are together equal to a right angle, and consequently, since these are double of the angles DCA and BCE , it follows, that the sum of the latter two angles is given, being equal to half a right angle; and therefore also the whole angle DCE is given, being equal to a right angle and half a right angle; therefore the locus of the point C is in the circumference of a given circle. And since the perpendicular CG is also given, the locus of the point C is the right line CF , parallel to the base AB , whence the point C is determined, being found in the intersection of the right line CF and the given segment DCE .

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Construction.—On the right line DE , equal to the given perimeter, describe a segment capable of containing an angle equal to a right angle and half a right angle; and parallel to DE , and at the given perpendicular distance, draw the right line FC cutting the segment in C and C' : join DC , CE ; and from C draw also CA , AB , making the angles DCA and BCE respectively equal to the angles CDA and CEB , so shall ACB be the triangle required.

For since the angle DCA is equal to the angle DAC , the side DA is equal to AC , and for the same reason the side CB is equal to BE , and therefore the three sides of the triangle ABC are equal to the whole DE , or to the given perimeter; also, since the angle DCE is equal to a right angle and half a right angle, the angles CDA and CEB are together equal to half a right angle; but the angle CAB is double the angle CDA , and the angle CBA is double the angle CEB , and consequently these two together are equal to a right angle; therefore the third angle of the triangle ACB is a right angle. Hence, since the perpendicular CG is equal to the given perpendicular, by construction, and the sum of the three sides AB , AC , BC , equal to the given perimeter, and the angle ACB equal to the given angle, it follows that the triangle ABC is that which was to be constructed.

This construction serves equally for any other triangle, provided the vertical angle be given: and the limits of possibility are the same as in the preceding problem.

We will add one other example from Dr. Pemberton's paper on this subject, printed in vol. liii. of the Philosophical Transactions, and will then proceed to the consideration of loci of the higher orders.

PROB. III.

Let it be proposed to draw a triangle given in species, so that two of its angles may touch a right line given in position, and the third angle a given point.

This problem, which would be extremely difficult to solve algebraically, admits of more than one very concise geometrical solution; and as they will occupy but little space, it is presumed they will not be unacceptable to the reader of this article.

In the first place, suppose a circle (*fig. 9.*) to pass through the three points A , E , D , which shall intersect AC in G . Then EG , DG , being joined, the angle DEG will be equal to the given angle DAC , both inscribing on the same arc DG : also the angle EDG is the complement to the two right ones of the given angle BAC : these angles therefore are given, and the whole figure $EFGD$ given in species. Consequently the angle EGF , and its equal ADE will be given, together with the side DE of the triangle in position.

Again, suppose a circle (*fig. 10.*) to pass through the three points A , E , F , cutting AD in H , and EH , FH joined. Here the angle EFH will be equal to the given angle EAH ; and the angle FEH equal to the given angle FAH . Therefore the whole figure $EHFD$ is given in species; and consequently the angle ADE as before.

Lastly, suppose a circle (*fig. 11.*) to circumscribe the triangle, and intersect one of the lines, as AC in I . Then DI being drawn, the angle DIF will be equal to the given angle DEF in the triangle; consequently DI is inclined to AC in a given angle, and is given in position, as also the point I given; whence IE being drawn, the angle FIE will be the complement of the angle EDF in the triangle to two right ones. Therefore IE is given in position.

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tion, and by its interfection with the line A B, gives the point E, with the position of D E, and thence the whole triangle as before. Here it may be observed, that the angle D of the triangle E D F, given in species touching a given point D, and another of its angles touching A C, the line A E here found is the locus of the third angle E.

Of the higher Order of Loci.

Loci are very commodiously divided into orders, according to the dimensions to which the variable quantity rises in the formula which expresses the equation of the curve.

Thus it will be a *locus of the first order*, if the equation be $x = a y$; a *locus of the second or quadrate order*, if $y^2 = a x$, or $y = a - x$, &c.; a *locus of the third or cubic order*, if $y^3 = a x$, or $y = a x^2 - x$, &c.

The better to conceive the nature of the locus, suppose two unknown and variable right lines A P, P M (*figs. 12 and 13*) making any given angle A P M with each other; the one whereof, as A P, we call x , having a fixed origin in the point A, and extending itself indefinitely along a right line given in position; the other P M, which we call y , continually changing its position, but always parallel to itself; and moreover an equation only containing these two unknown quantities x and y , mixed with known ones, which expresses the relation of every variable quantity A P (x) to its correspondent variable quantity P M (y): the line passing through the extremities of all the values of y , i. e. through all the points M, is called a geometrical locus, in general, and the locus of that equation in particular.

All equations, whose loci are of the *first order*, may be reduced to some one of the four following formulæ:

$$1. y = \frac{b x}{a}, \quad 2. y = \frac{b x}{a} + c, \quad 3. y = \frac{b x}{a} - c, \quad 4. y = c - \frac{b x}{a},$$

where the unknown quantity y is supposed always to

be freed from fractions, and the fraction that multiplies the other unknown quantity x to be reduced to this expression $\frac{b}{a}$, and all the known terms to this c .

The locus of the first formula being already determined; since it is evident, that it is a right line which cuts the axis in A, and which makes with it an angle, such that the two unknown quantities x, y , may be always to one another in the proportion of a to b ; to find that of the second, $y =$

$\frac{b x}{a} + c$. In the line A P (*fig. 14.*) take A B = a , and draw B E = b , A D = c , parallel to P M. On the same side A P, draw the line A E of an indefinite length towards E, and the indefinite straight line D M parallel to A E. I say the line D M is the locus of the aforesaid equation or formula; for if the line M P be drawn from any point M thereof parallel to Q A, the triangles A B E, A P F, will be similar; and therefore A B (a) : B E (b) :: A P (x)

$$: P F = \frac{b x}{a}; \text{ and consequently } P M (y) = P F \left(\frac{b x}{a} \right) + F M (c).$$

To find the locus of the third form, $y = \frac{b x}{a} - c$, proceed thus. Assume A B = a (*fig. 15.*) and draw the right lines B E = b , A D = c , parallel to P M, the one on one

side A P, and the other on the other side; and through the points A, E, draw the right line A E of an indefinite length towards E, and through the point D the line D M parallel to A E: I say, the indefinite right line G M shall be the locus sought; for we shall have always P M (y) = P F

$$\left(\frac{b x}{a} \right) - F M c.$$

Lastly, to find the locus of the fourth formula, $y = c - \frac{b x}{a}$; in A P (*fig. 16.*) take A B = a , and draw B E = b ,

A D = c , parallel to P M, the one on one side A P, and the other on the other side; and through the points A, E, draw the line A E indefinitely towards E, and through the point D draw the line D M parallel to A E. I say D G shall be the locus sought; for if the line M P be drawn from any point M thereof, parallel to A Q, then we shall have

$$\text{always } P M (y) = F M (c) - P F \left(\frac{b x}{a} \right).$$

Hence it appears, that all the loci of the *first degree* are straight lines; which may be easily found, because all their equations may be reduced to some one of the foregoing formulæ.

All loci of the *second degree* are conic sections, *viz.* either the parabola, the circle, ellipsis, or hyperbola: if an equation therefore be given, whose locus is of the second degree, and it be required to draw the conic section, which is its locus, first draw a parabola, ellipsis, and hyperbola; so that the equations expressing the natures thereof may be as compound as possible; in order to get general equations, or formulæ, by examining the peculiar properties whereof we may know which of these formulæ the given equation ought to have regard to; that is, which of the conic sections will be the locus of the proposed equation. This known, compare all the terms of the proposed equation with the terms of the general formula of that conic section, which you have found will be the locus of the given equation; by which means you will know how to draw the section, which is the locus of the equation given.

For example: let A P (x), P M (y), be unknown, and variable straight lines (*fig. 17.*), and let m, n, p, r, s , be given right lines: in the line A P take A B = m , and draw B E = n , A D = r , parallel to P M; and through the point A draw A E = c , and through the point D the indefinite right line D G parallel to A E. In D G take D C = s , and with C G as a diameter, having its ordinates parallel to P M, and the line C H = p , as the parameter, describe a parabola C M, and it will be the locus of the following general formula:

$$y^2 - \frac{2 n}{m} x y + \frac{n^2}{m^2} x^2 - 2 r y + \frac{2 n r}{m} x + r^2 = c.$$

$$- \frac{e p}{n} x + p s.$$

For if from any point M there be drawn the right line M P, making any angle A P M with A P; the triangles A B E, A P F, shall be similar; therefore A B (m) : A E (c) ::

$$A P (x) : A F, \text{ or } D G = \frac{c x}{m}; \text{ and } A B (m) : B E (n) :: A P (x) : P F = \frac{n x}{m}. \text{ And consequently, } G M \text{ or } P M = P F$$

$$PF - FG = y - \frac{nx}{m} - r, \text{ and } CG \text{ or } DG - DC =$$

$$\frac{ex}{m} - s. \text{ But from the nature of the parabola } GM^2 =$$

$CG \times CH$; which equation will become that of the general formula, by putting the literal values of those lines.

Again: if through the fixed point A you draw the indefinite right line A Q (fig. 18.) parallel to P M, and take A B = m, and draw B E = n, parallel to A P, and through the determinate points A E, the line A E = e; and if in A P you take A D = r, and draw the indefinite straight line D G parallel to A E, and take D C = s; this being done, if with the diameter C G, whose ordinates are parallel to A P, and parameter the line C H = p, you describe a parabola C M; this parabola shall be the locus of this second equation, or formula:

$$x^2 - \frac{2n}{m}xy + \frac{e^2}{m^2}y^2 - 2rx + \frac{2nr}{m}y + r^2 = 0.$$

$$- \frac{ep}{m}y + ps.$$

For if the line M Q be drawn from any point M, therein, parallel to A P; then will A B (m) : A E (e) : A Q or P M (y) : A F or D G = $\frac{ey}{m}$. And A B (m) : B E

$$(n) :: A Q (y) : Q F = \frac{ny}{m}. \text{ And therefore } GM \text{ or } QM$$

$$- QF - FG = x - \frac{ny}{m} - r; \text{ and } CG \text{ or } DG -$$

$$DC = \frac{ey}{m} - s. \text{ And so by the common property of}$$

the parabola, you will have the foregoing second equation, or formula. So likewise may be found general equations, or formulae, to the other conic sections.

Now if it be required to draw the parabola, which we find to be the locus of this proposed equation $y^2 - 2ay - bx + c^2 = 0$; compare every term of the first formula with the terms of the equation, because y^2 in both is

without fractions; and then will $\frac{2n}{m} = 0$, because the rect-

angle xy not being in the proposed equation, the said rectangle may be esteemed as multiplied by 0; whence $n = 0$, and $m = e$; because the line A E falling in A B, that is, in A P in the construction of the formula, the points B, E, do coincide. Therefore, destroying all the terms affected with

$\frac{n}{m}$ in the formula, and substituting m for e , we shall get $y^2 - 2ry - px + r^2 + ps = c$.

Again, by comparing the correspondent terms $-2ry$, and $-2ay$, as also $-px$, and $-bx$, we have $r = a$, and $p = b$; and comparing the terms wherein are neither of the unknown quantities x, y , we get $r^2 + ps = c$;

and substituting a and b for r and p , then will $s = \frac{c^2 - a^2}{b}$,

which is a negative expression, when a is greater than c , as is here supposed. There is no need of comparing the first terms y^2 and y^2 , because they are the very same. Now the values of m, n, r, p, s , being thus found, the sought locus

may be constructed by means of the construction of the formula, and after the following manner.

Because B E (n) = 0 (fig. 19.) the points B, E, do coincide, and the line A E falls in A P; therefore through the fixed point A draw the line A D $r = a$ parallel to P M, and draw D G parallel to A P, in which take D C (s) =

$$\frac{a^2 - c^2}{b}; \text{ then with } DC, \text{ as a diameter, whose ordinates}$$

are right lines parallel to P M, and parameter the line C H (p) = b, describe a parabola: I say, this will be the locus of the given equation, as is easily proved. If in a given equation, whose locus is a parabola, x^2 be without a fraction; then the terms of the second formula must be compared with those of the given equation.

Thus much for the method of constructing the loci of equations which are conic sections. If, now, an equation, whose locus is a conic section, be given, and the particular section whereof it is the locus, be required:

All the terms of the given equation being brought over to one side, so that the other be equal to 0, there will be two cases.

Case 1. When the rectangle xy is not in the given equation. 1. If either y^2 or x^2 be in the same equation, the locus will be a parabola. 2. If both x^2 and y^2 are in the equation with the same signs, the locus will be an ellipsis, or a circle. 3. If x^2 and y^2 have different signs, the locus will be an hyperbola, or the opposite sections regarding their diameters.

Case 2. When the rectangle xy is in the given equation. 1. If neither of the squares x^2 or y^2 , or only one of them, be in the same, the locus of it will be an hyperbola between the asymptotes. 2. If y^2 and x^2 be therein, having different signs, the locus will be an hyperbola, regarding its diameters. 3. If both the squares x^2 and y^2 are in the equation, having the same signs, then, according as the co-efficient of x^2 is greater, equal or less than the square of half the co-efficient of xy , the locus shall be an ellipse, parabola, or hyperbola. And in any case the locus of the equation is some conic section.

We will add a problem or two, by way of illustration, with which we must conclude this article.

PROBLEM I.

If A B be the axis of a conic section, from B draw B D to meet the curve in D; and erect D C perpendicular to A B, and produce it from C till C P is in a given ratio to B D; the locus of the point P will be a conic section.

1. For the ellipse (fig. 20.); put the axis A B = a, and its conjugate Q O E = b, B C = x, and the ratio B D : C P :: d : a. Then by the known property of the ellipse,

$$a^2 : b^2 :: ax - x^2 : CD^2 = \frac{b^2}{a^2} (ax - x^2);$$

$$\text{consequently, } BD^2 = \frac{b^2 ax}{a^2} - \frac{b^2}{a^2} x^2 + x^2 = \frac{b^2 ax}{a^2} +$$

$$\frac{a^2 - b^2}{a^2} x^2, \text{ and, therefore, } CP^2 = \frac{a^2}{d^2} + BD^2 =$$

$$\frac{b^2 ax}{d^2} + \frac{(a^2 - b^2)x^2}{d^2} = \frac{a^2 - b^2}{d^2} \left(\frac{b^2 a}{a^2 - b^2} x - x^2 \right), \text{ which,}$$

if a be greater than b , is an equation to the hyperbola, the axes of which are $\frac{b^2 a}{a^2 - b^2}$ and $\frac{b^2 a}{d \sqrt{a^2 - b^2}}$.

And if b be greater than a , the equation becomes

$$C P^2 = \frac{b^2 a x - (b^2 - a^2) x^2}{d^2} = \frac{b^2 - a^2}{d^2} \left\{ \frac{b^2 a}{b^2 - a^2} x - x^2 \right\}$$

which is an equation to the ellipse whose axes are

$$\frac{b^2 a}{b^2 - a^2} \text{ and } \frac{b^2}{d \sqrt{(b^2 - a^2)}}.$$

Again, if $b = a$, the ellipse becomes a circle, and the equation for the value of $C P$ becomes $C P^2 = \frac{b^2 a x}{d^2}$, which is an equation to the parabola, whose parameter is $\frac{b^2 a}{d^2}$.

1. For the hyperbola (fig. 21.); the same notation remaining, $D C^2 = \frac{b^2}{a^2} a x + \frac{b^2}{a^2} x^2$ by the property of the

curve; consequently $C P^2 = \frac{a^2}{d^2} \times B D^2 =$

$$\frac{b^2}{d^2} a x + \frac{b^2}{d^2} x^2 = \frac{a^2 + b^2}{d^2} \left\{ \frac{b^2 a x}{a^2 + b^2} + x^2 \right\}$$

which expresses an equation to an hyperbola, whose axes are

$$\frac{b^2 a}{a^2 + b^2} \text{ and } \frac{b}{d \sqrt{(a^2 + b^2)}}.$$

3. For the parabola (fig. 22.); put the parameter $= p$, then $C D^2 = p x$, and $B D^2 = p x + x^2$; therefore $C P^2 = \frac{a^2}{d^2} (p x + x^2)$ the equation to an hyperbola whose axes are p and $\frac{a p}{d}$.

PROB. II.

If on any given right line, $A B$, there be taken any variable distance $A L$, and from L , in the same direction, any given invariable distance $L M$; and if with the centres L and B , and radii $L A$, $B M$, arcs be described, it is required to determine the nature of the curve, which is the locus of P , the point of intersection.

Let $A B = a$ (fig. 23); $L M = b$; $B M = B P = \varphi$, and having drawn $P O$ perpendicular to $A B$, put $B O = x$. Then $B L = \varphi + b$; $L O = \varphi + b - x$; $L P = A L = a - b - x$; and because $L P^2 - L O^2 = B P^2 - B O^2$, we have in symbols $(a - b - x)^2 - (\varphi + b - x)^2 = \varphi^2 - x^2$; whence $a^2 - 2(a - x)b = \varphi^2 + 2(a - x)\varphi$; and adding $-b^2 + b^2 + (a - x)^2$ to one side, and its equal $(a - x)^2$ to the other side, there results $a^2 - b^2 + (a - b - x)^2 = (a - x + \varphi)^2$.

Now take $A C = L M = b$, draw $C D$ perpendicular to $A B$, and make $A D = A B = a$; then $C D^2 = a^2 - b^2$; $C O^2 = (a - b - x)^2$, and $(O A + B P)^2 = (a - x + \varphi)^2$ whence we have $D O = A O + P B$; or $P B = D O - A O$.

Hence it will be easy to derive an algebraical equation for the rectangular co-ordinates of the curve; for we have only to put $P O = y$, to substitute $\sqrt{(x^2 + y^2)}$ for x , and to clear the equation of radicals. The equation thus found will shew the curve to be of the fourth order; but the

curve and its principal properties may be more readily deduced from the property above invelligated; viz. $P B = D O - A O$. The curve will consist of two equal and similar parts, lying on different sides of $A B$, it will be a sort of oval, enclosing the point B on every side.

The following are some of the simplest cases of the higher order of loci.

1. The base, and sum of the sides of a plane triangle being given, the locus of its vertex is an *ellipse*.

2. The base and difference of the sides of a plane triangle being given, the locus is an *hyperbola*.

3. The locus of that point, from which, if perpendiculars be drawn to three right lines given in position, and such that the sum of their squares shall be equal to a given space, is an *ellipse*.

And the same is true, whatever be the number of lines given in position.

4. If a triangle given in species have two of its angles upon a straight line given by position, and the side adjacent to those angles passing through a given point, the locus of the angle, opposite that side, is an *hyperbola*.

5. Let A, B , be two given points in the right line $A B$, given in position; let C, D , be two given points without that line; and also let $C V, D V$, be drawn meeting in F and G , so that the rectangle $A F \times B G$ is given, the locus of the point will in all cases be a *conic section*.

6. Let $A B$ be a given straight line, and P a given point without it; let $C P D$ be drawn, meeting $A B$ in C ; and let $C P$ be to $P D$ as $A C$ to $C B$; the locus of the point D is a given *hyperbola*.

7. When the base of a triangle is given, and one of the angles at the base doubles the other, the locus of the vertex is an *hyperbola*.

8. The locus of the angles of parallelograms, formed by drawing tangents at the vertices of any two conjugate diameters of an ellipse, is also an *ellipse concentric with the former*.

The above cases, and several other curious properties of this kind, the reader will find invelligated in Leybourn's "Mathematical Repository."

The method of constructing geometrical loci, by reducing them to equations as compound as possible, we owe to Mr. Craig, who first published it in his Treatise of the Quadrature of Curves, 1693. It is explained at large in the seventh and eighth books, of the Conic Sections of the marquis de l'Hospital. This subject is particularly illustrated in Maclaurin's Algebra, part iii. See also Des Cartes's Geometry; Stirling's Illustratio Linearum Tertii Ordinis; De Witt's Elementa Curvarum: Bartholomæus Juliar, in his Aditus ad nova Arcana Geometrica delegenda, has shewn how to find the loci of equations of the higher order. See also the other writers mentioned in the preceding part of this article.

LOCUST, LOCUSTA, in *Entomology*, a genus of insects, referred to that of *gryllus*; which see.

Under that article the reader will find a particular account of the devastations occasioned by swarms of locusts in their marches, and he will perceive the propriety of the frequent allusions to them that occur in the sacred writings. Dr. Shaw, Niebuhr, Ruffell, and many other travellers into the eastern countries, represent their taste as agreeable, and inform us that they are frequently used for food. Dr. Shaw observes, that when they are sprinkled with salt and fried, they are not unlike, in taste, to our fresh-water cray-fish. Ruffell says, that the Arabs salt them, and eat them as a delicacy. We learn also from Niebuhr, that they are gathered by the Arabs in great abundance, dried, and kept for

for winter provision. Hence we may naturally suppose, that these locusts were the food of John the Baptist.

LOCUST, Water, *Locusta Aquatica*, the name given by authors to a species of water-insect, somewhat resembling the locust kind in shape. It is about three inches long, its tail an inch and quarter, and its legs are of different lengths, the anterior part being the shortest of all; its body is slender, and its fore-legs are always carried straight forward, so as to reach beyond the head in the form of antennæ; these, as well as the other legs, end each in two claws; the eyes are small, and not very prominent, and the upper wings are crustaceous; the under ones membranaceous, thin, and transparent; the middle joint of the leg is such, that the creature can only move them upwards, not downwards, and there runs an acute tongue or proboscis under the belly, as is the case in the water-scorpion and notonecta. See *NEPA Linearis*.

LOCUST, in *Botany*. See *CERATONIA Siliqua*. See also *GLEDITSIA* and *HYMENÆA*.

LOCUSTA. See *VALERIANA*.

LOCUSTA-Pulex, a name given by Swammerdam to a genus of insects, described since by Mr. Ray under the name *cicadula*.

LOCUSTÆ is used by botanists for the tender extremities of the branches of trees; such as, according to the erroneous supposition of some, John the Baptist fed on in the wilderness.

Some also used locustæ for the beards and pendulous seeds of oats, and of the gramina paniculata; to which the name is given on account of their figure, which something resembles that of a locust.

LOCUSTELLA, the *Grass-hopper Lark*, in *Ornithology*, the name of a small bird of the lark kind, the *ALAUDA Trivialis* of Linnæus; which see.

LOCUTIUS, in *Mythology, the god of speech among the Romans, called by Livy *Aius Locutius*; which see.*

LOCUTORIUM. The monks and other religious in monasteries, after they had dined in their common hall, had a withdrawing room, where they met and talked together among themselves, which room, for that sociable use and conversation, they called *locutorium*, a *loquendo*; as we call such a place in our houses parlour, from the French *parler*; and they had another room, which was called *locutorium forinsecum*, where they might talk with laymen.

LODARIA, in *Geography, a town of Hindoostan, in Bahar; 24 miles N.N.E. of Hajypour.*

LODDIGESIA, in *Botany*, is justly devoted by Dr. Sims in Curtis's Magazine, to commemorate the merits of a most excellent and scientific cultivator of plants, whose liberality is equal to his knowledge, Mr. Conrad Loddiges of Hackney. Curt. Mag. v. 24 965. Class and order, *Diadelphia Decandria*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminosæ*, Juss.

Est. Ch. Standard many times smaller than the wings or keel. Filaments all in one set, with a dorsal fissure. Legume stalked, turgid.

1. *L. oxalidifolia*. Oxalis-leaved Loddigesia. Curt. Mag. t. 965.—The only known species, a native of the Cape of Good Hope, from whence its seeds were first received by George Hibbert, esq. The plant is tolerably hardy in the conservatory, readily propagated by cuttings, and flowers freely in May and June. Mr. Loddiges himself has also raised it, many years ago, from Cape seeds. The stem is shrubby, low, much branched. Leaves scattered, stalked, ternate, inversely heart-shaped, rather glaucous, smooth, tipped with a minute point. Stipules intrafoliaceous, small, setaceous, deciduous. Clusters terminal, somewhat umbel-

late, of few flowers. Bractææ small, slender, almost capillary. Calyx nearly bell-shaped, obtuse at the base, coloured, smooth, its three lower teeth rather the longest. Standard white, not twice the length of the calyx. Wings and keel about thrice as long as the standard, white, the fore part of the keel violet. Style bent upward at a right angle. Stigma simple. Legume stalked, ovate, oblique, pointed, turgid, smooth. Seeds about four, kidney-shaped.

LODDON, in *Geography*, a small market-town in the hundred to which it gives name, in the county of Norfolk, England, is situated 111 miles from London, on the banks of a small stream, which, rising near Howe in Clavering, falls into the Yare at Hardley Crofs. The church, which is a handsome stone structure, with a fine tower, was erected near the end of the fifteenth century, at the sole expence of sir James Hobart, the attorney-general to king Henry VII., and afterwards chief justice of the common pleas, who was a great benefactor to this town and its vicinity. In the church are several memorials of the Hobart family. In the east window was a piece of stained glass, now removed, representing sir James and his lady, with a sketch of the church, and an appropriate inscription. Loddon was returned, in the year 1800, as containing 166 houses and 799 inhabitants. A market is held on Fridays, and two fairs annually. Blomfield's History, &c. of Norfolk, 11 vols. 8vo.

LODE, a town of the island of Sardinia; 80 miles N. of Cagliari.

LODE, in *Inland Navigation*, signifies a cut or reach of water.

LODE, in *Mining*. This word is derived from the Anglo-Saxon, according to Dr. Pryce, and is used by the Cornish miners to designate any regular vein, whether metallic or not. More commonly, however, it means a metallic vein.

The lodes that are found to contain tin and copper ores, in Cornwall and Devon, have their general direction in a line running nearly east and west; their dip or *underlay* being more commonly to the north; though some which incline to the south have been very productive. Veins which intersect the east and west lodes are called *cross-lodes*, or *cross-courses*, when their direction is nearly at right angles with the others; and *counters*, more generally, when their direction is oblique.

The metallic east and west lodes are traversed or disturbed by the cross-courses, and these interruptions are known by the name of *heaves*, which take place to very different degrees of extent, and vary much in the circumstances under which they are found; so that miners do not agree upon any certain rules for determining the distance or direction of the heave by the accompanying appearances.

Though copper and tin are found but partially in cross-lodes, yet lead has been raised in large quantities from some that have nearly a due north and south course; such as the Beeralstone lead-mines and Wheal Betsy lead-mine in Devon. East and west lodes have sometimes a mixture of lead ores with copper; but this appears to be derived from the intersection of a cross-course, or the effect of a later deposit. Lodes traverse all kinds of rock found in the line of their direction, whether vertically or horizontally. Those worked in Cornwall and Devon are chiefly in *kilas* or *grauwacke* slate; but they are sometimes in granite, and pass not unfrequently from the former into the latter.

The width of veins varies from an inch or two to fifteen or twenty feet; the latter dimension being rare, as the former is unprofitable to follow, unless in the expectation of an enlargement. The more common width, or, as the miners call it, the *size of lodes*, is from two to four feet; and if such a vein as this be fully impregnated with metal, it is

very

very profitable to work, and is called a good *course of ore*. The variations of width take place not only in distinct veins, but in one and the same; which, together with the fluctuations in the nature of their contents, render their produce so uncertain. A large and productive lode often dwindles to a mere *branch*, requiring an experienced eye to distinguish it from the rock through which it passes; and this again expands to a considerable size, filled with deposits of various kinds. The width of lodes seems often to have a relation to the nature of the rock in which they are found; and changes in the latter appear generally to produce changes in the former. Thus, a vein that is large and productive in soft blue killas, will, by passing into harder, become less in size, and barren as to metallic contents. Another lode may be rich in hard ground, but poor and unproductive in that which is of a softer kind; but this is not so frequent as the former case. The deposits of metal are as irregular in the lodes as the widths of them; and so much so, as to render the profits of mining proverbially uncertain. Ore is generally found to occupy certain parts of the veins only, differing constantly in extent, whether the length or depth on the course of the vein be considered, or the portion of its width which is filled up by it. No lode has been found regularly impregnated with metal to any great extent; and therefore, when ore is found, it is in what the miners aptly call *bunches* or *shoots*. The unproductive parts of veins, even in the most profitable mines, generally far exceed in extent the productive parts; but that mine is considered to be rich, which has either frequent or extensive shoots of ore; the great art of the miner, therefore, consists in tracing and working the valuable accumulations of the metals with as little waste of labour and expence on the poorer ground as possible.

Although the bunches of ore have no regular form in their vertical or horizontal extent, yet the tendency to a certain direction or dip in the lode may be observed in each bunch or shoot of ore. These shoots are frequently parallel in the same vein; and where the dip or underlay of the lode is to the north, the shoots of ore may frequently be observed to dip west in the lode. In veins underlaying south, the bunches of ore frequently have their dip to the east: but this is not to be taken as a general rule, as many mines afford exceptions to it; the underlay of the lode and the dip of the bunches of ore being reversed.

These tendencies or inclinations of the deposits of metal in the veins, connected with the situations, dips, and bearings of the veins themselves, seem to offer grounds for argument on the disputed question of the mode in which the metals were deposited; but they have not much, we believe, attracted the notice of mineralogists.

Lodes continue to indefinite lengths, and to unknown depths. It is very difficult to determine whether the end of any regular vein has been found or not; as there are many instances of their having become so small as to be scarcely visible, and yet afterwards, on pursuing them, to have resumed their usual size. When a lode has continued small, either in length or depth, to any considerable extent, it is moreover usually abandoned as unpromising; and thus complete evidence as to this question is not obtained.

Lodes are perfect in the surface of the mountains, as well as in their greater depths; and may be traced uniformly by removing the soil with which the rock is covered. This is done constantly by the miner when he is about to undertake operations upon a newly discovered vein. This process is called *costeining*, or *shedding*. The width of a lode at the surface is no certain indication of its size in depth: as, when large at the surface, they are sometimes found to become

small as they are pursued downwards; and, on the other hand, veins of moderate width at *grafs* have been found, at 40 or 50 fathoms deep, of great size.

The dip or inclination of lodes is seldom uniform. The common *underlay* is from one to four feet in a fathom of depth; but instances occur of a much greater inclination. The lodes that incline much from the perpendicular are not esteemed so promising as those which have a direction more downright; and it is a favourable symptom when a lode, from an oblique direction, is found to turn downwards. On the contrary, where bunches of ore *fail*, or become poor, in sinking on them, it may often be observed that the vein *goes away flat*, as miners express it. Thus it will be understood, that not only are the dips different in separate lodes, but that the same vein frequently varies in this respect. Lodes have been observed to change their underlay, that is, from dipping to the north, to become perpendicular, and even turn to the south. This is not, however, a matter of frequent occurrence.

The underlay of lodes must be ascertained, when it is intended to sink perpendicular shafts to meet them at certain required depths; and from this is determined the distance to be set out north or south from the back of the vein, for commencing such shafts.

Shafts are often sunk *upon* the lodes, and of course these are not perpendicular, but have the same inclination as the veins.

Levels driven from the shafts, are carried on in the substance of the lode, follow its direction, and are the principal means by which discoveries of ore are made and pursued.

The principal methods by which lodes are discovered are the two following: 1. By removing the soil covering the surface of the rock, by which the back of the vein is laid bare, and exposed to view. This may happen accidentally, in the formation of roads, ditches, and so on; or, as is more usual, it may be done for the express purpose of discovery, in consequence of indications of veins being near at hand, such as detached fragments being found, or springs of water impregnated with metal being observed. This process is conducted by sinking trenches, or pits, deep enough to reach the surface of the rock, called by miners the *shelf*; which trenches are called *shedding pits*, or *costeining pits*. The detached fragments, washed from the backs of lodes, are usually called *sheddes*, or *shedde-stones*.

The second mode of discovering veins is by levels, or horizontal cuts, driven under ground, which in their progress through the rock, or, as the miners say, across *the country*, intersect and expose lodes before unknown. Such levels must have a direction across the usual course of the lodes, and are either conducted for the express purpose of finding new veins, or for some other object; and then may occasionally be the means of valuable results of this sort.

Many rich mines have been opened, in consequence of a discovery made by carrying on an adit, or by driving a cross level from a shaft, or from one lode to another known to be parallel to it. The practice of driving adits for the purpose of discovery is more frequent than it used to be. The Tavielock canal has a long tunnel driving through a hill, defined principally for this purpose, and which has already been attended with very great success.

Lodes seldom contain ore near the surface of the ground: it is, therefore, an essential quality in a miner's judgment to decide on the indications presented by them, and to determine the amount of risk which their appearances will warrant on a further trial.

There are niceties in this business which cannot be described,

scribed, but must be seen and studied to be understood, and with which skilful miners are conversant; but the most experienced is liable to have his predictions falsified by the fluctuating nature of these hidden receptacles of various matter.

The indications most depended on, in forming a judgment of the value of a lode, are derived from considering the following circumstances:

1. The nature of the substances contained in the vein.
2. The kind of rock in which it is found.
3. The width and regularity of the vein, considering, at the same time, its direction and dip.
4. The structure of the vein, such as the being open and pervious to water, or, on the contrary, hard and close.

These symptoms may be, on the whole, considered as pertaining to veins containing all kinds of metals, though varying in some in a certain degree: thus a hard close lode may be favourable for tin, though not so for copper or lead.

When a vein is found exhibiting all or most of the appearances which experience has determined to belong to those which are productive, it is called a *kindly lode*, and is generally pursued with vigour, and at an expence proportioned to the prevalence and continuance of the favourable symptoms.

We shall endeavour to consider the principal indications, according to the order above stated, and point out the leading facts to be observed in this important branch of a miner's business.

1. *Of the nature of the substances contained in the vein.*

These substances vary according to the depth to which the lode is opened; those near the surface being generally different from the contents of the vein deeper under ground.

The first thing for which a miner looks is what in Cornwall is called *gossan*. This substance does not appear to have been very accurately described, but is apparently a decomposed mineral of an iron-ochre colour, varying from yellow to brown-red and chocolate-brown. It is of a spongy, cellular texture, of little specific gravity, and is generally soft and friable. It is probably the result of the decomposition of pyrites or mundie, together with quartz, and contains a considerable portion of iron, and not unfrequently a mixture of tin and copper ores. When these latter are present in the combination, it is a most favourable symptom; but even without them, gossan on the back of a lode warrants a trial to a certain extent. It can by no means be asserted, that the most promising gossans have always been followed by ore, on a further pursuit; but perhaps there is hardly an instance of a lode rich in ore, which has not a bunch of *kindly gossan* somewhere on the back.

The next substance, proceeding in depth, upon which reliance may be placed, is *mundie*, including in this name pyrites of all kinds, whether arsenical or sulphuretted, containing iron or copper. Mundie is found at all depths and in all situations in veins: it frequently surrounds bunches of copper ore, and is therefore a favourable symptom, as they are approached; and indicates their decline, when passed through on the other side. It should, however, be recollected, that mundie is very generally found, and therefore it must not be depended on by itself.

The earthy substances, which are esteemed favourable to the existence of valuable metallic ores, are principally quartz, going under the general name of *spar*; a kind of clay called *floukan*; and, what is not very abundant, *fluor*, distinguished by the appellation of *candied spar*.

The first and the chief ingredient in veins, *quartz*, is kindly, when it is in a loose friable form, often crystallized,

and cementing detached fragments of killas and the other substances before enumerated. It is unpromising when in a close amorphous form, and is then termed a *sharp hungry spar*.

The *floukan*, or clay, generally forms a branch or vein on one of the walls of the lode, and seems to be the division between that and the rock containing it.

The decomposition of the adjoining strata seems to have been the origin of this substance, which is called by some foreign writers the *saalbande*.

Besides fluor, on which miners are not well agreed as to its promising aspect, and which is not often found in quantity, are some other minerals, likewise of not very frequent occurrence, but esteemed favourable; such as *prian*, a kind of decomposed quartz, and *peach* or chlorite.

Hitherto we have said nothing of the judgment formed by ores found in a lode; it depends upon the following circumstances:

1. The situation, whether shallow or deep.
2. The mode of deposit, whether slightly sprinkled through the lode, or forming shoots or bunches of large or small extent.
3. The quality of the ore.

Under the first head, most miners agree that, as to copper lodes, rich bunches of ore found near the surface are not to be depended on as shewing that a mine will be very productive; it having often been found that such deposits have been followed by poverty at a greater depth. Tin and lead are found nearer the surface than copper. When a lode is spotted with small quantities of ore, and the other substances are kindly, such as the gossan and spar, the appearance is promising; but when the lode is hard, and in other respects unkindly, then small strings of ore are not to be reckoned on as particularly favourable. After a certain depth, a regular branch, or, as it is called, a *leader* of ore of any width, occupying part of a good-sized vein, and increasing or even fluctuating in size as it is pursued, is on the whole the best symptom, particularly if connected with favourable accompanying substances.

Under the head of quality of the ore as an indication of future prosperity to a mine, it must be remarked that nothing requires to be received with greater caution than promises of success supposed to be derived from the richness of individual specimens. We are speaking now more particularly of copper lodes. Few, we believe, of the most profitable mines produce much ore of the richer varieties, which indeed is seldom found to occupy veins of considerable width: on the contrary, most of the best mines are those which yield ore in large quantities, but poorer in metallic content. This observation has been likewise made on the silver mines of South America, according to the account of Humboldt. Copper ores are found in a greater variety of species near the surface than they are in depth; and therefore the miner's experience only will serve to discriminate perfectly on this point: but we wish to put all who are concerned in mining on their guard against a fallacious hope, too frequently excited by the assay of a stone of ore, which in reality often predicts the very reverse of what it is stated to do by the artful or ignorant.

II. The second indication to be attended to, in estimating the prospect of success on a particular vein, has been stated to be *The kind of rock in which it is found.*

It is unnecessary here to go into a voluminous account of rocks, because the great mines of England, as well as of the world, being found in such mountains as are conjectured to be of very early formation, do not admit the varieties in this respect, which some, who are acquainted only with other

other districts, where probably a later formation has exhibited different phenomena, might conjecture.

Lead-mines, indeed, exist in many parts of England, in various rock, and under various circumstances; but no general rules of mining can be formed from deposits of a metal, which appears to have taken its place at a period comparatively late. Such rules can only be applicable to separate districts, where the circumstances attending the deposits are similar.

There are two general classes of rock which claim the distinction of metalliferous above all others. These are the *killas* of the Cornish miner, or grauwacke or transition slate of Werner; and granitic rocks, including porphyry, gneiss, and other varieties, known in Cornwall by the general name of *grogran*.

Of these the great majority of mines are in *killas*, or grauwacke, not only in Cornwall and Devon, but in Scotland, in the Hartz, in the Saxon Erzgebirge, on the Rhine, in Bohemia, Silesia, Moravia, Salzburg, and other districts important for their mineral products.

Granitic rocks are not so metalliferous as the *killas*, but productive veins are found in them; and, as Dr. Berger has well observed in his account of Devon and Cornwall, in the first volume of the Transactions of the Geological Society, even the *killas* is not a depot of metallic veins to any extent, but near its junction with the granite: and this observation had been made, as he says, by baron Born and Ferber on the mines of the continent.

This fact of most mines being in one prevailing rock, would seem to simplify the exercise of judgment in a miner speculating on the effect of the rock upon the contents of a lode. But though *killas* is so universal, it is far from being all alike: on the contrary, it consists of many varieties. These varieties do not alternate according to certain rules, like the beds of secondary rocks; but exhibit changes in position and extent, more or less frequent, and most uncertain and capricious.

The varieties of *killas*, which are esteemed the most kindly for copper, are the blue and the white, more especially if of a tender, slaty texture. Tin often is found in abundance in harder *killas*, more irregular in its structure, and of a darker colour, indicating the presence of iron. Practice alone can enable men to judge of the shades of difference in these respects, which long experience has pointed out as essential to be attended to: and even then, allowance must be made for exceptions which frequently occur; rules which seem to hold good, when applied to one mine, being often inapplicable to another.

III. The third thing to be considered is *The width and regularity of the vein, and its direction and dip*.

These are important circumstances. If the lode be small, it cannot be expected that abundant deposits of metal can be found; and if it has not the characters belonging to a regular fissure, it is probable that the miner will soon be disappointed, by finding it dwindle to a trifling branch, or split into several insignificant ramifications.

Every large and productive lode is accompanied by other veins running parallel to it, or nearly so, which often fall into the main lode, and generally enrich it by their junction.

These must be carefully attended to, and sought after, as the changes that they produce are often most important, and the quantity of ore which they yield is frequently very great. It has indeed been asserted, that there is hardly a mine working on a single vein only, which has been profitable to any great degree.

The direction of the lode should be carefully ascertained;

because certain ores are only found in veins which have their course in common with others having similar deposits in the district.

Thus the writer of the present article has observed that copper and tin, in Cornwall, must only be expected in lodes running east and west; while lead is raised from such as have a direction at right angles to them, or from north to south.

The more usual dip or underlay, in copper mines particularly, is to the north; but some lodes that underlay to the south have been very productive. In either case, it is no favourable symptom to find the inclination from the perpendicular to be great; and it may be said to be so, if it exceed four feet in the fathom.

When a lode often splits or divides into two or more branches, it is subject to fluctuation in its produce; and these occurrences are important to be noticed with attention, as they afford prognostics as to the future success of working.

IV. The fourth and last head, under which we have arranged the appearances of productive lodes, is that relating to *The structure of the vein, whether open or porous, and thus pervious to water; or, on the other hand, dense and close, and consequently dry*.

All miners agree in this, that water being found to be abundant in a lode is an omen of a very favourable nature; and it is often confidently asserted, that no large returns of ore have been made from dry veins. As far as the experience of the writer of this article goes, it serves to confirm the observation.

Water, indeed, may be found passing freely through cross-courses, and other veins, from which metallic deposits are absent; but then such veins will be found to have all the characters which are adduced as proofs of a later formation, and are therefore easily distinguished from metallic veins.

Large lodes act as natural underdrains, and are channels through which water percolates; so that the rock lying on either side may often be sunk upon with but little interruption from water-until the vein is cut into, and then abundant streams flow out, and would put an end to further labour, if it were not for the aid of proper engines to get rid of it.

The quantity of water will of course be, in some degree, proportioned to the extent of the wide and porous parts of the lode; and, as it is from these parts only that much ore can be expected, the water forms in the first instance a pretty good prognostic.

If, in driving upon the course of a small, close, and unproductive lode, a stream of water be suddenly met with, it indicates the approach to an enlargement in the vein, and is a most favourable symptom; and it is, in point of fact, almost always observed before a good course of ore is seen.

The mines of Devon and Cornwall abound with water in a much greater degree than perhaps any others; and as evidence of this, we may adduce the number of vast steam-engines and overshot water-wheels employed for the sole purpose of draining them. We believe, likewise, that when the quantities of ores raised in this district be compared with those of any other which yield them from *true veins*, they will be found abundant in the same proportion.

Under the head of the internal structure of lodes, may be noticed the cavities, called by the Germans *druses*, and by the Cornish miners *voogs*: these are observed most frequently in large veins, and in such, of course, assist in the passage of water, and may be classed in the same place as a favourable indication. In these *voogs* are found all the varieties of

of crystals; and thus the presence of these in a lode is likewise considered promising, more particularly where observations are made on a vein at no great depth: for as the mine becomes deeper the lode often becomes more compact, and the miner calculates upon finding *solid courses of ore*.

In connection with this part of the subject, the *walls* which enclose the vein are not to be disregarded, when the lode itself is considered, as they should be found to be well determined, smooth, and regular. The rock of which they are formed should be of the hard schist called by miners *espel*; and if penetrated with traces of ore, it may be considered as a symptom of large deposits. On each side of the walls, which usually differ somewhat from the adjoining rock, as if altered by the presence of the vein, the strata may generally be observed to be twisted or bent downwards, in a slight degree towards the lode, which is in general considered to be more the case near large veins than near those which are smaller.

Having now detailed the principal characteristics of lodes, as important to the practical miner, described the modes of discovering them, and the symptoms by which a judgment is formed of their contents, as far as relates to working them for the metals; we leave the consideration of them, in a geological point of view, for the article *VEIN*. The operations of working upon them will be described under the head of *MINING*, and under that of *ORE*.

LODE, in *Rural Economy*, a provincial term applied to signify ford, in some districts.

LODER, in *Geography*, a town of Bavaria; 25 miles S. of Augsburg.

LODESAN, a country of Italy, in the Milanese, bounded north and west by the duchy of Milan, east by the Cremasco and the Cremonese, south by the Piacentia and Pavese; and now forming the department of the Adda. It is populous and fertile, though small; and particularly celebrated for its cheese, of which, it is said, the inhabitants annually export to the amount of 70,000*l*.; the number of cows kept here being reckoned at 30,000. The capital is Lodi.

LODESE, or *GAMLA Loder*, a town of Sweden, in West Gothland, which suffered so much from fire in the thirteenth and fourteenth centuries, that the inhabitants removed to New Lodefe, or Nydolefe.

LODESMAN, or *LOCMAN*, a pilot established for conducting vessels in and out of harbours, or up and down navigable rivers. See *PILOT*.

LODEVE, in *Geography*, a town of France, and principal place of a district, in the department of Hérault, and, before the revolution, the see of a bishop; 24 miles W. of Montpellier. The place contains 7843, and the canton 13,959 inhabitants, on a territory of 307½ kilometres, in 10 communes. N. lat. 43° 44'. E. long. 3° 24'.

LODGMET, in *Military Affairs*, sometimes denotes an encampment made by an army.

LODGMET is more frequently used for a work cast up by the besiegers, during their approaches, in some dangerous post, which they have gained, and where it is absolutely necessary to secure themselves against the enemy's fire; as in a covert-way, in a breach, the bottom of a moat, or any other part gained from the besieged.

Lodgments are made by casting up earth, or by gabions, or palisades, woolpacks, fascines, mantelets, or any thing capable of covering soldiers in the place they have gained, and are determined to keep.

LODI, *LA*, in *Biography*, a young female singer, in the service of the elector of Bavaria, at Munich in 1772, and now, if she lives, an old one; so that a few remarks upon

her slight imperfections can do her neither good nor harm, but may probably stimulate a wish of purification of voice in others. We thought that, in general, the tone of the Lodi's voice was clear and brilliant, and her manner of singing and acting elegant and graceful; yet thought, if there was any little defect in her voice, it was occasioned by a slight obstruction in the throat, particularly in sustaining low notes. These were our thoughts the first time we heard her. The second time, we were more pleased with her performance than the first; yet still imagined that her voice wanted a little more room in its passage. The third time we heard her in her best character, in the performance of which the still gave us more pleasure; but yet we could not get rid of our former remarks on the conduct of her voice in sustaining certain low and long notes.

These remarks, made on the Lodi 52 years ago, might, with respect to voice, be fairly applied to Mrs. Hindmarsh in 1804.

LODI, in *Geography*, a city of Italy, formerly the chief town of Lodetan, now the capital of the department of Adda, built by the emperor Frederick Barbarossa, on an eminence, in a plain watered by the river Adda. It is the see of a bishop, and contains, besides the cathedral, two collegiate and seven parish churches, and 26 convents. This is a place of little trade, its chief commodities being cheese (see *LODESAN*) and a beautiful kind of earthen ware resembling china. It is well built, and surrounded with walls, about three miles from the ancient town of the same name, called also "Laus Pompeii." The number of inhabitants is estimated at about 12,000. On the 11th of May 1796, the town was taken by the troops of the French republic, under the command of Bonaparte, Massena, and Angereau; after the passage of the bridge had been contested by 10,000 Austrians, and 30 pieces of artillery. The Austrians lost in killed, wounded, and prisoners, between two and three thousand men; 18 miles S.E. of Milan. N. lat. 45° 21'. E. long. 9° 30'.

LODOMIRIA, a territory of Poland, which, together with Galicia (which see), was ceded to the house of Austria in the late partition of Poland, A.D. 1772, and is now incorporated under this appellation with the Austrian dominions. The number of inhabitants in this ceded country amounted, in 1776, to 2,580,796. Hoeck computes Eastern Galicia and Lodomiria at 2,797,119, and Western Galicia at 1,106,178. The mountainous parts of Galicia and Lodomiria afford fine pastures; the plains are mostly sandy, but abound in forests, and are fertile in corn. The principal articles of traffic are cattle, hides, wax, and honey; and these countries contain mines of copper, lead, iron, and salt.

LODRONE, a town of Italy, in the Trentin, on the borders of the Bressan, near a small lake, called the "lake of Idro;" 25 miles S.W. of Trent.

LODOSA, a town of Spain, in Navarre, on the Ebro; 17 miles E. of Estella.

LODYPOUR, a town of Hindoostan, in Bahar; 18 miles S. of Patna.

LODZIEZE, a town of Lithuania, in the palatinate of Troki; 48 miles N.N.W. of Grodno.

LOE, a town of Norway; 48 miles N.E. of Drontheim.

LOE, in *Rural Economy*, a term used to signify a little round hill, or a heap of stones.

LOEBEGUN, or *LOBOCHIN*, a town of the duchy of Magdeburg; 44 miles S. of Magdeburg.

LOEBOE, or *LOEHOB*, a kingdom of Celebes, which was the most powerful and extensive of all the states of this

island,

ifland, before those of Macassar and Boni attained their subsequent celebrity. It stretches at present from Palopa, the capital of the country, to Larompo, having an extent of about 20 leagues along the western shore of the bay of Boni, and from the other side of the city, over the whole of the S.E. part of Celebes, between Buguefs-bay and the E. coast of the island, as far as the Alforse will suffer them inland; to the W. it is bounded by Wadjo, and to the N. by Taradja. The land is fertile in paddee; it yields likewise good iron, and much gold is found in the rivers. The first king mentioned in the records of the Dutch company, and called "Crain Haroo," was subdued by the arms of the company, at the same time with the Macassars at Bouton. For an account of its dissolute queen, see TANERE.

LOEFFLINGIA, in *Botany*, named by Linnæus in honour of his friend and favourite pupil Peter Loeffling, a Swede, who was born in the year 1729, in the province of Güttrikeland. He began to study medicine at the age of 16, and from his proficiency in the science of Natural History he afterwards obtained, through the recommendation of Linnæus, the appointment of botanist to the king of Spain, in which capacity he explored the botanical treasures of South America, where he died Feb. 22, 1756. His name frequently occurs in the writings of his preceptor, who published at Stockholm, in 1758, a collection of Loeffling's letters, and the Latin descriptions of Spanish and American plants which he left behind him, with a biographical preface of his own, in Swedish. A German translation of this volume, by Kölpin, appeared at Berlin in 1766. The inaugural dissertation of Loeffling on "the buds of trees" is printed in the *Amoenitates Academicæ*, v. 2. 182.—Linn. Gen. 24. Schreb. 33. Willd. Sp. Pl. v. 1. 191. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 1. 79. Juss. 299. Lamarck Illustr. t. 29. Gaertn. t. 129.—Class and order, *Triandria Monogynia*. Nat. Ord. *Caryophylleæ*, Linn. *Caryophyllea*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of five, erect, lanceolate leaves, marked on each side at the base with a small tooth, sharp-pointed, permanent. *Cor.* Petals five, very small, oblong-ovate, closed together in the form of a globe. *Stam.* Filaments three, the length of the corolla; anthers roundish, twin. *Pist.* Germen superior, ovate, triangular; style thread-shaped, a little dilated upwards; stigma rather obtuse. *Peric.* Capsule ovate, nearly triangular, of one cell and three valves. *Seeds* numerous, ovate-oblong.

Eff. Ch. Calyx of five leaves. Corolla of five petals, very small. Capsule of one cell, and three valves.

1. *L. hispanicum*. Spanish Loefflingia. Linn. Sp. Pl. 50. Loeffl. It. 113. t. 1. f. 2. Cavan. Ic. v. 1. 64. t. 94.—Leaves awl-shaped, sharp-pointed. Flowers axillary, sessile.—Found on open hills in the neighbourhood of Madrid, and other parts of Spain, flowering in June.—*Root* annual, zig-zag, smooth. *Stems* procumbent, sometimes a little ascending, jointed, round, slightly pubescent, viscid, about two inches long. *Leaves* in pairs at the joints of the stems, sometimes three or four together. *Flowers* nearly white. Linnæus remarks, that this species approaches in habit to *Scleranthus* or *Herniaria*.

2. *L. indica*. Indian Loefflingia. Willd. n. 2. Retz. Obf. fasc. 4. 8. (*Pharnaceum depressum*; Linn. Mant. 562.)—Leaves oblong. Flowers axillary, cymose. A native of rice fields and dried pools in the East Indies, where it abounds, according to König, in April and May.—*Root* very long and branching. *Stems* numerous, prostrate, about a span in length, pubescent. *Leaves* two, four or more together at the joints, almost sessile. *Stipulas* solitary, small,

membranaceous. *Flowers* nearly sessile, cinereous, with a trifid style. Linnæus, who places this species in *Pharnaceum*, says that it resembles a *Mollugo*, and that it puts forth its flowers only in fine weather. Retz and Willdenow properly make it a *Loefflingia*, of which authors, the former observes, that *L. indica* has dark-green and keeled calyx-leaves with a broad scaly margin. The *corolla* is purple, smaller than the *calyx*. The *capsule* of one cell, with many seeds.

LOEILLET, JOHN, in *Biography*, a relation of John Baptist Locillet of Ghent, the famous master on the common flute, and voluminous composer for that instrument. John the younger was a celebrated harpsichord master, and performer in the opera band in London, while Corbet was the leader.

Having a large room in the house which he occupied in Hart-street, Covent Garden, he established a weekly concert there, which was frequented chiefly by gentlemen performers, who rewarded him liberally for conducting it. Corelli's concertos were first performed in England at this concert, where Mr. Needler, at the head of dilettanti players on the violin, was the leader.

Locillet was not only an excellent teacher of the harpsichord, but a good composer for that instrument, and a minut in his lessons, in the key of A minor, which was in great favour with the ladies of that time, from the vulgar pronunciation of Locillet's name, was long supposed to have been composed by John Baptist Lully, whose name was prefixed to it in many printed books, nor was the mistake ever publicly cleared up.

Locillet died about the year 1728, after accumulating, by industry and economy, a fortune of 16,000*l.* The works which he published, though numerous, are now only to be traced in Walf's old catalogues.

LOENEN, in *Geography*, a town of Holland; 10 miles S.W. of Naerden.

LOESDRECHT, a town of Holland; eight miles S. of Naerden.

LOESLIA, in *Botany*, received its name from Linnæus, in honour of John Loefel, Professor of Medicine at Königsberg in Prussia, who was born in the year 1607, and died in 1655. By the direction of our author's will, his son edited a catalogue of the native plants of Prussia, which is by no means a despicable work. It abounds with several curious notes, and contains many rare plants which till then were unknown as natives of Prussia. He had also prepared several excellent plates, and these, together with his manuscripts, partly by the wish of his son to perpetuate his father's fame, and partly by royal authority, were afterwards committed to the charge of his successor, Professor John Gottsched, who compiled from them the *Flora Prussica*, seu *Plantæ in Regno Prussie sponte nascentes*, which was published in quarto in 1743. The book is scarce, but is frequently cited for the plates.—Linn. Gen. 317. Royen. L. Bat. 299. Schreb. 415. Willd. Sp. Pl. v. 3. 323. Mart. Mill. Dict. v. 3. Juss. 135. Lamarck Illustr. t. 527. Gaertn. t. 62. (Royenia; Hoult MSS.)—Class and order, *Didymia Angiospermia*. Nat. Ord. *Corniculæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, tubular, four-cleft, acute, short, permanent. *Cor.* of one petal, unequal; tube the length of the calyx; limb in five, ovate-lanceolate, equal segments, all deflexed towards the lower side. *Stam.* Filaments four, the length of the corolla, two of them shorter, all opposite to the segments of the petal and reflexed, in a contrary direction to the corolla; anthers simple. *Pist.* Germen superior, ovate; style simple, placed like the stamens; stigma thickish. *Peric.* Capsule ovate,

of three cells. *Seeds* solitary or two together, slightly angulated.

Obf. Gärtner remarks, that he found five ftamens in all the flowers of this genus which he had examined, though one of them was constantly fhorter than the reft. Hence it has been fuggelted that *Loefelia* fhould be referred to *Pentandria*.

Efl. Ch. Calyx four-cleft. Corolla with its fegments all leaning one way. Stamens oppofite to the petal. Capfule of three celis.

1. *L. cilata*. Fringed Loefelia. Linn. Sp. Pl. 875. Gärtn. t. 62. f. 3.—Found by Dr. Houftoun at Vera Cruz in South America.—*Stem* erect, flightly quadrangular. *Leaves* oppofite, lanceolate-ovate, fharply ferrated. *Flowers* yellow, forming a head at the ends of the branches, accompanied by imbricated, ovate, fringed *bractæes*.

This genus is fully defcribed by Gärtner, who moft probably muft have made his defcription from the fpecimen fent by Dr. Houftoun to Mr. Miller's collection, now in the poffeffion of the right honourable fir Jofeph Banks. Linnæus had it not in his own herbarium, but appears to have feen it in the hands of Adrian Van Royen during his ftay at Leyden. Hence it found admiffion into the appendix of the firft edition of his *Genera Plantarum*, p. 348.

LOEVESTEIN, or LOUVESTEIN, in *Geography*, a fortress of Holland, where Grotius was confined, and whence he was delivered by a stratagem of his wife. See the article GROTIUS.

LOEVI, in *Ancient Geography*, a people of Italy, whose cantonment lay between the rivers Sefilis and Ticinus, now the Selia and Tefino.

LOFANGER, in *Geography*, a town of Sweden, in Weft Bothnia; 40 miles N.N.E. of Umea.

LOFANGO, one of the fmaller Friendly iflands; five miles E.S.E. of Neeneeva.

LOFEEREN, a clufter of fmall iflands in the North fea, near the coaft of Norway. N. lat. 68°.

LOFFALO, a fmall ifland in the gulf of Finland. N. lat. 60° 2'. E. long. 46° 3'.

LOFFINGEN, a town of Germany, in the lordfhip of Furftenberg, having a medicinal bath; fix miles W. of Furftenberg.

LOFFODEN ISLANDS, a clufter of iflands off the Norwegian coaft, in N. lat. 67° to 68°. Thefe iflands are numerous and extenfive, and noted for the whirlpool of Maelstrom. They have excellent fisheries, and the palturage fuffices for a great number of fheep.

LOFSTA, a town of Sweden, in Smaland; 70 miles N. of Calmar.—Alfo, a town of Sweden, in the province of Upland, in which are a hammer-mill, eight forges, and a fmelting furnace; 40 miles N. of Upfal.

LOFTUS HEIGHTS, the barrier-port in the S.W. corner of the United States, on the E. fide of the Miffiffippi, in Adams county. Miffiffippi territory, about 40 miles below Natchez. The plan of the works here contructed presents the handfomeft military object in the United States.

LOFVESTA, a fea-port town of Sweden, in the province of Schonen; 25 miles S. of Chriftianftadt.

LOG, is the *Jewifh Antiquities*, a meafure which held a quarter of a cab, and confequently five-fixths of a pint. There is mention of a log, 2 Kings, vi. 25. under the name of a *fourth part of a cab*. But in Leviticus the word log is often met with, and fignifies that meafure of oil, which lepers were to offer at the temple after they were cured of any difeafe.

Dr. Arbuthnot fays, that the log was a meafure of liquids, the feventy-fecond part of the bath or ephah, and

twelfth part of the hin, according to all the accounts of the Jewifh writers.

LOG, a fea-term, fignifying a fmall piece of timber of a triangular, fectoral, or quadrantal figure, on board a fhip, generally about a quarter of an inch thick, and five or fix inches from the angular point to the circumference. It is balanced by a thin plate of lead, nailed upon the arch, or circular fide, fo as to fwim perpendicularly in the water, with about two-thirds immerfed under the furface.

LOG-line, a little cord, or line, about a hundred and fifty fathoms long, faftened to the log, by means of two legs, one of which paffes through a hole at the corner, and is knotted on the oppofite fide, while the other leg is attached to the arch by a pin fixed into another hole, fo as to draw out occasionally. By thefe legs the log is hung in equilibrio; and the line thus annexed to it is wound round a reel fixed for that purpofe in the gallery of the fhip.

This line, from the diftance of about ten, twelve, or fifteen fathoms off the log, has certain knots or divifions, which ought to be at leaft fifty feet from each other; though it was the common practice at fea, not to have them above forty-two feet afunder.

The length of each knot ought to be the fame part of a fea-mile as half a minute is of an hour; and admitting the meafurement of Mr. Norwood, who makes a degree on a great circle of the earth to contain 367,200 Englifh feet, or about 69½ Englifh ftatute miles; and, therefore, $\frac{1}{720}$ of it, or a nautical mile, will be 6120 feet; $\frac{1}{720}$ th of 6120, or 51 feet, fhould be the length of each knot. But becaufe it is fafer to have the reckoning rather before the fhip than after it, therefore fifty feet may be taken as the proper length of each knot. The knots are fometimes made to confift only of forty-two feet each, even in the prefent practice; and this method of dividing the log-line was founded on the fuppofition that fixty miles, each of 5000 Englifh feet, made a degree; for $\frac{1}{720}$ th of 5000 is 41½, or, in round numbers, 42 feet. Mariners, rather than quit the old way, though known to be erroneous, ufe glaffes for half minute ones, that run but 24 or 25 feconds. They have alfo ufed a line of 45 feet to 30 feconds, or a glafs of 28 feconds to 42 feet. When this is the cafe, the diftance between the knots fhould be corrected by the following proportion: as 30 is to 50, fo is the number of feconds of the glafs to the diftance between the knots upon the line. The heat or moifture of the weather has often a confiderable effect upon the glafs, fo as to make it run flower or fafter; it fhould, therefore, be frequently tried by the pendulum in the following manner. On a round nail hang a ftring that has a mufket-ball fixed to one end, carefully meafuring between the centre of the ball and the ftring's loop over the peg 39½ inches, being the length of a fecond pendulum; then fwing it, and count one for every time it paffes under the peg, beginning at the fecond time it paffes, and the number of fwings made during the time the glafs is running out, fhews the feconds it contains. The line alfo is liable to relax and fhink, and fhould, therefore, be occasionally meafured.

The ufe of the log and line is, to keep account, and make an estimate of the fhip's way, or diftance run; which is done by obferving the length of line unwound in half a minute's time, told by a half-minute glafs: for fo many knots as run out in that time, fo many miles the fhip fails in an hour. Thus, if there be four knots veered out in half a minute, the fhip is computed to run four miles an hour.

The author of this device for meafuring the fhip's way is not known; and no mention of it occurs till the year 1607, in an Eaft India voyage, publifhed by Purchas: but from that time its name occurs in other voyages among his col-

lections: and henceforward it became famous, being taken notice of both by our own authors, and by foreigners; as by Gunter in 1623; Snellius, in 1624; Metius, in 1631; Oughtred, in 1633; Herigone, in 1634; Saltonstall, in 1636; Norwood, in 1637; Fournier, in 1643; and almost by all the succeeding writers on navigation of every country. See *Marine SURVEYOR*.

Log, to heave the, as they call it, they throw it into the water, on the lee-side, letting it run, till it comes without the eddy of the ship's wake; then one, holding a half-minute glass, turns it up just as the first knot, or the mark from which the knots begin to be reckoned, turns off the reel, or passes over the stern. As soon as the glass is out, the reel is stopped, and the knots run off are told, and their parts estimated.

It is usual to heave the log once every hour in ships of war and East Indiamen; and in all other vessels, once in two hours; and if at any time of the watch the wind has increased or abated at the intervals, so as to affect the ship's velocity, the officer generally makes a suitable allowance for it at the close of the watch.

The log is a very precarious way of computing, and must always be corrected by experience and good sense; there being a great deal of uncertainty in the yawing of the ship going with the wind ast, or upon the quarter, in the heaving of it, by its coming home, or being drawn after the ship, on account of the friction of the reel, and lightness of the log, in the course of the current, and in the strength of the wind, which seldom keeps the same tenor for two hours together; which is the interval between the times of using the log, in short voyages, though in longer ones they heave it every hour. Yet is this a much more exact way of computing than any other in use; much preferable certainly to that of the Spaniards and Portuguese, who guessed at the ship's way, by the running of the froth or water by the ship's side; or to that of the Dutch, who used to heave a chip overboard, and to number the paces they walk on the deck, while the chip swims between any two marks, or bulk-heads on the side.

The above-mentioned errors, and particularly the log's being subject to drive with the motion which the water may have at its surface, whereas the experiment requires it to be fixed in the place where it is when the mark commencing the knots goes off the reel, have been considered by writers, and many methods have been proposed to remove, or at least to lessen them. The late M. Bouguer proposed a method, which has been thought deserving of particular attention, in the *Mém. Acad. Sc.* 1747; afterwards in his *Treatise on Navigation*, published at Paris in 1753, and since reprinted in 1760, by the Abbé de la Caille. For this purpose, take for the log a conical piece of wood, which fix to the log-line passed through or along its axis, at about forty, fifty, or sixty, or more feet, from one end; and to this end fix the diver, which is a body formed of two equal square pieces of tin, or of thin iron plate, fixed at right angles to one another along their diagonals; and its size so fitted to that of the cone, that the whole may float. A cone of three inches diameter in the base, and of six inches in the slant height, is proposed by M. Bouguer to suit a diver made of plates about $9\frac{3}{4}$ inches square; the intersection of the diagonals is joined to the log-line, and the loop and peg fixed as in the common log. However, it has been found, that no kind of wood used in British dock-yards, when formed into a cone of the above dimensions, will float a diver made of stout tin plates, one side of the square being $9\frac{3}{4}$ inches. Such a diver weighing $1\frac{1}{2}$ lb. avoirdupois, required to float it, a cone of five inches diameter, and twelve

inches on the slant side, so as the point of the cone, which was made of light fir, should just appear above the water. Now supposing one side of such a square tin diver to be about ten inches, and made of plates only two-thirds of the thickness of the former. Such a diver would weigh, with its folder, about twenty ounces, and can be floated by a light fir cone of four inches diameter in the base, and ten inches in the slant height or length; and such a compound log might, perhaps, be found on trial to be affected by about as much again as that proposed by M. Bouguer, and consequently the difference between the numbers given by the common log and compound log, must be augmented by two-thirds of itself, for the necessary correction, as below. When the compound log of Bouguer, above described, is hove overboard, the diver will sink too deep to be much affected by the current or motion of the water at the surface; and the log will thereby keep more steadily in the place where it first fell; and consequently, the knots run off the reel will shew more accurately the ship's rate of sailing. As the common log is affected by the whole motion of the current, so this compound log will feel only a part thereof, viz. such a part nearly as the resistance of the cone is of the resistance of the diver: then the resistances of the above cone and diver are about as 1 to 5; and consequently this log will drive but one-fifth part of what the common log would do; and so the ship's true run will be affected by one-fifth part only of the motion of the waters. To obtain the true rate of sailing, it will be proper to heave alternately hour and hour, the common log, and this compound log; then the difference of their knots run off, augmented by its one-fourth part, is the correction; which applied to the knots of the common log, will give the ship's true rate of sailing, at the middle time between the hours when these logs were hove. The correction is additive, when the compound log's run is the greatest, otherwise it is subtractive. To find the course made good: increase the observed angle between the log-lines by one-fourth part; and this gives the correction to be applied to the apparent course, or the opposite of that shewn by the common log; the correction is to be applied to the $\left\{ \begin{smallmatrix} \text{right} \\ \text{left} \end{smallmatrix} \right\}$ of the apparent course, when the bearing of the common log is to the $\left\{ \begin{smallmatrix} \text{left} \\ \text{right} \end{smallmatrix} \right\}$ of the compound log. Or thus: the lengths run off both logs, together with their bearings, being known; in a card or compass apply the knots run off, taken from a scale of equal parts along their respective bearings, from the centre; join the ends, and in this line produced, on the side next the compound log's length, take one-fourth of the interval; then a line drawn from the end, thus produced, to the centre of the card, will shew the true course and distance made good. When a current, such as a tide, runs to any depth, the velocity of that current may be much better ascertained by the compound log than by the common one, provided the diver does not descend lower than the run of the current; for as those ships which are deepest immersed, drive fastest with the tide; so the diver, by being acted on below, as well as the log on the surface, their joint motion will give the total effect to the current's motion better than what could be derived from the motion at the surface only. Also by such a compound log, the depth to which any current runs, may be easily tried. Robertson's Nav. book ix. § 1.

We have an account in the *Voyage to the North Pole*, p. 97, of two other logs, which were tried by captain Phipps: one invented by Mr. Russel, the other by Foxon; both constructed upon this principle, that a spiral, in proceeding

ceeding its own length in the direction of its axis through a refilling medium, makes one revolution round the axis; if, therefore, the revolutions of the spiral are registered, the number of times it has gone its own length through the water will be known. In both these the motion of the spiral in the water is communicated to the clock-work within-board, by means of a small line, fastened at one end of the spiral, which tows it after the ship, and at the other to a spindle, which sets the clock-work in motion. That invented by Mr. Ruffel has a half spiral of two threads, made of copper, and a small dial with clock-work, to register the number of turns of the spiral. The other log has a whole spiral of wood with one thread, and a larger piece of clock-work, with three dials, two of them to mark the distance, and the other divided into knots and fathoms, to shew the rate by the half-minute glass for the convenience of comparing it with the log. This kind of log will have the advantage of every other in smooth water and moderate weather; and it will be useful in finding the trim of the ship when alone, in surveying a coast in a single ship, or in measuring distances in a boat between headlands and shoals; but it is subject to other inconveniences, which will not render it a proper substitute for the common log. See Phil. Trans. vol. xlviii. p. 532.

Log-board is a table divided into four or five columns, whereon are marked the reckonings of every day; from whence they are entered into the log-book or traverse-book, whence it may be transcribed into the journals, and how much the ship gains in her course be estimated daily. In the first column of the log-board, is entered the hour of the day, from the noon of one day to the noon of the next; in the second and third, the number of knots and fathoms the ship is found to run per hour, set against the hours when the log was hove: in the fourth, the courses which the ship steers; and in the fifth, or right-hand column, the winds, the alterations of the sails, the business doing aboard, observations made of the weather, variations of the compass, &c. See JOURNAL.

Log-book, at sea, a book ruled and columned like the log-board. It is used by some to enter the log-board's account in every day at noon, with the observations then made; and from hence it is corrected and entered into the journals. (See JOURNAL.) The intermediate divisions or watches of the log-book, containing four hours each, are usually signed by the commanding officer in ships of war, or East Indiamen.

LOGAN, in *Geography*, a county of America, in the state of Kentucky, containing 4870 inhabitants, besides 730 slaves.

LOGANIA, in *Botany*, so denominated by Mr. R. Brown, after Mr. James Logan, President of the Council, and Chief Justice of the Province of Pennsylvania, author of a small Latin tract in support of the Linnæan doctrine of the generation of plants, published at Leyden, in 1739, and republished, we believe by Dr. Fothergill, at London, in 1747, with an English translation. Brown Prodr. Nov. Holl. v. i. 454. (Euosma; Andr. Repof. v. 8. 520.)—Class and order, *Pentandria Monogynia*. Nat. Ord. *Geniana*, Juss.

Gen. Ch. *Cal.* Perianth inferior, in five deep equal segments, permanent. *Cor.* of one petal, somewhat bell-shaped, rather hairy in the throat; limb in five deep, equal, roundish segments. *Stam.* Filaments five, equal, inserted into some part of the tube, shorter than the limb; anthers small, roundish. *Pist.* Germen superior, ovate, with a groove at each side; style short, thick, permanent; stigma capitate, somewhat club-shaped. *Peric.* Capsule ovate,

with a furrow at each side, separating into two parts, each of one cell and two valves, with a longitudinal triangular receptacle to each cell. *Seeds* numerous, roundish, peltate, rough.

Eff. Ch. Calyx in five deep segments. Corolla somewhat bell-shaped, five-cleft, hairy in the throat. Stamens shorter than the limb. Stigma capitate. Capsule superior, with two furrows, four valves, two cells, and a receptacle to each. Seeds peltate.

This New-Holland genus consists of either shrubs or herbs, with opposite entire leaves, generally attended by stipulas, which are either united into a small intrafoliaceous sheath, or distinct; in the latter case, within the insertion of the leaves or at their sides; sometimes there are no stipulas. Flowers either terminal or axillary, opposite in corymbs or clusters, sometimes solitary. Corolla white, sometimes veined. Albumen fleshy. Mr. Brown indicates its near affinity to *Geniostoma*, see that article, and thence to the order of *Apocinee*, and to *Ulleria*, one of the *Rubiaceae*. He defines eleven species, eight of which are shrubs, with an obtuse calyx, and the stamens within the tube; the rest are herbaceous, or but slightly shrubby, with an acute calyx, and somewhat prominent stamens. Of the eight first-mentioned species, five have the stipulas united into a sheath or ring within the insertion of the leaves. These are called true *Logania*. A specimen of them is

L. latifolia. Brown n. 2. (Exacum vaginale; Labill. Nov. Holl. v. 1. 37. t. 51.)—Leaves obovate, rather pointed at each end. Flowers corymbose. Young branches smooth. Stem erect.—Native of the southern part of New Holland. The stem is shrubby, about a yard high, with upright, square, smooth, leafy branches. Leaves opposite, scarcely stalked, coriaceous, broadly obovate, above two inches long, entire, acute, tapering at the base, and united by means of the short, tubular, intrafoliaceous stipula. Flowers numerous, in terminal and axillary, smooth, repeatedly three-forked, corymbose panicles, with a pair of acute bractees at each subdivision. It is remarkable that Labillardiere says nothing of their colour, neither does he here, or perhaps in any part of his work, seem to have made any notes on the spot, but merely to have described the dried specimens after his return.

The three others have either setaceous, lateral, distinct stipulas, or none at all. These answer to the genus *Euosma* of Andrews.

L. floribunda. Brown n. 6. (Euosma albidiflora; Andr. Repof. t. 520.)—Leaves lanceolate, tapering at each end, smooth. Stipulas lateral, bristle-shaped. Clusters axillary, compound, shorter than the leaves; with downy flower-stalks.—Sent originally by Dr. White, from Port Jackson. Mr. Andrews had it in flower from the fine collection of the Marquis of Blandford, at White Knights, where it was trained against a south wall in the open air, and in April was covered with a profusion of white blossoms, which had the scent of hawthorn. The stem of this plant was about four feet high, shrubby. Branches wand-like, opposite, square, smooth, leafy, reddish. Leaves snow-like, tapering much at each end, near two inches long; smooth, shining and dark green above; whitish, opaque and obscurely dotted beneath. Clusters compound, axillary, shorter than the leaves. Flowers somewhat like lily of the valley, but only half as large. Capsules rugose.

The three last species of this genus, which have, as before mentioned, an acute calyx, and stamens inserted into the throat of the corolla, have received from Mr. Brown a sort of provisional generic name, *Stemandra*, expressive of this last character; so that if any person chooses to separate them from

from *Logania*, he may not be at a loss what to call them. These are

L. serpyllifolia. Br. n. 9.—“Somewhat shrubby. Leaves ovate. Stipulas within the footstalks, fringed like the calyx. Flowers terminal, somewhat corymbose.”—Gathered by Mr. Brown in the south part of New Holland.

L. pusilla. Br. n. 10.—“Herbaceous. Leaves elliptical. Stipulas triangular, within the footstalks. Flowers axillary, solitary.”—Native of Port Jackson.

L. campanulata. Br. n. 11.—“Herbaceous. Leaves linear, without stipulas. Flowers terminal. Flower-stalks and calyx downy.”—From the south part of New Holland.

LOGARITHMIC, ATMOSPHERICAL, is a curve (Plate XI. *Analysis*, fig. 2.) described in the following manner: let the point C represent the centre of the earth, CA the earth's semidiameter, and AB any height above the surface; at A, place a right line AD, of any finite length, at right angles with AC. In the right line AC, towards C, take A β such, that CA may be to A β in the proportion of CB to BA. In a right line drawn through β , at right angles with AC, take βE , of such length, as to be to AD in the proportion of the density of the air at B to the density at A, the earth's surface. The curve, which the point E always touches, is a logarithmic, of which AC is the asymptote; and is called by Dr. Horsley the atmospherical logarithmic.

Imagine this curve described, and take another height Ab, and take $A\epsilon = \frac{CA \times Ab}{Cb}$, and draw $\epsilon\epsilon$ parallel to

βE , meeting the curve in ϵ . Then $\beta\epsilon$ is the logarithm of the ratio of βE to $\epsilon\epsilon$, or of the density at B to the density at b . But if the greater of the two heights, AB and Ab, bear but a very small proportion to the semidiameter of the earth, their difference Bb will be very nearly equal to $\epsilon\epsilon$.

For, because CB : BA = CA : A β by construction. Therefore, by conversion, CB : CA = CA : C β . In like manner, and by inversion, CA : Cb = C ϵ : CA, by equidistance perturbate, CB : Cb = C ϵ : C β , and converting, CB : Bb = C ϵ : $\epsilon\beta$, by permutation, Bb : $\beta\epsilon$ = CB : C ϵ .

But when AB is infinitely diminished, CB = CA ultimately. Also Ab being infinitely diminished, C ϵ = CA ultimately. Therefore CB = C ϵ ultimately, and Bb = $\beta\epsilon$ ultimately. Q. E. D.

Now AB and Ab will always be so small, with respect to CA, if B and b be supposed to represent any accessible places, that CB, C ϵ , and Bb, $\beta\epsilon$, may always, in this case, be considered as in their ultimate proportion of equality.

It is still therefore to be admitted, as a principle, in practice, that the difference of elevation of any two places is as the difference of the tabular logarithms of the heights of the quicksilver in the barometer at the same time at both places; that is, it is the logarithm of the ratio of those heights in some system of logarithms. And the heights of the quicksilver being given by observation, the difference of elevation will be known, if that particular system can be determined; that is, if the modulus of the system, or the length of the subtangent of the curve DE ϵ of that system, can be ascertained, in some known measure, as English fathoms, or Paris toises.

The easiest method of doing this, that theory suggests, is to compare barometers at two stations, suppose B and b, each of a known elevation AB and Ab, above the level of

the sea. For the logarithms of any given ratio, in different systems, are proportional to the subtangents; and the difference of elevation Bb, diminished in the proportion of CB, (the distance of the higher station from the earth's centre,) to C ϵ , (a third proportional to Cb, the distance of the lower station from the earth's centre, and CA, the earth's semidiameter,) is the logarithm of the ratio of the density at B, to the density at β , (that is, of the columns of quicksilver sustained in the barometer at B and b,) in the atmospherical system. Therefore, as the difference of the tabular logarithms of these columns, to the subtangent of the tabular system, so should Bb, diminished as hath been said, (that is, so should $\beta\epsilon$), be to the subtangent of the atmospherical logarithmic. The utmost height to which we can ascend, above the level of the sea, is so small, that the reduction of Bb may, even in this investigation, always be neglected. For, if AB were four English miles, which exceeds the greatest accessible heights, even of the Peruvian mountains, and A ϵ three, $\beta\epsilon$ would be scarce one part in 500 less than Bb. So that, by comparing barometers at different elevations, within a mile above the level of the sea, the subtangent of the atmospherical curve might be determined, as it should seem, without sensible error, by taking simply the difference of elevation, without reduction, for the logarithm of the ratio of the observed height of the quicksilver in the atmospherical system.

The subtangent is different in length at different times; though M. de Luc has shewn, that it is constant in a given temperature; so that if the temperature of the air is + 16 $\frac{1}{4}$ of his scale, the difference of the tabular logarithms of the heights of the quicksilver in the barometer, gives the difference of elevation in 10000ths of a Paris toise; whence the number, which is the modulus of Briggs's system, expresses the length of the subtangent of the atmospherical curve, such as it is in that temperature, in 10000ths of a Paris toise, Phil. Trans. vol. lxiv. part i. p. 231, &c.

LOGARITHMIC, or LOGISTIC Curve, is a curve which obtained its name from its properties and uses in explaining and constructing logarithms; because its ordinates are in geometrical progression, while the corresponding abscissas are in arithmetical progression; so that the abscissas are the logarithms of the corresponding ordinates. Hence the curve may be constructed in the following manner. Fig. 3. Plate XI. *Analysis*.

Upon any right line as an axis, take the equal parts AB, BC, CD, &c. or the arithmetical progression AB, AC, AD, &c. and at the points A, B, C, D, &c. erect the perpendicular ordinates AP, BQ, CR, DS, &c. in a geometrical progression, and the curve line drawn through the extremities of these ordinates P, Q, R, S, &c. is the logarithmic or logistic curve, its abscissas AB, AC, AD, being as the logarithms of the respective corresponding ordinates BQ, CR, DS, &c.

Hence, if any abscissa AN = x , its ordinate NO = y , AP = 1, and a = a certain constant quantity, or the modulus of the logarithms, then the equation of the curve is $x = a \times \log. y = \log. y^a$; the fluxion of which being

taken, it will be $\dot{x} = \frac{a\dot{y}}{y}$; whence the following proportion,

$$y : \dot{x} :: y : a;$$

but in any curve $y : \dot{x} :: y$ the subtangent AT, and therefore the subtangent to this curve, is every where equal to the same constant quantity a , the modulus of the logarithms.

To find the area contained between any two ordinates.—Here

latter definitions. According to the first; if unity be made the common consequent of all ratios, or the common standard to which all other numbers are to be referred, then every logarithm will be the numeral exponent of the ratio of its natural number to unity. *E.g.* the ratio of 81 to 1 contains the four following ratios, *viz.* that of 81 to 27, 27 to 9, 9 to 3, and 3 to 1, or $\frac{81}{1} = \frac{81}{27} \times \frac{27}{9} \times \frac{9}{3} \times \frac{3}{1}$; but all these ratios are equal to one another, and $\frac{81}{1} = \frac{3}{1} \times \frac{3}{1} \times \frac{3}{1} \times \frac{3}{1} = \left(\frac{3}{1}\right)^4$; consequently the logarithm of 81, is four times as great as that of 3. In the same manner, the ratio of 24 to 1, or $\frac{24}{1} = \frac{24}{4} \times \frac{4}{2} \times \frac{2}{1} = \frac{3}{1} \times \frac{2}{1} \times \frac{2}{1}$; and, therefore, the logarithm of 24 is equal to the sum of the logarithms of 2, 3, and 4. And, universally, the magnitude of the ratio of A to 1, is to the magnitude of the ratio of B to 1, as the logarithm of A to the logarithm of B. Hence we derive a method of measuring all ratios whatever, let their consequents be what they will: *e.g.* the ratio of A to B is the excess of the ratio of A to 1, above the ratio of B to 1; therefore the numeral exponent of the ratio of A to B, will be the excess of the numeral exponent of the ratio of A to 1, above the numeral exponent of the ratio of B to 1, that is, the excess of the logarithm of A above the logarithm of B: therefore the magnitude of the ratio of A to B is to the magnitude of the ratio of C to D as the excess of the logarithm of A above the logarithm of B, which is the measure of the former ratio, is to the excess of the logarithm of C above that of D, which is the measure of the latter ratio: and thus we see that logarithms are as true and proper measures of ratios, as circular arcs are of angles.

The nature and genius of logarithms will be easily conceived from what follows:—A series of quantities increasing or decreasing according to the same ratio is called a *geometrical progression*; e. gr. 1. 2. 4. 8. 16. 32, &c. A series of quantities increasing, or decreasing, according to the same difference, is called an *arithmetical progression*; e. gr. 3. 6. 9. 12. 15. 18. 21. Now, if under the numbers proceeding in a geometrical ratio, be placed as many of those proceeding in the arithmetical one, these last are called the *logarithms* of the first.

Suppose e. gr. two progressions :

Geomet. 1. 2. 4. 8. 16. 32. 64. 128. 256. 512.

Arithmet.	0.	1.	2.	3.	4.	5.	6.	7.	8.	9.
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Logarithms.

0 will be the logarithm of the first term; viz. 1; 5, of the 6th, 32; 7, the logarithm of the 8th, 128, &c.

These indices or logarithms may be adapted to any geometric series; and, therefore, there may be as many kinds of indices or logarithms, as there can be taken kinds of geometric series; but the logarithms most convenient for common use, are those adapted to a geometrical series increasing in a ten-fold progression, as in the sequel. The doctrine and use of logarithms may be conceived from the following propositions.

1. If the logarithm of unity be 0, the logarithm of the *factum* or product will be equal to the sum of the logarithms of the *factors*.—For as unity is to one of the factors, so is the other factor to the product. So that the logarithm of the product is a fourth equidifferent term to the logarithm of unity, and those of the factors; but the logarithm of unity being 0, the sum of the logarithms of the factors must be the logarithm of the factum, or product. Q. E. D. Hence, since the factors of a square are equal to each other, *i. e.* a square is the factum or product of its root multiplied into itself, the logarithm of the square will be double the logarithm of the root.

We will consider these numbers under each of the two

LOGARITHMS.

In the same manner it appears, that the logarithm of the cube is triple; of the biquadrate, quadruple; of the fifth power, quintuple; of the sixth, sextuple, &c. of the logarithm of the root.

Unity, therefore, is to the exponent of the power, as the logarithm of the root to the logarithm of the power.

So that the logarithm of the power is had, if the logarithm of the root be multiplied by its exponent; and the logarithm of the root is had, if the logarithm of the power be divided by its exponent.

And hence we derive one of the great uses of logarithms, which is to expedite and facilitate the business of multiplication, involution of powers, and extraction of roots; the former of which is here performed by mere addition, and the two latter by multiplication and division. Thus 3, the sum of the logarithms 1 and 2, is the logarithm of 8, the product of 2 and 4. In like manner 7, the sum of the logarithms 2 and 5, is the logarithm of 128, the product of 4 and 32. Again, 6, the logarithm of 64, which is the third power of 4, or 4^3 , is equal to 3×2 . And 8, the logarithm of 256, which is the fourth power of 4, or 4^4 , is equal to 4×2 . Moreover, 3, the logarithm of the square root 8, is half the logarithm 6, of the square 64; and 2, the logarithm of the cube root 4, is one-third the logarithm 6 of the cube 64.

2. *If the logarithm of unity be 0, the logarithm of the quotient will be equal to the difference of the logarithms of the divisor and dividend.*—For as the divisor is to the dividend, so is unity to the quotient; therefore the logarithm of the quotient is a fourth equidifferent number to the logarithms of the divisor, the dividend, and the logarithm of unity. The logarithm of unity, therefore, being 0, the difference of the logarithm of the divisor, and that of the dividend, is the logarithm of the quotient. Q. E. D.

Hence appears another great advantage of logarithms; viz. their expediting the business of division, and performing it by a bare subtraction. *E. gr.* 2, the difference between 7 and 5, is the logarithm of the quotient 4, obtained by dividing 128 by 32. In like manner, 5, the difference between 8 and 3, is the logarithm of the quotient 32, obtained by dividing 256 by 8.

These properties of logarithms, however, are more obvious according to our latter definition. For in that case, if $r^a = a$, and $r^b = b$, x and y being the logarithms of a and b , we have immediately from the first principles of algebra,

$$r^x \times r^y = r^{x+y} = ab \quad \text{Multiplication.}$$

$$r^x \div r^y = r^{x-y} = \frac{a}{b} \quad \text{Division.}$$

$$(r^x)^n = r^{x \cdot n} = r^{x^n} = a^n \quad \text{Involution.}$$

$$\sqrt[n]{r^x} = r^{x/n} = r^{x^{\frac{1}{n}}} = \sqrt[n]{a} \quad \text{Evolution.}$$

From which formulæ it is evident, that the logarithm of the product of a multiplied by b is equal to the sum of the logarithms of a and b . The logarithm of the quotient of a divided by b , is equal to the difference of the logarithms of a and b . The logarithm of the n th power of a is equal to n times the logarithm of a . And the logarithm of the n th root of a , is equal to the logarithm of a divided by n . Therefore, universally, to multiply two numbers together, we must take the sum of their logarithms: to divide one number by another, we subtract the logarithm of the latter from the logarithm of the former. To involve a number to any power, we must multiply its logarithm by the index of the power. And to extract the root of any number, we must divide its logarithm by the

index of the power of which the root is to be found. But each of these rules will require a more particular illustration, which will be found in the subsequent part of this article.

The properties of logarithms hitherto mentioned, and their various uses, are taken notice of by Stifelius; but they come all far short of the use of logarithms in trigonometry, first discovered by John Napier, baron of Merchiston, in Scotland, and first published at Edinburgh in 1614, in his *Mirifici Logarithmorum Canonis Descriptio*. This work was translated by Mr. Edward Wright, and published by him for, with the assistance of Mr. Briggs, in the year 1616 or 1618. The method of constructing the table was reserved by the ingenious author, till the sense of the learned upon his invention should be known; nevertheless Kepler, in his *Chilias Logarithmorum ad totidem Numeros rotundos*, published at Marburg in 1724; Spéidell in his *New Logarithms*, published in 1619, and republished with considerable additions, in a sixth impression in 1624; Benj. Urfinus, in his *Table of Logarithms*, printed at Cologne in 1625, and others, at home and abroad, laboured at the computation of logarithms, and constructed small tables, conformable to the plan of lord Napier. But of all those who assisted in the construction of logarithmic tables, Briggs is most conspicuous; it was he who first suggested our present system, and laboured more than any one in the computation of the numbers it contains. In the present state of analysis many comparatively short and easy methods may be employed for this purpose, that were unknown to the early writers; and for want of which the labour attending the first computation was exceedingly great; some idea of which may be formed from the following illustration.

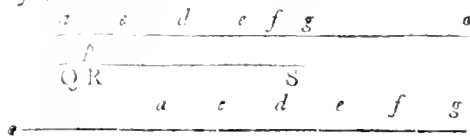
To find the logarithm of any number, according to Briggs's method.—1. Because, 1. 10. 100. 1000. 10000, &c. constitute a geometrical progression, their logarithms may be taken at pleasure: to be able, then, to express the logarithms of the intermediate numbers by decimal fractions, take 0.00000000, 1.00000000, 2.00000000, 3.00000000, 4.00000000, &c. 2. It is manifest, that for those numbers which are not contained in the scale of geometrical progression, the just logarithms cannot be had: yet they may be had so near the truth, that, as to matters of use, they shall be altogether as good as if strictly just. To make this appear, suppose the logarithm of the number 9 were required; between 1.00000000 and 10.00000000, find a mean proportional, and between their logarithms 0.00000000, and 1.00000000 an equidifferent mean, which will be the logarithm thereof; that is, of a number exceeding three by $\frac{1}{100000000}$, and therefore far remote from nine. Between 3 and 10, therefore, find another mean proportional, which may come somewhat nearer 9; and between 10 and this mean another still; and so on between the numbers next greater and next less than 9, till at last you arrive at $9 \frac{1}{100000000}$; which not being one millionth part from 9, its logarithm may, without any sensible error, be taken for that of 9 itself. Seeking then in each case for the logarithms of the mean proportionals, you will at last have 0.954251, which is exceedingly near the true logarithm of 9. 3. If in like manner you find mean proportionals between 1.00000000 and 3.1622777, and align the proper logarithms to each, you will at length have the logarithm of the number 2, and so of the rest.

Such was the method employed by the early computers of logarithms: and though they had certain means of abridging the operations in particular cases, yet it is evident that the computation of them was not effected without immense labour; a particular and interesting account of which, with an explanation of the several modifications of the

LOGARITHMS.

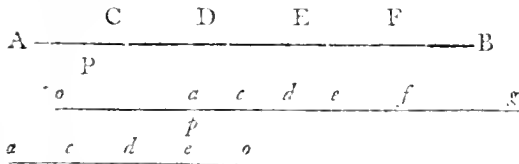
the above method made use of by different authors, may be seen in the introduction to Dr. Hutton's Mathematical Tables. It is unnecessary to observe, that these computations were only required for prime numbers; for these being once obtained, the logarithms of all other numbers were found by simple addition. At present, we have only spoken of logarithms as they are applicable to numerical computations. But they are also of very extensive use in the higher geometry, particularly in the doctrine of fluxions, and it will not be amiss, before we quit this part of the subject, to give an idea of the way in which they have been considered by writers on the latter science. Maclaurin, in his *Theoria Fluxionum*, has explained the nature and general properties of logarithms, agreeably to the notion of their first inventor, Lord Napier, delivered in his *Mirif. Logar. Canon*. He there supposes logarithms, and the quantities to which they correspond, to be generated by the motion of a point. If this point moves over equal spaces in equal times, the line described by it increases equally.

Again, when it decreases proportionally when the point that moves, or it describes such parts in equal times as are always in the same constant ratio to the lines from which they are subtracted, or to the distances of that point at the beginning of those times, from a given term in the line. In like manner, a line may increase proportionally, if in equal time the moving point describes spaces proportional to its distances from a certain term, at the beginning of each time. Thus, in the first case, let ac be to ao , cd to co , de to do , ef to fo



eo , fg to fo , always in the same ratio of QR to QS ; and suppose that the point p sets out from a , describing ac, cd, de, ef, fg , in equal parts of the time; and let the space described by p , in any given time, be always in the same ratio to the distance of p from o , at the beginning of that time, then will the right line ao decrease proportionally; and the lines ao, co, do, eo, fo , &c. or the distances of the point p from o , at equal succeeding intervals of time, are in a continued geometrical progression.

In like manner, the line oa increases proportionally, if the point p in equal times describes spaces ac, cd, de, ef, fg , &c. so that ac is to ao , cd to co , de to do , &c. in a constant ratio.



If we now suppose a point P describing the line AB with an uniform motion, equal to that with which p sets out from a , in describing the line ao , while the point p describes a line increasing or decreasing proportionally, the line AP described by P with this uniform motion, in the same time that oa by increasing or decreasing proportionally, becomes equal to op , is the logarithm of op . Thus AC, AD, AE , &c. are the logarithms of oc, od, oe , &c. respectively; and oa is the quantity whose logarithm is supposed equal to nothing.

We have here abstracted from numbers, that the doctrine

may be the more general; but it is plain, that if AC, AD, AE , &c. be supposed 1, 2, 3, &c. in arithmetic progression; oc, od, oe , &c. will be in geometric progression; and that the logarithm of oa , which may be taken for unity, is nothing.

Lord Napier, in his first scheme of logarithms, supposes, that while op increases or decreases proportionally, the uniform motion of the point P , by which the logarithm of op is generated, is equal to the velocity of p at a ; that is, at the term of time when the logarithms begin to be generated. Hence logarithms, formed after this model, are called *Napier's logarithms*, and sometimes *natural logarithms*.

When the ratio is given, the point p describes the difference of the terms of the ratio in the same time. When a ratio is duplicate of another ratio, the point p describes a difference of the terms in a double time. When a ratio is triplicate of another, it describes the difference of the terms in a triple time; and so on. Also, when a ratio is compounded of two or more ratios, the point p describes the difference of the terms of that ratio, in a time equal to the sum of the times in which it describes the differences of the terms of the simple ratios of which it is compounded. And what is here said of the times of the motion of p , when op increases proportionally, is to be applied to the spaces described by P in those times, with its uniform motion.

Hence the chief properties of logarithms are deduced. They are the measures of ratios. The excess of the logarithm of the antecedent above the logarithm of the consequent measures the ratio of those terms. The measure of the ratio of a greater quantity to a lesser is positive, as this ratio compounded with any other ratio increases it. The ratio of equality, compounded with any other ratio, neither increases nor diminishes it; and its measure is nothing. The measure of the ratio of a lesser quantity to a greater is negative, as this ratio compounded with any other ratio diminishes it. The ratio of any quantity A to unity, compounded with the ratio of unity to A , produces the ratio of A to A , or the ratio of equality; and the measures of those two ratios destroy each other, when added together: so that when the one is considered as positive, the other is to be considered as negative.

When op increases proportionally, the motion of p is perpetually accelerated; and, on the contrary, when op decreases proportionally, the motion of p is perpetually retarded.

If the velocity of the point p be always as the distance op , then will this line increase or decrease in the manner supposed by Lord Napier: and the velocity of the point p being the fluxion of the line op , will always vary in the same ratio as this quantity itself. See Maclaurin's *Flux.* art. 151—160.

The fluxion of any quantity is to the fluxion of its logarithm, as the quantity itself is to unity.

Hence the fluxion of the logarithm of x will be $\frac{\dot{x}}{x}$.

For $x : 1 :: \dot{x} : \frac{\dot{x}}{x}$ = the fluxion of the logarithm required.

When op increases proportionally, the increments generated in any equal times, are accurately in the same ratio as the velocities of p , or the fluxions of op , at the beginning, end, or at any similar terms of those times.

When op increases, or decreases proportionally, the fluxions of this line, in all the higher orders, increase or decrease in the same proportion as the line itself increases or decreases; so that one rule serves for comparing together those of any kind at different terms of time; and in this case we never

arrive at any constant or invariable fluxion. If the logarithms of two quantities be always to each other in any invariable ratio, the fluxions of those quantities shall be in a ratio that is compounded of a ratio of the quantities themselves, and of the invariable ratio of their logarithms.

Let op be greater than oa ; $ad:ap::oa:op$; and let oa ,

$$\frac{o}{A} \frac{q}{P} \frac{a}{P} \frac{d}{P} \frac{e}{P} \frac{f}{P} \frac{g}{P} \frac{h}{P} \frac{k}{P} \frac{p}{P} \frac{x}{P}$$

$ad, de, ef, fg, \&c.$ be in continued proportion: then by adding together $ad, \frac{1}{2}de, \frac{1}{3}ef, \frac{1}{4}fg, \&c.$ we approximate continually to the value of AP , the logarithm of op . And we approximate continually to the logarithm of od , by summing up the differences betwixt ad and $\frac{1}{2}de, \frac{1}{3}ef, \&c.$ and $\frac{1}{2}fg, \frac{1}{3}gb$ and $\frac{1}{6}bk, \&c.$ See Maclaurin's Fluxions, art. 171, 172. From what has been said, it follows, that if $ao:od::op:ox$, then the logarithm of ox will be equal to the sum of the logarithms of op and od : that is, to the sum of $ad + \frac{1}{2}de + \frac{1}{3}ef + \frac{1}{4}fg + \frac{1}{5}gh + \frac{1}{6}hk, \&c.$ and $ad + \frac{1}{2}de + \frac{1}{3}ef + \frac{1}{4}fg + \frac{1}{5}gb + \frac{1}{6}bk, \&c.$ and $ad + \frac{1}{2}de + \frac{1}{3}ef + \frac{1}{4}fg + \frac{1}{5}gb + \frac{1}{6}bk, \&c.$ which sum is $2ad + \frac{2}{3}ef + \frac{2}{5}gb, \&c.$

Let $aq = ad$; then the logarithm of ox will measure the ratio of od to oq . But od and oq have half their sum equal to oa , and half their difference equal to ad , which are the two first terms of the geometric progression $oa, ad, de, ef, fg, gb, bk, \&c.$ Hence, if $oa = 1$, and $ad = x$, $de, ef, fg, \&c.$ will be respectively, $x^2, x^3, x^4, \&c.$ and the ratio of $1+x$ to $1-x$ will be equal to that of od to oq . But the logarithm of this ratio is $2ad + \frac{2}{3}ef + \frac{2}{5}gb$

$+$, $\&c.$ therefore the logarithm of $\frac{1+x}{1-x} = 2 \times x + \frac{2}{3}x^3 + \frac{1}{5}x^5 + \frac{1}{7}x^7 + \&c.$ agreeably to what has been shewn by Dr. Halley and others.

Having thus given an idea of the forms under which logarithms were considered, and the methods by which they were computed by some of the early writers on this subject, it will be proper now to bestow a few columns, to explain the more modern way of investigating the principles and of computing these very useful numbers; in doing which, however, the limits of our article will necessarily confine our observation to only the most popular and useful formulae.

We have already defined a logarithm to be the index of a certain number called the radix, which being raised to the power denoted by that index or logarithm, will produce the given number. If, therefore, $r^x = N$, then x is the logarithm of N , and r is the radix of the system. Now, first, in order to find an analytical expression for N in terms of x and r ; r^x must be converted into a series, for which purpose it may be put under the form

$$r^x = (1 + (r-1))^x = 1 + x(r-1) + \frac{x \cdot (x-1)}{1 \cdot 2} (r-1)^2 + \frac{x \cdot (x-1) \cdot (x-2)}{1 \cdot 2 \cdot 3} (r-1)^3 + \&c.$$

$$= 1 + x \left\{ (r-1) - \frac{1}{2}(r-1)^2 + \frac{1}{6}(r-1)^3 - \&c. \right\}$$

$$+ \frac{x^2}{1 \cdot 2} \left\{ (r-1)^2 - (r-1)^3 + \&c. \right\} =$$

$$1 + Ax + A'x^2 + A''x^3 + \&c.$$

by writing

$$A = (r-1) - \frac{1}{2}(r-1)^2 + \frac{1}{6}(r-1)^3 - \&c.$$

$$A' = (r-1)^2 - (r-1)^3 + \&c.$$

$$A'' = \&c.$$

where $A, A', A'', \&c.$ are constant but unknown quantities. And now, in order to determine the law by which they are connected with each other, let x be increased by any indeterminate quantity z ; then $r^{x+z} = 1 + A(x+z) + A'(x+z)^2 + A''(x+z)^3 + \&c. \dots A^{(n-1)}(x+z)^{n-1}$; or, expanding the powers of $x+z$, and stopping at the first two terms, we have

$$r^{x+z} = 1 + A(x+z) + A'(x^2 + 2xz + \&c.) + A''(x^3 + 3x^2z + \&c.) + A^{(n-1)}(x^n + nx^{n-1}z + \&c.) + A^{(n)}(x^{n+1} + (n+1)x^n z + \&c.)$$

Again

$$r^{x+z} = r^x \times r^z = (1 + Ax + A'x^2 + A''x^3 + \&c.) \times (1 + Az + A'z^2 + A''z^3 + \&c.)$$

the actual multiplication of which gives

$$r^{x+z} = 1 + A(x+z) + A'x^2 + A''x^3 \dots A^{(n-1)}x^n + A^2xz + A'A'x^2z \dots \&c.$$

whence, by comparing the corresponding terms in the two expansions, we have

$$2A' = A^2, \text{ or } A' = \frac{A^2}{2}; \quad 3A'' = A'A' = \frac{A^3}{2};$$

and therefore $A'' = \frac{A^3}{1 \cdot 2 \cdot 3}$

in the same way $A''' = \frac{A^4}{1 \cdot 2 \cdot 3 \cdot 4}$

and generally $A^{(n-1)} = \frac{A^n}{1 \cdot 2 \cdot 3 \dots n}$

$$A^n = \frac{A^{n+1}}{1 \cdot 2 \cdot 3 \dots (n+1)}$$

And consequently,

$$r^x = N = 1 + Ax + \frac{A^2}{1 \cdot 2} x^2 + \frac{A^3}{1 \cdot 2 \cdot 3} x^3 + \&c.$$

which is the analytical expression for any number in terms of the radix r and its logarithm x ; but the reverse of this, by which the logarithm is expressed in terms of its number and radix, is the formula which is more particularly applicable in the present enquiry. This may be found as follows.

In the preceding article we found

$$r^x = N = 1 + Ax + \frac{A^2}{1 \cdot 2} x^2 + \frac{A^3}{1 \cdot 2 \cdot 3} x^3 + \&c.$$

where $A = (r-1) - \frac{1}{2}(r-1)^2 + \frac{1}{6}(r-1)^3 - \&c.$; and if now we make

$$B = (N-1) - \frac{1}{2}(N-1)^2 + \frac{1}{6}(N-1)^3 - \&c.$$

we shall have on the same principles

$$N^z = 1 + Bz + \frac{B^2}{1 \cdot 2} z^2 + \frac{B^3}{1 \cdot 2 \cdot 3} z^3 + \&c.$$

But

$$N^z = r^{xz} = 1 + Axz + \frac{A^2}{1 \cdot 2} x^2 z^2 + \frac{A^3}{1 \cdot 2 \cdot 3} x^3 z^3 +$$

$\&c.$; whence, by comparing the co-efficients of z in both series, we have

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$$A x = B; \frac{A^2 x^2}{1 \cdot 2} = \frac{B^2}{1 \cdot 2}; \frac{A^3 x^3}{1 \cdot 2 \cdot 3} = \frac{B^3}{1 \cdot 2 \cdot 3} \&c;$$

each of which gives the same result, viz. $A x = B$; whence we obtain immediately

$$x = \frac{B}{A} = \frac{(N-1) - \frac{1}{2}(N-1)^2 + \frac{1}{3}(N-1)^3 - \&c.}{(r-1) - \frac{1}{2}(r-1)^2 + \frac{1}{3}(r-1)^3 - \&c.}$$

which is the analytical expression for the logarithm of any number N , in functions of itself, and the radix of the system; that is, writing a instead of N

$$\log. a = \frac{(a-1) - \frac{1}{2}(a-1)^2 + \frac{1}{3}(a-1)^3 - \&c.}{(r-1) - \frac{1}{2}(r-1)^2 + \frac{1}{3}(r-1)^3 - \&c.}$$

$$\text{Or, } \log. 1 \pm a = \frac{\pm a - \frac{1}{2}a^2 \pm \frac{1}{3}a^3 - \frac{1}{4}a^4 \pm \&c.}{(r-1) - \frac{1}{2}(r-1)^2 + \frac{1}{3}(r-1)^3 - \&c.}$$

This, however, must only be considered as a simple algebraical method of expressing a logarithm; but it does not always answer the purposes of calculation, for if a be any number greater than unity, it is obvious that the series in the numerator will either converge very slowly, or otherwise will diverge, and the same with regard to the denominator, supposing r to be equal to 10, as it is in the common system; in fact, the terms of the series are larger the more remote they are from the beginning; and consequently no number of them can exhibit, either exactly or nearly, the true sum. Let us, therefore, investigate the method of submitting these to calculation; in order to which we will repeat again our last series, viz.

$$\log. 1 \pm a = \frac{\pm a - \frac{1}{2}a^2 \pm \frac{1}{3}a^3 - \frac{1}{4}a^4 \pm \&c.}{(r-1) - \frac{1}{2}(r-1)^2 + \frac{1}{3}(r-1)^3 - \&c.}$$

and here, since the denominator is always a constant quantity when the radix of the system is given, we may make

$$M = (r-1) - \frac{1}{2}(r-1)^2 + \frac{1}{3}(r-1)^3 - \&c.$$

which renders the above expression still more simple, as in that case it becomes barely

$$\log. 1 + a = \frac{1}{M} \times \left\{ a - \frac{1}{2}a^2 + \frac{1}{3}a^3 - \frac{1}{4}a^4 + \&c. \right\}$$

Or, taking a negative,

$$\log. 1 - a = \frac{1}{M} \times \left\{ -a - \frac{1}{2}a^2 - \frac{1}{3}a^3 - \frac{1}{4}a^4 - \&c. \right\}$$

Whence again by subtraction,

$$\log. \left(\frac{1+a}{1-a} \right) = \frac{2}{M} \left\{ a + \frac{1}{3}a^3 + \frac{1}{5}a^5 + \frac{1}{7}a^7 + \&c. \right\}$$

$$\text{Now } a = \frac{1 + \frac{a-1}{a+1}}{1 - \frac{a-1}{a+1}}; \text{ if, therefore, we substitute in the}$$

foregoing expression $\frac{a-1}{a+1}$ instead of a , it becomes

$$\log. a = \frac{2}{M} \times \left\{ \left(\frac{a-1}{a+1} \right) + \frac{1}{3} \left(\frac{a-1}{a+1} \right)^3 + \frac{1}{5} \left(\frac{a-1}{a+1} \right)^5 + \&c. \right\}$$

which series must necessarily converge, because the denominator of each of the fractions is greater than its numerator; still, however, when a is a number of any considerable magnitude, the decrease in the terms will be so slow as to render the formula useless for the purposes of calculation.

At present we have assumed the series which constitutes the denominator in our first expression a known quantity,

which we have represented by M . It will, however, be proper, before we proceed any farther, to offer a few remarks upon the absolute value of this series, according to any given radix. First then, since

$$\log. 1 + a = \frac{a - \frac{1}{2}a^2 + \frac{1}{3}a^3 - \frac{1}{4}a^4 + \&c.}{(r-1) - \frac{1}{2}(r-1)^2 + \frac{1}{3}(r-1)^3 - \&c.}$$

the denominator and numerator of this fraction are totally independent of each other, and therefore r may be assumed at pleasure, and the value of the whole denominator computed for any particular magnitude assigned to this letter: or otherwise, the whole denominator may be taken equal to any quantity, and the value of r itself determined by computation. The latter method, at first sight, appears the most eligible; for by assuming the whole denominator equal to unity, it disappears entirely, and the expression becomes

$$\log. (1 + a) = a - \frac{1}{2}a^2 + \frac{1}{3}a^3 - \frac{1}{4}a^4 + \&c.$$

There are, however, inconveniences attending this system, that do not appear upon a slight view of the subject, but which are notwithstanding very evident upon a farther investigation. In the case in which the whole denominator is assumed equal to unity, the value of r , the radix of this particular system, is found to be 2.7182818284, &c. and the

fraction $\frac{1}{M}$ becomes = 1. These constitute what are called

hyperbolic logarithms, and which are treated of under that article in the present work. We shall, therefore, enter no farther upon the subject in this place, than is necessary to shew the defect of this system for general purposes, when compared with that now in common use, a defect which is by no means compensated by the trifling advantage attending their computation. In the common system the radix r is assumed equal to 10, the same as the radix of our scale of notation; and hence arises a most important advantage, which is, that the logarithm of all numbers expressed by the same digits, whether integers, decimals, or mixed of the two, have the same decimal part; the only alteration being in the index or characteristic of the logarithm. For the radix being 10, 0, 1, 2, 3, &c. will be logarithms of 1, 10, 10², &c. that is, 10⁰ = 1, 10¹ = 10, 10² = 100, &c.; and therefore, to multiply or divide a number by any power of 10, we have only to add or subtract the number expressing that power from the integral part of the logarithm, and the decimal part will still remain the same, by which means the tables of logarithms are much more contracted than they could be with any other radix; for in the hyperbolic system, or in any other, which has not its radix the same as that of the scale of notation, every particular number would require a particular logarithm; and this circumstance would either swell the tables to an unmanageable size, or if they were kept within the present limits, frequent computations would become necessary; so that in either way it is clear that the advantages of the present logarithms much more than counterbalance the extra trouble in computing them. This in fact only consists in multiplying the hyperbolic logarithm by a constant factor; viz. the reciprocal of the foregoing constant denominator represented above by $\frac{1}{M}$, the value of

$$\text{which, when } r = 10, \text{ is } \frac{1}{2.30258509, \&c.} = .43429448,$$

&c. Hence it is obvious, that different systems of logarithms are connected together by constant multipliers, and by means of which a logarithm may always be converted from one scale to another. Thus the hyperbolic logarithm of a
1.1 2 number

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number is transformed to the common logarithm, by multiplying the former by .4342944; and the latter is converted into the former by multiplying it by 2.30258509.

Having said thus much with regard to advantages of different systems of logarithms, and the method of transform-

ing them from one scale to another; we will now add one example by way of illustration. Let it therefore be proposed to find the common logarithm of 3. In this case our

$$\text{series } \log. a = \frac{2}{M} \times \left\{ \left(\frac{a-1}{a+1} \right) + \frac{1}{3} \left(\frac{a-1}{a+1} \right)^3 + \frac{1}{5} \left(\frac{a-1}{a+1} \right)^5 + \&c. \right\}$$

$$\text{becomes } \log. 3 = \frac{2}{M} \times \left\{ \frac{1}{2} + \frac{1}{3 \cdot 2^3} + \frac{1}{5 \cdot 2^5} + \frac{1}{7 \cdot 2^7} + \&c. \right\}$$

the computation of which will stand thus:

$$\begin{array}{rcl} \frac{1}{2} & = & .5 \\ \frac{1}{3 \cdot 2^3} & = & .041666666 \\ \frac{1}{5 \cdot 2^5} & = & .00625 \\ \frac{1}{7 \cdot 2^7} & = & .0011160714 \\ \frac{1}{9 \cdot 2^9} & = & .0002170138 \\ \frac{1}{11 \cdot 2^{11}} & = & .0000443892 \\ \frac{1}{13 \cdot 2^{13}} & = & .0000093900 \\ \frac{1}{15 \cdot 2^{15}} & = & .0000020345 \\ \frac{1}{17 \cdot 2^{17}} & = & .0000004487 \end{array}$$

$$\frac{1}{19 \cdot 2^{19}} = .000000100,$$

$$\frac{1}{21 \cdot 2^{21}} = .0000000227$$

$$\frac{1}{23 \cdot 2^{23}} = .0000000050$$

whence $\frac{2}{2.30258509}$, or $43429448 \times 5493061422 = .4771212$, which is the logarithm of 3 required.

This series, we have already observed, will only answer for the computation of the logarithms of small numbers, in other cases different series must be employed according to the particular number under consideration. The limits of this article will not admit of an investigation of the separate cases. But for the sake of reference it will be useful to subjoin a few of the most useful formulæ, for which purpose we avail ourselves of the selection made by Mr. Bencey, in his valuable treatise of Trigonometry.

1. $\log. a = \frac{1}{M} \times \left\{ (a-1) - \frac{1}{2} (a-1)^2 + \frac{1}{3} (a-1)^3 - \&c. \right\}$
2. $\log. a = \frac{1}{M} \times \left\{ \left(\frac{a-1}{a} \right) + \frac{1}{2} \left(\frac{a-1}{a} \right)^2 + \frac{1}{3} \left(\frac{a-1}{a} \right)^3 - \&c. \right\}$
3. $\log. a = \frac{2}{M} \times \left\{ \left(\frac{a-1}{a+1} \right) + \frac{1}{3} \left(\frac{a-1}{a+1} \right)^3 + \frac{1}{5} \left(\frac{a-1}{a+1} \right)^5 + \&c. \right\}$
4. $\log. \frac{a}{b} = \frac{1}{M} \times \left\{ \left(\frac{a \div b}{b} \right) - \frac{1}{2} \left(\frac{a \div b}{b} \right)^2 + \frac{1}{3} \left(\frac{a \div b}{b} \right)^3 - \&c. \right\}$
5. $\log. \frac{a}{b} = \frac{1}{M} \times \left\{ \left(\frac{a \div b}{a} \right) + \frac{1}{2} \left(\frac{a \div b}{a} \right)^2 + \frac{1}{3} \left(\frac{a \div b}{a} \right)^3 - \&c. \right\}$
6. $\log. \frac{a}{b} = \frac{2}{M} \times \left\{ \left(\frac{a \div b}{a+b} \right) + \frac{1}{3} \left(\frac{a \div b}{a+b} \right)^3 + \frac{1}{5} \left(\frac{a \div b}{a+b} \right)^5 + \&c. \right\}$
7. $\log. a = \log. (a-1) + \frac{1}{M} \times \left\{ \frac{1}{a} + \frac{1}{2a^2} + \frac{1}{3a^3} + \frac{1}{4a^4} + \&c. \right\}$
8. $\log. a = \log. (a-1) + \frac{1}{M} \times \left\{ \frac{1}{a-1} - \frac{1}{2(a-1)^2} + \frac{1}{3(a-1)^3} - \&c. \right\}$
9. $\log. a = \log. (a-2) + \frac{2}{M} \times \left\{ \frac{1}{a-1} + \frac{1}{3(a-1)^3} + \frac{1}{5(a-1)^5} + \&c. \right\}$

To the above may be added the following, which will be found useful on many occasions.

10. $\log. a = \frac{1}{M} \times \left\{ (a - a^{-1}) - \frac{1}{2} (a^2 - a^{-2}) + \frac{1}{3} (a^3 - a^{-3}) - \&c. \right\}$
11. $\log. (a+z) = \log. a + \frac{1}{M} \times \left\{ \frac{z}{a} - \frac{1}{2} \frac{z^2}{a^2} + \frac{1}{3} \frac{z^3}{a^3} - \frac{1}{4} \frac{z^4}{a^4} + \&c. \right\}$
12. $\log. (a-z) = \log. a - \frac{1}{M} \times \left\{ \frac{z}{a} + \frac{1}{2} \frac{z^2}{a^2} + \frac{1}{3} \frac{z^3}{a^3} + \frac{1}{4} \frac{z^4}{a^4} + \&c. \right\}$
13. $\log. (a \pm z) = \log. a \pm \frac{2}{M} \times \left\{ \left(\frac{z}{a+z} \right) + \frac{1}{3} \left(\frac{z}{a+z} \right)^3 + \frac{1}{5} \left(\frac{z}{a+z} \right)^5 + \&c. \right\}$
14. $\log. a = \frac{m}{M} \times \left\{ (\sqrt[m]{a} - 1) - \frac{1}{2} (\sqrt[m]{a} - 1)^2 + \frac{1}{3} (\sqrt[m]{a} - 1)^3 - \&c. \right\}$

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These formulæ might have been extended to a much greater length, but those that are given will be found to embrace the generality of cases, and will be found useful on various occasions.

The publications on the subject of logarithms have been so numerous, that we can only find room to mention a small portion of them, but as it is useful to know which are reputed the best, and particularly the best editions of the same authors, we shall subjoin the following enumeration, which may be considered as containing the most respectable and accurate works of this kind.

1. The first canon of logarithms for natural numbers from 1 to 10,000, and from 90,000 to 100,000, was constructed and published in 1622, by Briggs, with the approbation of the inventor lord Napier.

2. Briggs's logarithms, with their difference to 10 places of figures; as also the logarithmic sines, tangents, &c. by George Miller, London 1631.

3. "Trigonometria," by Richard Norwood 1631, containing a table of logarithms from 1 to 10,000, besides sines, tangents, &c.

4. "Directorium Generale Uranometricum," by Francis Bonaventura Cavalieri, Bologna 1632. This work, beside the usual table of logarithms, contains several new and useful tables of sines, versed sines, &c. and some other original matter.

5. In 1643 appeared the "Trigonometria" of the same author, which may also be considered an interesting work.

6. "Tabule Logarithmicæ" by Nathaniel Rowe, London 1633. In this work the logarithms are given to eight places of figures, for every number from 1 to 100,000, and logarithmic sines, tangents, &c. to every hundredth part of degrees to ten places.

7. "Trigonometria Britannica" by John Newton, London 1658. Here the logarithmic tables are put in the most convenient form, being nearly the same as is now adopted by authors of the present period.

8. Adrian Vlacq also published different editions of logarithmic tables, which have been since republished; these are generally considered very accurate and useful tables, particularly the edition of 1631.

9. Sherwin's mathematical tables, published in 8vo. London 1706, form the most complete collection of any we have yet noticed; containing, besides the logarithms of all numbers from 1 to 100,000, the sines, tangents, secants, and versed sines, both natural and logarithmic, to every minute of the quadrant. The first edition was printed in 1706, but the third, published in 1742, as revised by Gardiner, is considered as superior to any other. The fifth, and last, edition published in 1717, is so incorrect, that no dependence can be placed upon it.

The third edition above-mentioned, which is called Gardiner's tables, was republished at Avignon, in France, in

1770, but this is not considered so accurate as the original one by Gardiner himself.

10. An "Antilogarithmic Canon," for readily finding the number corresponding to any logarithm, was begun by the algebraist Harriot, and completed by Warner, the editor of the former's works, but it was never published for want of proper encouragement. But a complete canon of this kind was published by James Dodson 1742, in which the numbers answering to each logarithm from 1 to 100,000, are computed to 11 places of figures.

11. In 1723 was published, by M. Callet, at Paris, a very neat and useful collection of logarithmic tables; and in 1795 an enlarged edition of the same work, under the title of "Tables Portative de Logarithmes." This is an elegant work, beautifully printed and stereotyped, at the celebrated Didot's press; it is more correct than the former edition, though it contains a few errors not noticed in the list of errata.

12. Dr. Hutton's "Mathematical Tables," containing the common hyperbolic and logistic logarithms, also sines, tangents, secants, and versed sines, both natural and logarithmic, together with several other tables useful in mathematical calculations. To which is prefixed a history of the discoveries and writings of the most celebrated authors on this subject. This work was first published in 1785, since which time it has passed through several editions, which are all very correct.

13. Taylor's tables of logarithmic sines and tangents to every second of the quadrant, to which is prefixed a table of logarithms from 1 to 100,000. This is a very valuable work, and has a useful introduction composed by the late astronomer royal Dr. Maskelyne.

14. Vega's tables, published in Latin and German, is also a very excellent performance, particularly the second edition of 1797.

15. Another very accurate and extensive collection of tables, computed for the decimal division of the circle by Borda, and revised and augmented by Delambre, was published in Paris. This work is held in great esteem by the French; but it is of little use to English mathematicians on account of the particular division of the circle. It is, however, preceded by a very perspicuous and scientific investigation of the most useful logarithmic series, and trigonometrical formulæ; and may therefore be read with interest by the general mathematician. Besides the authors above-mentioned, many others have treated on the subject of logarithms, among the principal of whom are Halley, Leibnitz, Mercator, Cotes, Brook Taylor, Euler, Maclaurin, Wolfius, Keil, and Simpson.

As we have frequent occasion to refer to tables of logarithms in the course of this work; we have subjoined a table of logarithms of all numbers from 1 to 10,000, which will be found useful in various cases when other tables may not be at hand.

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TABLE of Logarithms, from 1 to 10,000.

Nº	0	1	2	3	4	5	6	7	8	9	Diff.
100	0000000	0004341	0008677	0013009	0017337	0021661	0025980	0030295	0034605	0038912	4324
101	0013214	0017512	0021805	0026094	0030380	0034660	0038937	0043210	0047478	0051742	4280
102	0048002	0052257	0056509	0060756	0065000	0069239	0073474	0077704	0081931	0086154	4239
103	0128372	0132587	0136797	0141003	0145205	0149403	0153598	0157788	0161974	0166155	4198
104	0170333	0174527	0178717	0182843	0187015	0191163	0195317	0199467	0203613	0207755	4158
105	0211893	0216027	0220157	0224284	0228406	0232525	0236639	0240750	0244857	0248960	4119
106	0253059	0257154	0261245	0265333	0269416	0273496	0277572	0281644	0285713	0289777	4080
107	0293338	0297405	0301468	0305527	0309583	0313635	0317683	0321727	0325768	0329804	4042
108	0334238	0338257	0342273	0346285	0350293	0354297	0358298	0362295	0366289	0370279	4004
109	0374265	0378248	0382226	0386202	0390173	0394141	0398106	0402066	0406023	0409977	3968
110	0413927	0417873	0421816	0425755	0429691	0433623	0437551	0441476	0445398	0449315	3932
111	0453230	0457141	0461048	0464952	0468852	0472749	0476642	0480532	0484418	0488301	3897
112	0492180	0496059	0499929	0503798	0507663	0511525	0515384	0519239	0523091	0526939	3862
113	0530784	0534626	0538464	0542299	0546131	0549959	0553783	0557605	0561423	0565237	3828
114	0569049	0572856	0576661	0580462	0584260	0588055	0591846	0595634	0599419	0603200	3795
115	0606978	0610753	0614525	0618293	0622058	0625820	0629578	0633334	0637086	0640834	3762
116	0644780	0648522	0652261	0655997	0659730	0663459	0667186	0670909	0674628	0678345	3729
117	0681859	0685569	0689276	0692980	0696681	0700379	0704073	0707765	0711453	0715138	3693
118	0718820	0722499	0726175	0729847	0733517	0737184	0740847	0744507	0748164	0751819	3660
119	0755470	0759118	0762763	0766404	0770043	0773679	0777312	0780942	0784568	0788192	3629
120	0791812	0795430	0799045	0802656	0806265	0809870	0813473	0817073	0820669	0824263	3605
121	0827854	0831441	0835026	0838608	0842187	0845763	0849336	0852906	0856473	0860037	3576
122	0863598	0867157	0870712	0874269	0877814	0881361	0884905	0888446	0891984	0895519	3547
123	0899051	0902581	0906107	0909631	0913152	0916670	0920185	0923697	0927206	0930713	3518
124	0934217	0937718	0941216	0944711	0948204	0951694	0955180	0958665	0962146	0965624	3490
125	0969100	0972573	0976043	0979511	0982975	0986437	0989896	0993353	0996806	1000257	3462
126	1003705	1007151	1010594	1014034	1017471	1020905	1024337	1027766	1031193	1034616	3434
127	1038037	1041456	1044871	1048284	1051694	1055102	1058507	1061909	1065309	1068705	3408
128	1072100	1075491	1078880	1082267	1085650	1089031	1092410	1095785	1099159	1102529	3381
129	1105897	1109262	1112625	1115985	1119343	1122698	1126050	1129400	1132747	1136092	3355
130	1139434	1142773	1146110	1149444	1152776	1156105	1159432	1162756	1166077	1169396	3329
131	1172713	1176027	1179335	1182647	1185954	1189258	1192559	1195858	1199154	1202448	3304
132	1205732	1209028	1212315	1215598	1218880	1222159	1225435	1228709	1231981	1235250	3279
133	1238510	1241781	1245042	1248301	1251558	1254813	1258065	1261314	1264561	1267806	3255
134	1271048	1274288	1277525	1280760	1283993	1287223	1290451	1293676	1296899	1300119	3230
135	1303328	1306553	1309767	1312978	1316187	1319393	1322597	1325798	1328998	1332195	3206
136	1335389	1338589	1341771	1344959	1348144	1351327	1354507	1357685	1360861	1364034	3183
137	1367200	1370375	1373541	1376705	1379867	1383027	1386184	1389339	1392492	1395643	3160
138	1398791	1401937	1405080	1408222	1411361	1414498	1417632	1420765	1423895	1427022	3137
139	1430148	1433271	1436393	1439511	1442628	1445742	1448854	1451964	1455072	1458177	3114
140	1461280	1464381	1467480	1470577	1473671	1476763	1479853	1482941	1486027	1489110	3092
141	1492191	1495270	1498347	1501422	1504494	1507564	1510633	1513699	1516762	1519824	3070
142	1522883	1525941	1528996	1532049	1535100	1538149	1541195	1544240	1547282	1550322	3049
143	1552360	1555406	1558450	1561492	1564532	1567571	1570608	1573644	1576678	1579710	3027
144	1583125	1586160	1589193	1592226	1595257	1598287	1601315	1604342	1607368	1610394	3006
145	1613430	1616474	1619516	1622556	1625594	1628630	1631664	1634696	1637727	1640757	2986
146	1643729	1646762	1649794	1652824	1655853	1658880	1661906	1664931	1667955	1670978	2965
147	1673173	1676197	1679219	1682240	1685259	1688276	1691291	1694305	1697318	1700330	2945
148	1702617	1705621	1708624	1711625	1714625	1717623	1720619	1723614	1726608	1729601	2926
149	1731863	1734856	1737848	1740839	1743828	1746815	1749801	1752786	1755769	1758751	2906

LOGARITHMS.

TABLE of Logarithms.

N ^o	0	1	2	3	4	5	6	7	8	9	Diff.
150	1760913	1763807	1766699	1769590	1772478	1775365	1778250	1781133	1784013	1786892	285
151	1789769	1792645	1795518	1798389	1801259	1804126	1806992	1809856	1812718	1815578	286
152	1818436	1821292	1824147	1826999	1829850	1832698	1835545	1838390	1841234	1844075	287
153	1846914	1849752	1852588	1855422	1858254	1861084	1863912	1866739	1869563	1872386	288
154	1875207	1878026	1880844	1883659	1886473	1889285	1892095	1894903	1897710	1900514	289
155	1903317	1906118	1908917	1911715	1914510	1917304	1920096	1922886	1925675	1928461	290
156	1931246	1934029	1936810	1939590	1942367	1945143	1947918	1950690	1953461	1956229	291
157	1958997	1961762	1964525	1967287	1970047	1972806	1975562	1978317	1981070	1983821	292
158	1986571	1989319	1992065	1994809	1997552	2000293	2003032	2005769	2008505	2011239	293
159	2013971	2016702	2019431	2022158	2024883	2027607	2030329	2033049	2035768	2038485	294
160	2041200	2043913	2046625	2049335	2052044	2054750	2057455	2060159	2062860	2065560	295
161	2068259	2070955	2073650	2076344	2079035	2081725	2084414	2087100	2089785	2092468	296
162	2095150	2097830	2100508	2103185	2105860	2108534	2111205	2113876	2116544	2119211	297
163	2121876	2124540	2127202	2129862	2132521	2135178	2137833	2140487	2143139	2145790	298
164	2148438	2151086	2153732	2156376	2159018	2161659	2164298	2166936	2169572	2172207	299
165	2174839	2177471	2180100	2182729	2185355	2187980	2190603	2193225	2195845	2198464	300
166	2201081	2203696	2206310	2208922	2211533	2214142	2216750	2219356	2221960	2224563	301
167	2227165	2229764	2232363	2234959	2237555	2240148	2242740	2245331	2247920	2250507	302
168	2253093	2255677	2258260	2260841	2263421	2265999	2268576	2271151	2273724	2276296	303
169	2278867	2281436	2284004	2286570	2289134	2291697	2294258	2296818	2299377	2301934	304
170	2304489	2307043	2309596	2312146	2314696	2317244	2319790	2322335	2324870	2327421	305
171	2329961	2332500	2335038	2337574	2340108	2342641	2345173	2347703	2350232	2352759	306
172	2355284	2357809	2360331	2362853	2365373	2367891	2370408	2372923	2375437	2377950	307
173	2380461	2382971	2385470	2387968	2390461	2392955	2395447	2397936	2400426	2402916	308
174	2405492	2407988	2410482	2412974	2415465	2417954	2420442	2422929	2425414	2427898	309
175	2430380	2432861	2435341	2437819	2440296	2442771	2445245	2447718	2450189	2452658	310
176	2455127	2457594	2460059	2462523	2464986	2467447	2469907	2472365	2474822	2477278	311
177	2479733	2482186	2484637	2487087	2489536	2491984	2494430	2496874	2499318	2501759	312
178	2504200	2506639	2509077	2511513	2513949	2516382	2518815	2521246	2523675	2526103	313
179	2528530	2530956	2533380	2535803	2538224	2540645	2543063	2545481	2547897	2550312	314
180	2552725	2555137	2557548	2559957	2562365	2564772	2567177	2569582	2571984	2574386	315
181	2576786	2579185	2581582	2583978	2586373	2588766	2591158	2593549	2595939	2598327	316
182	2600714	2603099	2605484	2607867	2610248	2612629	2615008	2617385	2619762	2622137	317
183	2624511	2626883	2629255	2631625	2633993	2636361	2638727	2641092	2643455	2645817	318
184	2648178	2650538	2652896	2655253	2657609	2659964	2662317	2664669	2667020	2669369	319
185	2671717	2674064	2676410	2678754	2681097	2683439	2685780	2688119	2690457	2692794	320
186	2695129	2697464	2699797	2702129	2704459	2706788	2709116	2711443	2713769	2716093	321
187	2718416	2720738	2723058	2725377	2727696	2730013	2732328	2734643	2736956	2739268	322
188	2741578	2743888	2746196	2748503	2750809	2753114	2755417	2757719	2760020	2762320	323
189	2764618	2766915	2769211	2771506	2773800	2776092	2778383	2780673	2782962	2785250	324
190	2787536	2789821	2792105	2794388	2796669	2798950	2801229	2803507	2805784	2808059	325
191	2810334	2812607	2814879	2817151	2819419	2821688	2823955	2826221	2828486	2830750	326
192	2833012	2835274	2837535	2839793	2842051	2844307	2846563	2848817	2851070	2853322	327
193	2855573	2857823	2860071	2862319	2864565	2866810	2869054	2871296	2873538	2875778	328
194	2878017	2880255	2882492	2884728	2886963	2889196	2891428	2893660	2895890	2898118	329
195	2900346	2902573	2904797	2907022	2909246	2911468	2913689	2915908	2918127	2920344	330
196	2922561	2924776	2926990	2929203	2931415	2933626	2935835	2938044	2940251	2942457	331
197	2944662	2946866	2949069	2951271	2953471	2955671	2957869	2960067	2962263	2964458	332
198	2966652	2968845	2971037	2973227	2975417	2977605	2979792	2981979	2984164	2986348	333
199	2988531	2990713	2992893	2995073	2997252	2999429	3001605	3003781	3005955	3008128	334

LOGARITHMS.

TABLE of Logarithms.

N	0	1	2	3	4	5	6	7	8	9	Dill.
200	3010300	3012471	3014641	3016809	3018977	3021144	3023309	3025474	3027637	3029799	2167
201	3031661	3033821	3035978	3038135	3040290	3042445	3044599	3046752	3048904	3051055	2156
202	3053214	3055364	3057512	3059659	3061805	3063950	3066094	3068237	3070378	3072518	2145
203	3074070	3076210	3078347	3080483	3082617	3084750	3086882	3089013	3091142	3093269	2135
204	3095402	3097537	3100670	3102801	3104931	3107060	3109187	3111313	3113438	3115561	2124
205	3117530	3119657	3121774	3123889	3126004	3128118	3130231	3132343	3134454	3136563	2114
206	3138672	3140786	3142897	3145007	3147116	3149224	3151331	3153437	3155541	3157644	2104
207	3159753	3161851	3163948	3166043	3168138	3170231	3172323	3174414	3176504	3178592	2093
208	3180683	3182771	3184857	3186943	3189027	3191110	3193191	3195271	3197349	3199426	2084
209	3201493	3203570	3205647	3207722	3209797	3211870	3213942	3216013	3218083	3220151	2074
210	3222210	3224281	3226352	3228422	3230491	3232559	3234626	3236692	3238757	3240821	2064
211	3242885	3244953	3247020	3249086	3251151	3253215	3255278	3257340	3259401	3261461	2054
212	3263530	3265597	3267663	3269728	3271792	3273855	3275917	3277978	3280038	3282097	2044
213	3284156	3286214	3288271	3290327	3292382	3294436	3296489	3298541	3300592	3302642	2034
214	3304691	3306740	3308788	3310835	3312881	3314926	3316970	3319013	3321055	3323096	2025
215	3324135	3326184	3328231	3330277	3332322	3334366	3336409	3338451	3340492	3342533	2016
216	3344583	3346631	3348678	3350724	3352769	3354813	3356856	3358898	3360939	3362979	2006
217	3364979	3367026	3369072	3371117	3373161	3375204	3377246	3379287	3381328	3383368	1998
218	3385405	3387445	3389484	3391522	3393559	3395595	3397630	3399664	3401697	3403729	1988
219	3405771	3407803	3409834	3411864	3413893	3415921	3417948	3419974	3422000	3424024	1979
220	3426047	3428071	3430094	3432116	3434137	3436157	3438176	3440194	3442211	3444228	1970
221	3446244	3448260	3450275	3452289	3454302	3456314	3458326	3460337	3462347	3464356	1961
222	3466364	3468372	3470379	3472385	3474390	3476394	3478397	3480399	3482399	3484398	1952
223	3486396	3488393	3490389	3492384	3494377	3496369	3498360	3500350	3502338	3504325	1943
224	3506311	3508297	3510282	3512266	3514249	3516231	3518212	3520192	3522171	3524149	1934
225	3526125	3528102	3530078	3532053	3534027	3535999	3537970	3539940	3541909	3543877	1926
226	3545844	3547811	3549777	3551742	3553706	3555669	3557631	3559592	3561552	3563511	1918
227	3565470	3567427	3569383	3571338	3573292	3575245	3577197	3579148	3581098	3583047	1909
228	3585005	3586953	3588899	3590844	3592788	3594731	3596673	3598614	3600554	3602493	1901
229	3604431	3606369	3608306	3610242	3612177	3614111	3616044	3617976	3619907	3621837	1893
230	3623766	3625694	3627621	3629547	3631472	3633396	3635319	3637241	3639162	3641082	1884
231	3642999	3644918	3646836	3648753	3650669	3652584	3654498	3656411	3658323	3660234	1876
232	3662144	3664055	3665964	3667872	3669779	3671685	3673590	3675494	3677397	3679299	1868
233	3681200	3683101	3685001	3686899	3688796	3690692	3692587	3694481	3696374	3698266	1860
234	3699157	3701048	3702938	3704827	3706714	3708600	3710485	3712368	3714250	3716131	1852
235	3718011	3719891	3721770	3723648	3725525	3727401	3729276	3731150	3733023	3734895	1844
236	3736766	3738637	3740507	3742376	3744243	3746109	3747974	3749838	3751699	3753559	1836
237	3755418	3757276	3759133	3760989	3762844	3764698	3766551	3768403	3770254	3772104	1829
238	3773953	3775801	3777648	3779494	3781338	3783181	3785023	3786864	3788704	3790543	1821
239	3792381	3794218	3796054	3797889	3799722	3801554	3803385	3805215	3807044	3808871	1814
240	3810697	3812522	3814346	3816169	3817990	3819811	3821631	3823450	3825268	3827085	1806
241	3828899	3830716	3832532	3834347	3836161	3837974	3839786	3841597	3843407	3845216	1798
242	3847023	3848830	3850636	3852441	3854245	3856048	3857850	3859651	3861451	3863250	1791
243	3865057	3866861	3868664	3870466	3872267	3874067	3875866	3877664	3879461	3881257	1784
244	3883052	3884847	3886641	3888434	3890226	3892017	3893807	3895596	3897383	3899169	1777
245	3900954	3902739	3904522	3906304	3908085	3909865	3911644	3913422	3915199	3916975	1769
246	3918750	3920524	3922297	3924069	3925840	3927610	3929379	3931147	3932914	3934680	1762
247	3936444	3938207	3939969	3941730	3943489	3945247	3947004	3948760	3950515	3952269	1755
248	3954022	3955775	3957527	3959278	3961028	3962776	3964523	3966269	3968014	3969758	1748
249	3971500	3973242	3974983	3976723	3978462	3980200	3981937	3983673	3985408	3987142	1739

LOGARITHMS.

TABLE of Logarithms.

N ^o	0	1	2	3	4	5	6	7	8	9	Diff.
250	3979400	3981137	3982873	3984608	3986343	3988077	3989811	3991543	3993275	3995007	1734
251	3990737	3998467	4000196	4001925	4003653	4005380	4007106	4008832	4010557	4012282	1727
252	4014005	4015728	4017451	4019173	4020894	4022614	4024333	4026052	4027771	4029488	1720
253	4031205	4032921	4034637	4036352	4038066	4039780	4041492	4043205	4044916	4046627	1714
254	4048337	4050047	4051755	4053464	4055171	4056878	4058584	4060289	4061994	4063698	1707
255	4065402	4067105	4068807	4070508	4072209	4073909	4075608	4077307	4079005	4080703	1700
256	4082400	4084096	4085791	4087486	4089180	4090874	4092567	4094259	4095950	4097641	1694
257	4099331	4101021	4102710	4104398	4106085	4107772	4109459	4111144	4112829	4114513	1687
258	4116197	4117880	4119562	4121244	4122925	4124605	4126285	4127964	4129643	4131321	1680
259	4132998	4134674	4136350	4138025	4139700	4141374	4142047	4144719	4146391	4148063	1674
260	4149733	4151404	4153073	4154742	4156410	4158077	4159744	4161410	4163076	4164741	1667
261	4166405	4168069	4169732	4171394	4173056	4174717	4176377	4178037	4179696	4181355	1661
262	4183013	4184670	4186327	4187983	4189638	4191293	4192947	4194601	4196254	4197906	1655
263	4199557	4201208	4202859	4204509	4206158	4207800	4209454	4211101	4212748	4214394	1648
264	4216039	4217684	4219328	4220972	4222615	4224257	4225898	4227539	4229180	4230820	1642
265	4232459	4234097	4235735	4237372	4239009	4240645	4242281	4243916	4245550	4247183	1636
266	4248816	4250449	4252081	4253712	4255342	4256972	4258601	4260230	4261858	4263486	1630
267	4265113	4266739	4268365	4269990	4271614	4273238	4274861	4276484	4278106	4279727	1624
268	4281348	4282968	4284588	4286207	4287825	4289443	4291060	4292677	4294293	4295908	1618
269	4297523	4299137	4300751	4302364	4303976	4305588	4307199	4308809	4310419	4312029	1612
270	4313638	4315246	4316853	4318460	4320067	4321673	4323278	4324883	4326487	4328090	1606
271	4329693	4331295	4332897	4334498	4336098	4337698	4339298	4340896	4342495	4344092	1600
272	4345689	4347285	4348881	4350476	4352071	4353665	4355259	4356851	4358444	4360035	1594
273	4361626	4363217	4364807	4366396	4367985	4369573	4371161	4372748	4374334	4375920	1588
274	4377506	4379090	4380675	4382258	4383841	4385423	4387005	4388587	4390167	4391747	1582
275	4393327	4394906	4396484	4398062	4399639	4401216	4402792	4404368	4405943	4407517	1577
276	4409091	4410664	4412237	4413809	4415380	4416951	4418522	4420092	4421661	4423230	1571
277	4424798	4426365	4427932	4429499	4431065	4432630	4434195	4435759	4437322	4438885	1565
278	4440448	4442010	4443571	4445132	4446692	4448252	4449811	4451370	4452928	4454485	1560
279	4456042	4457598	4459154	4460709	4462264	4463818	4465372	4466925	4468477	4470029	1554
280	4471580	4473131	4474681	4476231	4477780	4479329	4480877	4482424	4483971	4485517	1549
281	4487063	4488608	4490153	4491697	4493241	4494784	4496327	4497868	4499410	4500951	1543
282	4502491	4504031	4505570	4507109	4508647	4510185	4511722	4513258	4514794	4516329	1538
283	4517864	4519399	4520932	4522466	4523998	4525531	4527062	4528593	4530124	4531654	1533
284	4533183	4534712	4536241	4537769	4539296	4540823	4542349	4543875	4545400	4546924	1527
285	4548449	4549972	4551495	4553018	4554540	4556061	4557582	4559102	4560622	4562142	1521
286	4563660	4565179	4566696	4568213	4569730	4571246	4572762	4574277	4575791	4577305	1516
287	4578819	4580332	4581844	4583356	4584868	4586378	4587889	4589399	4590908	4592417	1510
288	4593925	4595433	4596940	4598446	4599953	4601458	4602963	4604468	4605972	4607475	1505
289	4608978	4610481	4611983	4613484	4614985	4616486	4617986	4619485	4620984	4622482	1501
290	4623980	4625477	4626974	4628470	4629966	4631461	4632956	4634450	4635944	4637437	1495
291	4638930	4640422	4641914	4643405	4644895	4646386	4647875	4649364	4650853	4652343	1491
292	4653829	4655316	4656802	4658288	4659774	4661259	4662743	4664227	4665711	4667194	1485
293	4668676	4670158	4671640	4673121	4674601	4676081	4677561	4679039	4680518	4681996	1480
294	4683473	4684950	4686427	4687903	4689378	4690853	4692327	4693801	4695275	4696748	1475
295	4698220	4699692	4701164	4702634	4704105	4705575	4707044	4708513	4709982	4711450	1470
296	4712917	4714384	4715851	4717317	4718782	4720247	4721711	4723175	4724639	4726102	1465
297	4727564	4729027	4730488	4731949	4733410	4734870	4736329	4737788	4739247	4740705	1460
298	4742163	4743620	4745076	4746533	4747988	4749443	4750898	4752352	4753806	4755259	1455
299	4756712	4758164	4759616	4761067	4762518	4763968	4765418	4766867	4768316	4769765	1450

LOGARITHMS.

TABLE of Logarithms.

N	0	1	2	3	4	5	6	7	8	9	Diff.
300	4771213	4772660	4774107	4775553	4776999	4778445	4779890	4781334	4782778	4784222	1446
301	4785665	4787108	4788550	4789991	4791432	4792873	4794313	4795753	4797192	4798631	1441
302	4800069	4801507	4802945	4804381	4805818	4807254	4808689	4810124	4811559	4812993	1436
303	4814426	4815859	4817292	4818724	4820156	4821587	4823018	4824448	4825878	4827307	1431
304	4828736	4830164	4831592	4833020	4834446	4835873	4837299	4838725	4840150	4841574	1427
305	4842998	4844422	4845845	4847268	4848690	4850112	4851533	4852954	4854375	4855795	1422
306	4857214	4858633	4860052	4861470	4862888	4864305	4865722	4867138	4868554	4869969	1417
307	4871384	4872798	4874212	4875626	4877039	4878451	4879863	4881275	4882686	4884097	1412
308	4885507	4886917	4888326	4889735	4891144	4892552	4893959	4895366	4896773	4898179	1408
309	4899585	4900990	4902395	4903799	4905203	4906607	4908010	4909412	4910814	4912216	1404
310	4913617	4915018	4916418	4917818	4919217	4920616	4922015	4923413	4924810	4926207	1399
311	4927604	4929000	4930396	4931791	4933186	4934581	4935974	4937368	4938761	4940154	1395
312	4941546	4942938	4944329	4945720	4947110	4948500	4949890	4951279	4952667	4954056	1390
313	4955443	4956831	4958218	4959604	4960990	4962375	4963761	4965145	4966529	4967913	1385
314	4969296	4970679	4972062	4973444	4974825	4976206	4977587	4978967	4980347	4981727	1381
315	4983106	4984484	4985862	4987240	4988617	4989994	4991370	4992746	4994121	4995496	1377
316	4996871	4998245	4999619	5000992	5002365	5003737	5005109	5006481	5007852	5009222	1372
317	5010593	5011962	5013332	5014701	5016069	5017437	5018805	5020172	5021539	5022905	1368
318	5024271	5025637	5027002	5028366	5029731	5031094	5032458	5033821	5035183	5036545	1363
319	5037907	5039258	5040629	5041989	5043349	5044709	5046068	5047426	5048785	5050142	1360
320	5051500	5052857	5054213	5055569	5056925	5058280	5059635	5060990	5062344	5063697	1355
321	5065050	5066403	5067755	5069107	5070459	5071810	5073160	5074511	5075860	5077210	1351
322	5078559	5079907	5081255	5082603	5083950	5085297	5086644	5087990	5089335	5090680	1347
323	5092025	5093370	5094714	5096057	5097400	5098743	5100085	5101427	5102768	5104109	1343
324	5105450	5106790	5108130	5109469	5110808	5112147	5113485	5114823	5116160	5117497	1339
325	5118834	5120170	5121505	5122841	5124175	5125510	5126844	5128178	5129511	5130844	1335
326	5132176	5133508	5134840	5136171	5137502	5138832	5140162	5141491	5142820	5144149	1330
327	5145478	5146805	5148133	5149460	5150787	5152113	5153439	5154764	5156089	5157414	1326
328	5158738	5160062	5161386	5162709	5164031	5165354	5166676	5167997	5169318	5170639	1323
329	5171959	5173279	5174598	5175917	5177236	5178554	5179872	5181189	5182507	5183823	1318
330	5185139	5186455	5187771	5189086	5190400	5191715	5193028	5194342	5195655	5196968	1315
331	5198280	5199592	5200903	5202214	5203525	5204835	5206145	5207455	5208764	5210073	1310
332	5211381	5212689	5213996	5215303	5216610	5217916	5219222	5220528	5221833	5223138	1306
333	5224442	5225746	5227050	5228353	5229656	5230958	5232260	5233562	5234863	5236164	1302
334	5237465	5238765	5240064	5241364	5242663	5243961	5245259	5246557	5247854	5249151	1298
335	5250448	5251744	5253040	5254336	5255631	5256925	5258220	5259513	5260807	5262100	1294
336	5263393	5264685	5265977	5267269	5268560	5269851	5271141	5272431	5273721	5275010	1291
337	5276299	5277588	5278876	5280163	5281451	5282738	5284024	5285311	5286596	5287882	1287
338	5289167	5290452	5291736	5293020	5294304	5295587	5296870	5298152	5299434	5300716	1283
339	5301997	5303278	5304558	5305839	5307118	5308398	5309677	5310955	5312234	5313512	1280
340	5314789	5316066	5317343	5318619	5319896	5321171	5322446	5323721	5324996	5326270	1275
341	5327544	5328817	5330090	5331363	5332635	5333907	5335179	5336450	5337721	5338991	1272
342	5340261	5341531	5342800	5344069	5345338	5346606	5347874	5349141	5350408	5351675	1268
343	5352941	5354207	5355473	5356738	5358003	5359267	5360532	5361795	5363059	5364322	1264
344	5365584	5366847	5368109	5369370	5370631	5371892	5373153	5374413	5375673	5376932	1261
345	5378191	5379450	5380708	5381966	5383223	5384481	5385737	5386994	5388250	5389506	1258
346	5390761	5392016	5393271	5394525	5395779	5397032	5398286	5399538	5400791	5402043	1253
347	5403295	5404546	5405797	5407048	5408298	5409548	5410798	5412047	5413296	5414544	1250
348	5415792	5417040	5418288	5419535	5420781	5422028	5423274	5424519	5425765	5427010	1247
349	5428254	5429498	5430742	5431986	5433229	5434472	5435714	5436956	5438198	5439439	1243

LOGARITHMS.

TABLE of Logarithms.

Nº	0	1	2	3	4	5	6	7	8	9	Diff
350	5440680	5441921	5443161	5444401	5445641	5446880	5448119	5449358	5450596	5451834	1239
351	5453071	5454308	5455545	5456781	5458018	5459253	5460489	5461724	5462958	5464193	1235
352	5465427	5466660	5467894	5469126	5470359	5471591	5472823	5474055	5475286	5476517	1232
353	5477747	5478977	5480207	5481436	5482665	5483894	5485123	5486351	5487578	5488806	1229
354	5490033	5491259	5492486	5493712	5494937	5496162	5497387	5498612	5499836	5501060	1225
355	5502284	5503507	5504730	5505952	5507174	5508396	5509618	5510839	5512059	5513280	1222
356	5514500	5515720	5516939	5518158	5519377	5520595	5521813	5523031	5524248	5525465	1218
357	5526682	5527899	5529115	5530330	5531545	5532760	5533975	5535189	5536403	5537617	1215
358	5538830	5540043	5541256	5542468	5543680	5544892	5546103	5547314	5548524	5549735	1212
359	5550944	5552154	5553363	5554572	5555781	5556989	5558197	5559404	5560612	5561818	1208
360	5563025	5564231	5565437	5566643	5567848	5569053	5570257	5571461	5572665	5573869	1205
361	5575072	5576275	5577477	5578680	5579881	5581083	5582284	5583485	5584686	5585886	1202
362	5587086	5588285	5589484	5590683	5591882	5593080	5594278	5595476	5596673	5597870	1198
363	5599066	5600262	5601458	5602654	5603849	5605044	5606239	5607433	5608627	5609821	1195
364	5611014	5612207	5613399	5614592	5615784	5616975	5618167	5619358	5620548	5621739	1193
365	5622929	5624118	5625308	5626497	5627685	5628874	5630062	5631250	5632437	5633624	1187
366	5634811	5635997	5637183	5638369	5639555	5640740	5641925	5643109	5644293	5645477	1185
367	5646661	5647844	5649027	5650209	5651392	5652573	5653755	5654936	5656117	5657298	1181
368	5658478	5659658	5660838	5662017	5663196	5664375	5665553	5666731	5667909	5669087	1179
369	5670264	5671440	5672617	5673793	5674969	5676144	5677320	5678495	5679669	5680843	1175
370	5682017	5683191	5684364	5685537	5686710	5687882	5689054	5690226	5691397	5692568	1172
371	5693739	5694910	5696080	5697249	5698419	5699588	5700757	5701926	5703094	5704262	1169
372	5705429	5706597	5707764	5708930	5710097	5711263	5712429	5713594	5714759	5715924	1166
373	5717088	5718252	5719416	5720580	5721743	5722906	5724069	5725231	5726393	5727555	1163
374	5728716	5729877	5731038	5732198	5733358	5734518	5735678	5736837	5737996	5739154	1160
375	5740313	5741471	5742628	5743786	5744943	5746099	5747256	5748412	5749568	5750723	1156
376	5751878	5753033	5754188	5755342	5756496	5757650	5758803	5759956	5761109	5762261	1154
377	5763414	5764565	5765717	5766868	5768019	5769170	5770320	5771470	5772620	5773769	1151
378	5774918	5776067	5777215	5778363	5779511	5780659	5781806	5782953	5784100	5785246	1148
379	5786392	5787538	5788683	5789828	5790973	5792118	5793262	5794406	5795550	5796693	1145
380	5797836	5798979	5800121	5801263	5802405	5803547	5804688	5805829	5806969	5808110	1142
381	5809250	5810389	5811529	5812668	5813807	5814945	5816084	5817222	5818359	5819497	1138
382	5820634	5821770	5822907	5824043	5825179	5826314	5827450	5828585	5829719	5830854	1135
383	5831988	5833122	5834255	5835388	5836521	5837654	5838786	5839918	5841050	5842181	1133
384	5843312	5844443	5845574	5846704	5847834	5848963	5850093	5851222	5852351	5853479	1129
385	5854607	5855735	5856863	5857990	5859117	5860244	5861370	5862496	5863622	5864748	1127
386	5865873	5866998	5868123	5869247	5870371	5871495	5872618	5873742	5874865	5875987	1124
387	5877110	5878232	5879353	5880475	5881596	5882717	5883838	5884958	5886078	5887198	1121
388	5888317	5889436	5890555	5891674	5892792	5893910	5895028	5896145	5897263	5898379	1118
389	5899496	5900612	5901728	5902844	5903959	5905075	5906189	5907304	5908418	5909532	1116
390	5910646	5911760	5912873	5913986	5915098	5916210	5917322	5918434	5919546	5920657	1112
391	5921768	5922878	5923988	5925098	5926208	5927318	5928427	5929536	5930644	5931753	1110
392	5932861	5933968	5935076	5936183	5937290	5938397	5939503	5940609	5941715	5942820	1107
393	5943926	5945030	5946135	5947239	5948344	5949447	5950551	5951654	5952757	5953860	1103
394	5954962	5956064	5957166	5958268	5959369	5960470	5961571	5962671	5963771	5964871	1101
395	5965971	5967070	5968169	5969268	5970367	5971465	5972563	5973661	5974758	5975855	1098
396	5976952	5978048	5979145	5980241	5981336	5982432	5983527	5984622	5985717	5986811	1096
397	5987905	5988999	5990092	5991186	5992279	5993371	5994464	5995556	5996648	5997739	1092
398	5998831	5999922	6001013	6002103	6003193	6004283	6005373	6006462	6007551	6008640	1090
399	6009729	6010817	6011905	6012993	6014081	6015168	6016255	6017341	6018428	6019514	1087

LOGARITHMS.

TABLE of Logarithms.

N ^o	0	1	2	3	4	5	6	7	8	9	Diff.
400	6020600	6021686	6022771	6023856	6024941	6026025	6027109	6028193	6029277	6030361	1084
401	6031444	6032527	6033609	6034692	6035774	6036855	6037937	6039018	6040099	6041180	1081
402	6042261	6043341	6044421	6045500	6046580	6047659	6048738	6049816	6050895	6051973	1079
403	6053050	6054128	6055205	6056282	6057359	6058435	6059512	6060587	6061663	6062739	1076
404	6063814	6064889	6065963	6067037	6068111	6069185	6070259	6071332	6072405	6073478	1074
405	6074550	6075622	6076694	6077766	6078837	6079909	6080979	6082050	6083120	6084191	1072
406	6085260	6086330	6087399	6088468	6089537	6090605	6091674	6092742	6093809	6094877	1068
407	6095944	6097011	6098078	6099144	6100210	6101276	6102342	6103407	6104472	6105537	1066
408	6106602	6107666	6108730	6109794	6110857	6111921	6112984	6114046	6115109	6116171	1064
409	6117233	6118295	6119356	6120417	6121478	6122539	6123599	6124660	6125720	6126779	1061
410	6127839	6128898	6129957	6131015	6132074	6133132	6134189	6135247	6136304	6137361	1058
411	6138418	6139475	6140531	6141587	6142643	6143698	6144754	6145809	6146863	6147918	1055
412	6148972	6150026	6151080	6152133	6153187	6154240	6155292	6156345	6157397	6158449	1053
413	6159501	6160552	6161603	6162654	6163705	6164755	6165805	6166855	6167905	6168954	1050
414	6170003	6171052	6172101	6173149	6174197	6175245	6176293	6177340	6178387	6179434	1048
415	6180481	6181527	6182573	6183619	6184665	6185710	6186755	6187800	6188845	6189889	1045
416	6190933	6191977	6193021	6194064	6195107	6196150	6197193	6198235	6199277	6200319	1043
417	6201361	6202402	6203443	6204484	6205524	6206565	6207605	6208645	6209684	6210724	1041
418	6211763	6212802	6213840	6214879	6215917	6216955	6217992	6219030	6220067	6221104	1038
419	6222140	6223177	6224213	6225249	6226284	6227320	6228355	6229390	6230424	6231459	1036
420	6232493	6233527	6234560	6235594	6236627	6237660	6238693	6239725	6240757	6241789	1033
421	6242821	6243852	6244884	6245915	6246945	6247976	6249006	6250036	6251066	6252095	1031
422	6253125	6254154	6255182	6256211	6257239	6258267	6259295	6260322	6261350	6262377	1028
423	6263404	6264430	6265457	6266483	6267509	6268534	6269560	6270585	6271610	6272634	1025
424	6273659	6274683	6275707	6276730	6277754	6278777	6279800	6280823	6281845	6282867	1023
425	6283889	6284911	6285933	6286954	6287975	6288996	6290016	6291037	6292057	6293076	1021
426	6294096	6295115	6296134	6297153	6298172	6299190	6300209	6301226	6302244	6303262	1018
427	6304279	6305296	6306312	6307329	6308345	6309361	6310377	6311393	6312408	6313423	1016
428	6314438	6315452	6316467	6317481	6318495	6319508	6320522	6321535	6322548	6323560	1013
429	6324573	6325585	6326597	6327609	6328620	6329632	6330643	6331654	6332664	6333674	1011
430	6334695	6335694	6336694	6337713	6338723	6339732	6340740	6341749	6342757	6343765	1009
431	6344773	6345780	6346788	6347795	6348801	6349808	6350814	6351820	6352826	6353832	1007
432	6354837	6355843	6356848	6357852	6358857	6359861	6360865	6361869	6362873	6363876	1004
433	6364879	6365882	6366884	6367887	6368889	6369891	6370893	6371894	6372895	6373897	1002
434	6374897	6375898	6376898	6377898	6378898	6379898	6380897	6381896	6382895	6383894	1000
435	6384893	6385891	6386889	6387887	6388884	6389882	6390879	6391876	6392872	6393869	998
436	6394865	6395861	6396857	6397852	6398847	6399842	6400837	6401832	6402826	6403820	995
437	6404814	6405808	6406802	6407795	6408788	6409781	6410773	6411765	6412758	6413749	993
438	6414741	6415733	6416724	6417715	6418705	6419696	6420686	6421676	6422666	6423656	991
439	6424645	6425634	6426623	6427612	6428601	6429589	6430577	6431565	6432552	6433540	988
440	6434527	6435514	6436500	6437487	6438473	6439459	6440445	6441431	6442416	6443401	986
441	6444386	6445371	6446355	6447339	6448323	6449307	6450291	6451274	6452257	6453240	984
442	6454223	6455205	6456187	6457169	6458151	6459133	6460114	6461095	6462076	6463057	982
443	6464037	6465018	6465998	6466977	6467957	6468936	6469915	6470894	6471873	6472851	979
444	6473830	6474808	6475786	6476763	6477741	6478718	6479695	6480671	6481648	6482624	977
445	6483600	6484576	6485552	6486527	6487502	6488477	6489452	6490426	6491401	6492375	975
446	6493349	6494322	6495296	6496269	6497242	6498215	6499187	6500160	6501132	6502104	973
447	6503075	6504047	6505018	6505989	6506960	6507930	6508901	6509871	6510841	6511811	970
448	6512780	6513749	6514719	6515687	6516656	6517624	6518593	6519561	6520528	6521496	968
449	6522463	6523431	6524397	6525364	6526331	6527297	6528263	6529229	6530195	6531160	966

LOGARITHMS.

TABLE of Logarithms.

N ^o	0	1	2	3	4	5	6	7	8	9	Diff.
450	6532125	6533090	6534055	6535019	6535984	6536948	6537912	6538876	6539839	6540802	964
451	6541765	6542728	6543691	6544653	6545616	6546578	6547539	6548501	6549462	6550423	962
452	6551384	6552345	6553306	6554266	6555226	6556186	6557145	6558105	6559064	6560023	960
453	6560982	6561941	6562899	6563857	6564815	6565773	6566730	6567688	6568645	6569602	958
454	6570559	6571515	6572471	6573427	6574383	6575339	6576294	6577250	6578205	6579159	956
455	6580114	6581068	6582023	6582977	6583930	6584884	6585837	6586790	6587743	6588696	954
456	6589648	6590601	6591553	6592505	6593456	6594408	6595359	6596310	6597261	6598212	952
457	6599162	6600112	6601062	6602012	6602962	6603911	6604860	6605809	6606758	6607706	949
458	6608655	6609603	6610551	6611499	6612446	6613393	6614341	6615287	6616234	6617181	947
459	6618127	6619073	6620019	6620964	6621910	6622855	6623800	6624745	6625690	6626634	945
460	6627578	6628522	6629466	6630410	6631353	6632296	6633239	6634182	6635125	6636067	943
461	6637009	6637951	6638893	6639835	6640776	6641717	6642658	6643599	6644539	6645480	941
462	6646420	6647360	6648299	6649239	6650178	6651117	6652056	6652995	6653934	6654872	939
463	6655810	6656748	6657686	6658623	6659560	6660497	6661434	6662371	6663307	6664244	937
464	6665180	6666116	6667051	6667987	6668922	6669857	6670792	6671727	6672661	6673595	935
465	6674530	6675463	6676397	6677331	6678264	6679197	6680130	6681062	6681995	6682927	933
466	6683859	6684791	6685723	6686654	6687585	6688516	6689447	6690378	6691308	6692239	931
467	6693169	6694099	6695028	6695958	6696887	6697816	6698745	6699674	6700602	6701530	929
468	6702459	6703386	6704314	6705242	6706169	6707096	6708023	6708950	6709876	6710802	927
469	6711728	6712654	6713580	6714506	6715431	6716356	6717281	6718206	6719130	6720054	925
470	6720979	6721903	6722826	6723750	6724673	6725596	6726519	6727442	6728365	6729287	923
471	6730209	6731131	6732053	6732974	6733896	6734817	6735738	6736659	6737579	6738500	921
472	6739420	6740340	6741260	6742179	6743099	6744018	6744937	6745856	6746775	6747693	919
473	6748611	6749529	6750447	6751365	6752283	6753200	6754117	6755034	6755951	6756867	917
474	6757783	6758700	6759615	6760531	6761447	6762362	6763277	6764192	6765107	6766022	915
475	6766936	6767850	6768764	6769678	6770592	6771505	6772418	6773332	6774244	6775157	913
476	6776070	6776982	6777894	6778806	6779718	6780629	6781540	6782452	6783362	6784273	911
477	6785184	6786094	6787004	6787914	6788824	6789734	6790643	6791552	6792461	6793370	910
478	6794279	6795187	6796096	6797004	6797912	6798819	6799727	6800634	6801541	6802448	908
479	6803355	6804262	6805168	6806074	6806980	6807886	6808792	6809697	6810602	6811507	906
480	6812412	6813317	6814222	6815126	6816030	6816934	6817838	6818741	6819645	6820548	904
481	6821451	6822354	6823256	6824159	6825061	6825963	6826865	6827766	6828668	6829569	902
482	6830470	6831371	6832272	6833173	6834073	6834973	6835873	6836773	6837673	6838572	900
483	6839471	6840370	6841269	6842168	6843066	6843965	6844863	6845761	6846659	6847556	899
484	6848454	6849351	6850248	6851145	6852041	6852938	6853834	685473	6855626	6856522	897
485	6857417	6858313	6859208	6860103	6860998	6861892	6862787	6863681	6864575	6865469	894
486	6866363	6867256	6868150	6869043	6869936	6870828	6871721	6872613	6873506	6874398	892
487	6875290	6876181	6877073	6877964	6878855	6879746	6880637	6881528	6882418	6883308	891
488	6884198	6885088	6885978	6886867	6887757	6888646	6889535	6890423	6891312	6892200	889
489	6893089	6893977	6894864	6895752	6896640	6897527	6898414	6899301	6900188	6901074	887
490	6901961	6902847	6903733	6904619	6905505	6906390	6907275	6908161	6909046	6909930	885
491	6910815	6911699	6912584	6913468	6914352	6915235	6916119	6917002	6917885	6918768	883
492	6919651	6920534	6921419	6922298	6923180	6924062	6924944	6925826	6926707	6927588	882
493	6928469	6929350	6930231	6931111	6931991	6932872	6933752	6934631	6935511	6936390	881
494	6937269	6938149	6939027	6939906	6940785	6941663	6942541	6943419	6944297	6945175	878
495	6946052	6946929	6947806	6948683	6949560	6950437	6951313	6952189	6953065	6953941	877
496	6954817	6955692	6956568	6957443	6958318	6959193	6960067	6960942	6961816	6962690	875
497	6963564	6964438	6965311	6966185	6967058	6967931	6968804	6969676	6970549	6971421	873
498	6972293	6973165	6974037	6974909	6975780	6976652	6977523	6978394	6979264	6980135	872
499	6981005	6981876	6982746	6983616	6984485	6985355	6986224	6987093	6987963	6988831	870

LOGARITHMS.

TABLE of Logarithms.

N	0	1	2	3	4	5	6	7	8	9	Diff.
500	6989700	6990569	6991437	6992305	6993173	6994041	6994908	6995776	6996643	6997510	868
501	6998377	6999244	7000111	7000977	7001843	7002709	7003575	7004441	7005307	7006172	866
502	7007037	7007902	7008767	7009632	7010496	7011361	7012225	7013089	7013953	7014816	865
503	7015680	7016543	7017406	7018269	7019132	7019995	7020857	7021720	7022582	7023444	863
504	7024305	7025167	7026028	7026890	7027751	7028612	7029472	7030333	7031193	7032054	861
505	7032914	7033774	7034633	7035493	7036352	7037212	7038071	7038930	7039788	7040647	860
506	7041505	7042363	7043221	7044079	7044937	7045794	7046652	7047509	7048366	7049223	857
507	7050080	7050936	7051792	7052649	7053505	7054360	7055216	7056072	7056927	7057782	855
508	7058637	7059492	7060347	7061201	7062055	7062910	7063764	7064617	7065471	7066325	854
509	7067178	7068031	7068884	7069737	7070589	7071442	7072294	7073146	7073998	7074850	853
510	7075702	7076553	7077405	7078256	7079107	7079957	7080808	7081659	7082509	7083359	850
511	7084209	7085059	7085908	7086758	7087607	7088456	7089305	7090154	7091003	7091851	849
512	7092700	7093548	7094396	7095244	7096091	7096939	7097786	7098633	7099480	7100327	848
513	7101174	7102020	7102866	7103713	7104559	7105404	7106250	7107096	7107941	7108786	845
514	7109631	7110476	7111321	7112165	7113010	7113854	7114698	7115542	7116385	7117229	844
515	7118072	7118915	7119759	7120601	7121444	7122287	7123129	7123971	7124813	7125655	843
516	7126497	7127339	7128180	7129021	7129862	7130703	7131544	7132385	7133225	7134065	841
517	7134905	7135745	7136585	7137425	7138264	7139104	7139943	7140782	7141620	7142459	840
518	7143298	7144136	7144974	7145812	7146650	7147488	7148325	7149162	7150000	7150837	838
519	7151674	7152510	7153347	7154183	7155019	7155856	7156691	7157527	7158363	7159198	837
520	7160033	7160869	7161703	7162538	7163373	7164207	7165042	7165876	7166710	7167544	834
521	7168377	7169211	7170044	7170877	7171710	7172543	7173376	7174208	7175041	7175873	833
522	7176705	7177537	7178369	7179200	7180032	7180863	7181694	7182525	7183356	7184186	831
523	7185017	7185847	7186677	7187507	7188337	7189167	7189996	7190826	7191655	7192484	830
524	7193313	7194142	7194970	7195799	7196627	7197455	7198283	7199111	7199938	7200766	828
525	7201593	7202420	7203247	7204074	7204901	7205727	7206554	7207380	7208206	7209032	826
526	7209857	7210683	7211508	7212334	7213159	7213984	7214809	7215633	7216458	7217282	825
527	7218106	7218930	7219754	7220578	7221401	7222225	7223048	7223871	7224694	7225517	824
528	7226339	7227162	7227984	7228806	7229628	7230450	7231272	7232093	7232914	7233736	822
529	7234557	7235378	7236198	7237019	7237839	7238660	7239480	7240300	7241120	7241939	821
530	7242759	7243578	7244397	7245216	7246035	7246854	7247672	7248491	7249309	7250127	820
531	7250945	7251763	7252581	7253398	7254216	7255033	7255850	7256667	7257483	7258300	817
532	7259116	7259933	7260749	7261565	7262380	7263196	7264012	7264827	7265642	7266457	816
533	7267272	7268087	7268901	7269716	7270530	7271344	7272158	7272972	7273786	7274599	814
534	7275413	7276226	7277039	7277852	7278664	7279477	7280290	7281102	7281914	7282726	813
535	7283538	7284350	7285161	7285972	7286784	7287595	7288406	7289216	7290027	7290838	811
536	7291648	7292458	7293268	7294078	7294888	7295697	7296507	7297316	7298125	7298934	809
537	7299743	7300552	7301360	7302168	7302977	7303785	7304593	7305400	7306208	7307015	808
538	7307823	7308630	7309437	7310244	7311051	7311857	7312663	7313470	7314276	7315082	806
539	7315888	7316693	7317499	7318304	7319109	7319914	7320719	7321524	7322329	7323133	805
540	7323938	7324742	7325546	7326350	7327153	7327957	7328760	7329564	7330367	7331170	804
541	7331973	7332775	7333578	7334380	7335183	7335985	7336787	7337588	7338390	7339192	802
542	7339993	7340794	7341595	7342396	7343197	7343997	7344798	7345598	7346398	7347198	800
543	7347998	7348798	7349598	7350397	7351196	7351995	7352794	7353593	7354392	7355191	799
544	7355991	7356787	7357585	7358383	7359181	7359979	7360776	7361574	7362371	7363168	798
545	7363965	7364762	7365558	7366355	7367151	7367948	7368744	7369540	7370335	7371131	797
546	7371926	7372722	7373517	7374312	7375107	7375902	7376696	7377491	7378285	7379079	795
547	7379873	7380667	7381461	7382254	7383048	7383841	7384634	7385427	7386220	7387013	793
548	7387806	7388598	7389390	7390182	7390974	7391766	7392558	7393350	7394141	7394932	792
549	7395723	7396514	7397305	7398096	7398887	7399677	7400467	7401257	7402047	7402837	790

LOGARITHMS.

TABLE of Logarithms.

Nº	0	1	2	3	4	5	6	7	8	9	Diff.
550	7403627	7404416	7405206	7405995	7406784	7407573	7408362	7409151	7409939	7410728	789
551	7411516	7412304	7413092	7413880	7414668	7415455	7416243	7417030	7417817	7418604	797
552	7419391	7420177	7420964	7421750	7422537	7423323	7424109	7424895	7425680	7426466	786
553	7427251	7428037	7428822	7429607	7430392	7431176	7431961	7432745	7433530	7434314	784
554	7435098	7435882	7436665	7437449	7438232	7439016	7439799	7440582	7441365	7442147	783
555	7442930	7443712	7444495	7445277	7446059	7446841	7447622	7448404	7449185	7449967	782
556	7450748	7451529	7452310	7453091	7453871	7454652	7455432	7456212	7456992	7457772	781
557	7458552	7459332	7460111	7460890	7461670	7462449	7463228	7464006	7464785	7465564	779
558	7466342	7467120	7467898	7468676	7469454	7470232	7471009	7471787	7472564	7473341	778
559	7474118	7474895	7475672	7476448	7477225	7478001	7478777	7479553	7480329	7481105	776
560	7481880	7482656	7483431	7484206	7484981	7485756	7486531	7487306	7488080	7488854	775
561	7489629	7490403	7491177	7491950	7492724	7493498	7494271	7495044	7495817	7496590	774
562	7497363	7498136	7498908	7499681	7500453	7501225	7501997	7502769	7503541	7504312	772
563	7505084	7505855	7506626	7507398	7508168	7508939	7509710	7510480	7511251	7512021	771
564	7512791	7513561	7514331	7515101	7515870	7516639	7517409	7518178	7518947	7519716	769
565	7520484	7521253	7522022	7522790	7523558	7524326	7525094	7525862	7526629	7527397	768
566	7528164	7528932	7529699	7530466	7531232	7531999	7532766	7533532	7534298	7535065	767
567	7535831	7536596	7537362	7538128	7538893	7539659	7540424	7541189	7541954	7542719	766
568	7543483	7544248	7545012	7545777	7546541	7547305	7548069	7548832	7549596	7550359	764
569	7551123	7551886	7552649	7553412	7554175	7554937	7555700	7556462	7557224	7557987	762
570	7558749	7559510	7560272	7561034	7561795	7562556	7563318	7564079	7564840	7565600	761
571	7566361	7567122	7567882	7568642	7569402	7570162	7570922	7571682	7572442	7573201	760
572	7573960	7574719	7575479	7576237	7576996	7577755	7578513	7579272	7580030	7580788	759
573	7581546	7582304	7583062	7583819	7584577	7585334	7586091	7586848	7587605	7588362	757
574	7589119	7589875	7590632	7591388	7592144	7592900	7593656	7594412	7595168	7595923	756
575	7596678	7597434	7598189	7598944	7599699	7600453	7601208	7601962	7602717	7603471	754
576	7604225	7604979	7605733	7606486	7607240	7607993	7608746	7609500	7610253	7611005	753
577	7611758	7612511	7613263	7614016	7614768	7615520	7616272	7617024	7617775	7618527	752
578	7619278	7620030	7620781	7621532	7622283	7623034	7623784	7624535	7625285	7626035	751
579	7626786	7627536	7628286	7629035	7629785	7630534	7631284	7632033	7632782	7633531	749
580	7634280	7635029	7635777	7636526	7637274	7638022	7638770	7639518	7640266	7641014	748
581	7641761	7642509	7643256	7644003	7644750	7645497	7646244	7646991	7647737	7648484	747
582	7649230	7649976	7650722	7651468	7652214	7652959	7653705	7654450	7655195	7655941	745
583	7656686	7657430	7658175	7658920	7659664	7660409	7661153	7661897	7662641	7663385	744
584	7664128	7664872	7665616	7666359	7667102	7667845	7668588	7669331	7670074	7670810	743
585	7671559	7672301	7673043	7673785	7674527	7675269	7676011	7676752	7677494	7678235	742
586	7678976	7679717	7680458	7681199	7681940	7682680	7683421	7684161	7684901	7685641	740
587	7686381	7687121	7687860	7688600	7689339	7690079	7690818	7691557	7692296	7693035	739
588	7693773	7694512	7695250	7695988	7696727	7697465	7698203	7698940	7699678	7700416	738
589	7701153	7701890	7702627	7703364	7704101	7704838	7705575	7706311	7707048	7707784	737
590	7708520	7709256	7709992	7710728	7711463	7712199	7712934	7713670	7714405	7715140	735
591	7715875	7716610	7717344	7718079	7718813	7719547	7720282	7721016	7721750	7722483	734
592	7723217	7723951	7724684	7725417	7726150	7726884	7727616	7728349	7729082	7729815	733
593	7730547	7731279	7732011	7732743	7733475	7734207	7734939	7735670	7736402	7737133	732
594	7737864	7738596	7739326	7740057	7740788	7741519	7742249	7742979	7743710	7744440	731
595	7745170	7745900	7746629	7747359	7748088	7748818	7749547	7750276	7751005	7751734	729
596	7752463	7753191	7753920	7754648	7755376	7756104	7756832	7757560	7758288	7759016	728
597	7759743	7760471	7761198	7761925	7762652	7763379	7764106	7764833	7765560	7766286	727
598	7767012	7767738	7768464	7769190	7769916	7770642	7771367	7772093	7772818	7773543	726
599	7774268	7774993	7775718	7776443	7777167	7777892	7778616	7779340	7780065	7780789	724

LOGARITHMS.

TABLE of Logarithms.

Nº	0	1	2	3	4	5	6	7	8	9	Diff
600	7781513	7782236	7782960	7783683	7784407	7785130	7785853	7786576	7787299	7788022	723
601	7788745	7789467	7790190	7790912	7791634	7792356	7793078	7793800	7794522	7795243	722
602	7795965	7796686	7797408	7798129	7798850	7799571	7800291	7801012	7801732	7802453	721
603	7803173	7803893	7804613	7805333	7806053	7806773	7807492	7808212	7808931	7809650	720
604	7810369	7811088	7811807	7812526	7813245	7813963	7814681	7815400	7816118	7816836	718
605	7817554	7818272	7818989	7819707	7820424	7821141	7821859	7822576	7823293	7824010	717
606	7824726	7825443	7826159	7826876	7827592	7828308	7829024	7829740	7830456	7831171	716
607	7831887	7832602	7833318	7834033	7834748	7835463	7836178	7836892	7837607	7838321	715
608	7839036	7839750	7840464	7841178	7841892	7842606	7843319	7844033	7844746	7845460	714
609	7846173	7846886	7847599	7848312	7849024	7849737	7850450	7851162	7851874	7852586	713
610	7853298	7854010	7854722	7855434	7856145	7856857	7857568	7858279	7858990	7859701	712
611	7860412	7861123	7861833	7862544	7863254	7863965	7864675	7865385	7866095	7866805	711
612	7867514	7868224	7868933	7869643	7870352	7871061	7871770	7872479	7873188	7873896	709
613	7874605	7875313	7876021	7876730	7877438	7878146	7878854	7879561	7880269	7880976	708
614	7881684	7882391	7883098	7883805	7884512	7885219	7885926	7886632	7887339	7888045	707
615	7888751	7889457	7890163	7890869	7891575	7892281	7892986	7893692	7894397	7895102	706
616	7895807	7896512	7897217	7897922	7898626	7899331	7900035	7900739	7901444	7902148	705
617	7902852	7903555	7904259	7904963	7905666	7906370	7907073	7907776	7908479	7909182	704
618	7909885	7910587	7911290	7911992	7912695	7913397	7914099	7914801	7915503	7916205	702
619	7916906	7917608	7918309	7919011	7919712	7920413	7921114	7921815	7922516	7923216	701
620	7923917	7924617	7925318	7926018	7926718	7927418	7928118	7928817	7929517	7930217	700
621	7930916	7931615	7932314	7933014	7933712	7934411	7935110	7935809	7936507	7937206	699
622	7937904	7938602	7939300	7939998	7940696	7941394	7942091	7942789	7943486	7944183	698
623	7944880	7945578	7946274	7946971	7947668	7948365	7949061	7949757	7950454	7951150	697
624	7951846	7952542	7953238	7953933	7954629	7955324	7956020	7956715	7957410	7958105	695
625	7958800	7959495	7960190	7960884	7961579	7962273	7962967	7963662	7964356	7965050	694
626	7965743	7966437	7967131	7967824	7968517	7969211	7969904	7970597	7971290	7971983	693
627	7972675	7973368	7974060	7974753	7975445	7976137	7976829	7977521	7978213	7978905	692
628	7979596	7980288	7980979	7981671	7982362	7983053	7983744	7984435	7985125	7985816	691
629	7986506	7987197	7987887	7988577	7989267	7989957	7990647	7991337	7992027	7992716	690
630	7993405	7994095	7994784	7995473	7996162	7996851	7997540	7998228	7998917	7999605	689
631	8000294	8000982	8001670	8002358	8003046	8003734	8004421	8005109	8005796	8006484	688
632	8007171	8007858	8008545	8009232	8009919	8010605	8011292	8011978	8012665	8013351	687
633	8014037	8014723	8015409	8016095	8016781	8017466	8018152	8018837	8019522	8020208	685
634	8020893	8021578	8022262	8022947	8023632	8024316	8025001	8025685	8026369	8027053	684
635	8027737	8028421	8029105	8029789	8030472	8031156	8031839	8032522	8033205	8033888	683
636	8034571	8035254	8035937	8036619	8037302	8037984	8038666	8039348	8040031	8040712	682
637	8041394	8042076	8042758	8043439	8044121	8044802	8045483	8046164	8046845	8047526	681
638	8048207	8048887	8049568	8050248	8050929	8051609	8052289	8052969	8053649	8054329	680
639	8055009	8055688	8056368	8057047	8057726	8058405	8059085	8059764	8060442	8061121	679
640	8061800	8062478	8063157	8063835	8064513	8065191	8065869	8066547	8067225	8067903	678
641	8068580	8069258	8069935	8070612	8071290	8071967	8072644	8073320	8073997	8074674	677
642	8075350	8076027	8076703	8077379	8078055	8078731	8079407	8080083	8080759	8081434	676
643	8082110	8082785	8083460	8084136	8084811	8085486	8086160	8086835	8087510	8088184	675
644	8088859	8089533	8090207	8090881	8091555	8092229	8092903	8093577	8094250	8094924	674
645	8095597	8096270	8096944	8097617	8098290	8098962	8099635	8100308	8100980	8101653	673
646	8102325	8102997	8103670	8104342	8105013	8105685	8106357	8107029	8107700	8108372	672
647	8109043	8109714	8110385	8111056	8111727	8112398	8113068	8113739	8114409	8115080	671
648	8115750	8116420	8117090	8117760	8118430	8119100	8119769	8120439	8121108	8121778	670
649	8122447	8123116	8123785	8124454	8125123	8125792	8126460	8127129	8127797	8128465	669

LOGARITHMS.

TABLE of Logarithms.

Nº	0	1	2	3	4	5	6	7	8	9	Diff.
650	8129134	8129802	8130470	8131138	8131805	8132473	8133141	8133808	8134475	8135143	668
651	8135810	8136477	8137144	8137811	8138478	8139144	8139811	8140477	8141144	8141810	666
652	8142476	8143142	8143808	8144474	8145140	8145805	8146471	8147136	8147801	8148467	665
653	8149132	8149797	8150462	8151127	8151791	8152456	8153120	8153785	8154449	8155113	665
654	8155777	8156441	8157105	8157769	8158433	8159097	8159760	8160423	8161087	8161750	664
655	8162413	8163076	8163739	8164402	8165064	8165727	8166389	8167052	8167714	8168376	663
656	8169038	8169700	8170362	8171024	8171686	8172347	8173009	8173670	8174331	8174993	662
657	8175654	8176315	8176976	8177636	8178297	8178958	8179618	8180278	8180939	8181599	661
658	8182259	8182919	8183579	8184239	8184898	8185558	8186217	8186877	8187536	8188195	660
659	8188854	8189513	8190172	8190831	8191489	8192148	8192806	8193465	8194123	8194781	659
660	8195439	8196097	8196755	8197413	8198071	8198728	8199386	8200043	8200700	8201358	657
661	8202015	8202672	8203328	8203985	8204642	8205298	8205955	8206611	8207268	8207924	656
662	8208580	8209236	8209892	8210548	8211203	8211859	8212514	8213170	8213825	8214480	656
663	8215135	8215790	8216445	8217100	8217755	8218409	8219064	8219718	8220372	8221027	654
664	8221681	8222335	8222989	8223643	8224296	8224950	8225603	8226257	8226910	8227563	654
665	8228216	8228869	8229522	8230175	8230828	8231481	8232133	8232786	8233438	8234090	653
666	8234742	8235394	8236046	8236698	8237350	8238002	8238653	8239305	8239956	8240607	652
667	8241258	8241909	8242560	8243211	8243862	8244513	8245163	8245814	8246464	8247114	651
668	8247765	8248415	8249065	8249715	8250364	8251014	8251664	8252313	8252963	8253612	650
669	8254261	8254910	8255559	8256208	8256857	8257506	8258154	8258803	8259451	8260100	649
670	8260748	8261396	8262044	8262692	8263340	8263988	8264635	8265283	8265931	8266578	648
671	8267225	8267872	8268519	8269166	8269813	8270460	8271107	8271753	8272400	8273046	647
672	8273693	8274339	8274985	8275631	8276277	8276923	8277569	8278214	8278860	8279505	646
673	8280151	8280796	8281441	8282086	8282731	8283376	8284021	8284665	8285310	8285955	645
674	8286599	8287243	8287887	8288532	8289176	8289820	8290463	8291107	8291751	8292394	644
675	8293038	8293681	8294324	8294967	8295611	8296254	8296896	8297539	8298182	8298824	643
676	8299467	8300109	8300752	8301394	8302036	8302678	8303320	8303962	8304604	8305245	642
677	8305887	8306528	8307169	8307811	8308452	8309093	8309734	8310375	8311016	8311656	641
678	8312297	8312937	8313578	8314218	8314858	8315499	8316139	8316778	8317418	8318058	641
679	8318698	8319337	8319977	8320616	8321255	8321895	8322534	8323173	8323812	8324450	640
680	8325089	8325728	8326366	8327005	8327643	8328281	8328919	8329558	8330195	8330833	638
681	8331471	8332109	8332746	8333384	8334021	8334659	8335296	8335933	8336570	8337207	638
682	8337844	8338480	8339117	8339754	8340390	8341027	8341663	8342299	8342935	8343571	637
683	8344267	8344843	8345479	8346114	8346750	8347385	8348021	8348656	8349291	8349926	635
684	8350561	8351196	8351831	8352465	8353100	8353735	8354369	8355003	8355638	8356272	635
685	8356906	8357540	8358174	8358807	8359441	8360075	8360708	8361341	8361975	8362608	634
686	8363241	8363874	8364507	8365140	8365773	8366405	8367038	8367670	8368303	8368935	632
687	8369567	8370199	8370832	8371463	8372095	8372727	8373359	8373990	8374622	8375253	632
688	8375881	8376516	8377147	8377778	8378409	8379039	8379670	8380301	8380931	8381562	630
689	8382192	8382822	8383453	8384083	8384713	8385343	8385973	8386602	8387232	8387861	630
690	8388491	8389120	8389750	8390379	8391008	8391637	8392266	8392895	8393523	8394152	629
691	8394780	8395409	8396037	8396666	8397294	8397922	8398550	8399178	8399806	8400433	628
692	8401061	8401688	8402316	8402943	8403571	8404198	8404825	8405452	8406079	8406706	627
693	8407332	8407959	8408586	8409212	8409838	8410465	8411091	8411717	8412343	8412969	627
694	8413595	8414220	8414846	8415472	8416097	8416723	8417348	8417973	8418598	8419223	626
695	8419848	8420473	8421098	8421722	8422347	8422971	8423596	8424220	8424844	8425468	624
696	8426092	8426716	8427340	8427964	8428588	8429211	8429835	8430458	8431081	8431705	623
697	8432322	8432951	8433574	8434197	8434819	8435442	8436065	8436687	8437310	8437932	623
698	8438554	8439176	8439798	8440420	8441042	8441664	8442286	8442907	8443529	8444150	622
699	8444772	8445393	8446014	8446635	8447256	8447877	8448498	8449119	8449739	8450360	621

LOGARITHMS.

TABLE of Logarithms.

N ^o	0	1	2	3	4	5	6	7	8	9	Diff.
700	8450980	8451601	8452221	8452841	8453461	8454081	8454701	8455321	8455941	8456561	620
701	8457180	8457800	8458419	8459038	8459658	8460277	8460896	8461515	8462134	8462752	619
702	8463371	8463990	8464608	8465227	8465845	8466463	8467081	8467700	8468318	8468935	618
703	8469553	8470171	8470789	8471406	8472024	8472641	8473258	8473876	8474493	8475110	617
704	8475727	8476343	8476960	8477577	8478193	8478810	8479426	8480043	8480659	8481275	617
705	8481891	8482507	8483123	8483739	8484355	8484970	8485586	8486201	8486817	8487432	615
706	8488047	8488662	8489277	8489892	8490507	8491122	8491736	8492351	8492965	8493580	615
707	8494194	8494808	8495423	8496037	8496651	8497264	8497878	8498492	8499106	8499719	613
708	8500333	8500946	8501559	8502172	8502786	8503399	8504011	8504624	8505237	8505850	613
709	8506462	8507075	8507687	8508300	8508912	8509524	8510136	8510748	8511360	8511972	612
710	8512583	8513195	8513807	8514418	8515030	8515641	8516252	8516863	8517474	8518085	611
711	8518696	8519307	8519917	8520528	8521139	8521749	8522359	8522970	8523580	8524190	610
712	8524800	8525410	8526020	8526629	8527239	8527849	8528458	8529068	8529677	8530286	610
713	8530895	8531504	8532113	8532722	8533331	8533940	8534548	8535157	8535765	8536374	609
714	8536982	8537590	8538198	8538807	8539414	8540022	8540630	8541238	8541845	8542453	608
715	8543060	8543668	8544275	8544882	8545489	8546096	8546703	8547310	8547917	8548524	607
716	8549130	8549737	8550343	8550950	8551556	8552162	8552768	8553374	8553980	8554586	606
717	8555192	8555797	8556403	8557008	8557614	8558219	8558824	8559429	8560035	8560640	605
718	8561244	8561849	8562454	8563059	8563663	8564268	8564872	8565476	8566081	8566685	605
719	8567289	8567893	8568497	8569101	8569704	8570308	8570912	8571515	8572118	8572722	604
720	8573325	8573928	8574531	8575134	8575737	8576340	8576943	8577545	8578148	8578750	603
721	8579353	8579955	8580557	8581159	8581761	8582363	8582965	8583567	8584169	8584770	602
722	8585372	8585973	8586575	8587176	8587777	8588379	8588980	8589581	8590181	8590782	602
723	8591383	8591984	8592584	8593185	8593785	8594385	8594986	8595586	8596186	8596786	600
724	8597386	8597985	8598585	8599185	8599784	8600384	8600983	8601583	8602182	8602781	600
725	8603380	8603979	8604578	8605177	8605776	8606374	8606973	8607571	8608170	8608768	698
726	8609366	8609964	8610562	8611160	8611758	8612356	8612954	8613552	8614149	8614747	698
727	8615344	8615941	8616539	8617136	8617733	8618330	8618927	8619524	8620121	8620717	697
728	8621314	8621910	8622507	8623103	8623699	8624296	8624892	8625488	8626084	8626680	697
729	8627275	8627871	8628467	8629062	8629658	8630253	8630848	8631443	8632039	8632634	695
730	8633229	8633823	8634418	8635013	8635608	8636202	8636797	8637391	8637985	8638580	594
731	8639174	8639768	8640362	8640956	8641550	8642143	8642737	8643331	8643924	8644517	593
732	8645111	8645704	8646297	8646890	8647483	8648076	8648669	8649262	8649855	8650447	593
733	8651040	8651632	8652225	8652817	8653409	8654001	8654593	8655185	8655777	8656369	591
734	8656961	8657552	8658144	8658735	8659327	8659918	8660509	8661100	8661691	8662282	591
735	8662873	8663464	8664055	8664646	8665236	8665827	8666417	8667008	8667598	8668188	591
736	8668778	8669368	8669958	8670548	8671138	8671728	8672317	8672907	8673496	8674086	590
737	8674675	8675264	8675853	8676442	8677031	8677620	8678209	8678798	8679387	8679975	589
738	8680564	8681152	8681740	8682329	8682917	8683505	8684093	8684681	8685269	8685857	588
739	8686444	8687032	8687620	8688207	8688794	8689382	8689969	8690556	8691143	8691730	588
740	8692317	8692904	8693491	8694077	8694664	8695251	8695837	8696423	8697010	8697596	587
741	8698182	8698768	8699354	8699940	8700526	8701112	8701697	8702283	8702868	8703454	586
742	8704039	8704624	8705210	8705795	8706380	8706965	8707549	8708134	8708719	8709304	585
743	8709888	8710473	8711057	8711641	8712226	8712810	8713394	8713978	8714562	8715146	584
744	8715729	8716313	8716897	8717480	8718064	8718647	8719230	8719814	8720397	8720980	583
745	8721563	8722146	8722728	8723311	8723894	8724476	8725059	8725641	8726224	8726806	582
746	8727388	8727970	8728552	8729134	8729716	8730298	8730880	8731462	8732043	8732625	582
747	8733206	8733787	8734369	8734950	8735531	8736112	8736693	8737274	8737855	8738435	581
748	8739016	8739597	8740177	8740757	8741338	8741918	8742498	8743078	8743658	8744238	580
749	8744818	8745398	8745978	8746557	8747137	8747716	8748296	8748875	8749454	8750034	579

LOGARITHMS.

TABLE of Logarithms.

N ^o	0	1	2	3	4	5	6	7	8	9	Diff.
750	8750613	8751192	8751771	8752349	8752928	8753507	8754086	8754664	8755243	8755821	579
751	8756399	8756978	8757556	8758134	8758712	8759290	8759868	8760446	8761023	8761601	578
752	8762178	8762756	8763333	8763911	8764488	8765065	8765642	8766219	8766796	8767373	577
753	8767950	8768526	8769103	8769680	8770256	8770833	8771409	8771985	8772561	8773137	577
754	8773713	8774289	8774865	8775441	8776017	8776592	8777168	8777743	8778319	8778894	575
755	8779470	8780045	8780620	8781195	8781770	8782345	8782919	8783494	8784069	8784643	575
756	8785218	8785792	8786367	8786941	8787515	8788089	8788663	8789237	8789811	8790385	574
757	8790959	8791532	8792106	8792680	8793253	8793826	8794400	8794973	8795546	8796119	573
758	8796692	8797265	8797838	8798411	8798983	8799556	8800128	8800701	8801273	8801846	573
759	8802418	8802990	8803562	8804134	8804706	8805278	8805850	8806421	8806993	8807564	572
760	8808136	8808707	8809279	8809850	8810421	8810992	8811563	8812134	8812705	8813276	571
761	8813847	8814417	8814988	8815558	8816129	8816699	8817269	8817840	8818410	8818980	570
762	8819550	8820120	8820689	8821259	8821829	8822398	8822968	8823537	8824107	8824676	569
763	8825245	8825815	8826384	8826953	8827522	8828090	8828659	8829228	8829797	8830365	568
764	8830934	8831502	8832070	8832639	8833207	8833775	8834343	8834911	8835479	8836047	568
765	8836614	8837182	8837750	8838317	8838885	8839452	8840019	8840586	8841154	8841721	567
766	8842288	8842855	8843421	8843988	8844555	8845122	8845688	8846255	8846821	8847387	567
767	8847954	8848520	8849086	8849652	8850218	8850784	8851350	8851915	8852481	8853047	566
768	8853612	8854178	8854743	8855308	8855874	8856439	8857004	8857569	8858134	8858699	565
769	8859263	8859828	8860393	8860957	8861522	8862086	8862651	8863215	8863779	8864343	564
770	8864907	8865471	8866035	8866599	8867163	8867726	8868290	8868854	8869417	8869980	563
771	8870544	8871107	8871670	8872233	8872796	8873359	8873922	8874485	8875048	8875610	563
772	8876173	8876736	8877298	8877860	8878423	8878985	8879547	8880109	8880671	8881233	562
773	8881795	8882357	8882918	8883480	8884042	8884603	8885165	8885726	8886287	8886848	561
774	8887410	8887971	8888532	8889093	8889653	8890214	8890775	8891336	8891896	8892457	561
775	8893017	8893577	8894138	8894698	8895258	8895818	8896378	8896938	8897498	8898058	560
776	8898617	8899177	8899736	8900296	8900855	8901415	8901974	8902533	8903092	8903651	560
777	8904210	8904769	8905328	8905887	8906445	8907004	8907563	8908121	8908679	8909238	559
778	8909796	8910354	8910912	8911470	8912028	8912586	8913144	8913702	8914259	8914817	558
779	8915375	8915932	8916489	8917047	8917604	8918161	8918718	8919275	8919832	8920389	557
780	8920946	8921503	8922059	8922616	8923173	8923729	8924285	8924842	8925398	8925954	556
781	8926510	8927066	8927622	8928178	8928734	8929290	8929846	8930401	8930957	8931512	556
782	8932068	8932623	8933178	8933733	8934288	8934843	8935398	8935953	8936508	8937063	555
783	8937618	8938172	8938727	8939281	8939836	8940390	8940944	8941498	8942053	8942607	554
784	8943161	8943715	8944268	8944822	8945376	8945929	8946483	8947037	8947590	8948143	553
785	8948697	8949250	8949803	8950356	8950909	8951462	8952015	8952568	8953120	8953673	553
786	8954225	8954778	8955330	8955883	8956435	8956987	8957539	8958092	8958644	8959195	552
787	8959747	8960299	8960851	8961403	8961954	8962506	8963057	8963608	8964160	8964711	552
788	8965262	8965813	8966364	8966915	8967466	8968017	8968568	8969118	8969669	8970220	551
789	8970770	8971320	8971871	8972421	8972971	8973521	8974071	8974621	8975171	8975721	550
790	8976271	8976821	8977370	8977920	8978469	8979019	8979568	8980117	8980667	8981216	550
791	8981765	8982314	8982863	8983412	8983960	8984509	8985058	8985606	8986155	8986703	549
792	8987252	8987800	8988348	8988897	8989445	8989993	8990541	8991089	8991636	8992184	548
793	8992732	8993279	8993827	8994375	8994922	8995469	8996017	8996564	8997111	8997658	547
794	8998205	8998752	8999299	8999846	9000392	9000939	9001486	9002032	9002579	9003125	547
795	9003671	9004218	9004764	9005310	9005856	9006402	9006948	9007494	9008039	9008585	546
796	9009131	9009676	9010222	9010767	9011313	9011858	9012403	9012948	9013493	9014038	545
797	9014583	9015128	9015673	9016218	9016762	9017307	9017851	9018396	9018940	9019485	545
798	9020029	9020573	9021117	9021661	9022205	9022749	9023293	9023837	9024381	9024924	544
799	9025468	9026011	9026555	9027098	9027641	9028185	9028728	9029271	9029814	9030357	544

LOGARITHMS.

TABLE of Logarithms.

Nº	0	1	2	3	4	5	6	7	8	9	Diff.
800	9030900	9031443	9031985	9032528	9033071	9033613	9034156	9034698	9035241	9035783	542
801	9036325	9036867	9037409	9037951	9038493	9039035	9039577	9040119	9040661	9041202	542
802	9041744	9042285	9042827	9043368	9043909	9044450	9044992	9045533	9046074	9046615	541
803	9047155	9047696	9048237	9048778	9049318	9049859	9050399	9050940	9051480	9052020	541
804	9052560	9053101	9053641	9054181	9054721	9055260	9055800	9056340	9056880	9057419	539
805	9057959	9058498	9059038	9059577	9060116	9060655	9061195	9061734	9062273	9062812	539
806	9063350	9063889	9064428	9064967	9065505	9066044	9066582	9067121	9067659	9068197	539
807	9068735	9069273	9069812	9070350	9070887	9071425	9071963	9072501	9073038	9073576	538
808	9074114	9074651	9075188	9075726	9076263	9076800	9077337	9077874	9078411	9078948	537
809	9079485	9080022	9080559	9081095	9081632	9082169	9082705	9083241	9083778	9084314	537
810	9084850	9085386	9085922	9086458	9086994	9087530	9088066	9088602	9089137	9089673	536
811	9090209	9090744	9091279	9091815	9092350	9092885	9093420	9093955	9094490	9095025	535
812	9095560	9096095	9096630	9097165	9097699	9098234	9098768	9099303	9099837	9100371	535
813	9100905	9101440	9101974	9102508	9103042	9103576	9104109	9104643	9105177	9105710	534
814	9106244	9106778	9107311	9107844	9108378	9108911	9109444	9109977	9110510	9111043	533
815	9111576	9112109	9112642	9113174	9113707	9114240	9114772	9115305	9115837	9116369	533
816	9116902	9117434	9117966	9118498	9119030	9119562	9120094	9120626	9121157	9121689	532
817	9122221	9122752	9123284	9123815	9124346	9124878	9125409	9125940	9126471	9127002	532
818	9127533	9128064	9128595	9129126	9129656	9130187	9130717	9131248	9131778	9132309	531
819	9132839	9133369	9133899	9134430	9134960	9135490	9136019	9136549	9137079	9137609	530
820	9138139	9138668	9139198	9139727	9140257	9140786	9141315	9141844	9142373	9142903	529
821	9143432	9143961	9144489	9145018	9145547	9146076	9146604	9147133	9147661	9148190	529
822	9148718	9149246	9149775	9150303	9150831	9151359	9151887	9152415	9152943	9153471	528
823	9153998	9154526	9155054	9155581	9156109	9156636	9157163	9157691	9158218	9158745	527
824	9159272	9159799	9160326	9160853	9161380	9161907	9162433	9162960	9163487	9164013	527
825	9164539	9165066	9165592	9166118	9166645	9167171	9167697	9168223	9168749	9169275	526
826	9169800	9170326	9170852	9171378	9171903	9172429	9172954	9173479	9174005	9174530	526
827	9175055	9175580	9176105	9176630	9177155	9177680	9178205	9178730	9179254	9179779	525
828	9180303	9180828	9181352	9181877	9182401	9182925	9183449	9183973	9184497	9185021	524
829	9185545	9186069	9186593	9187117	9187640	9188164	9188687	9189211	9189734	9190258	524
830	9190781	9191304	9191827	9192350	9192873	9193396	9193919	9194442	9194965	9195488	523
831	9196010	9196533	9197055	9197578	9198100	9198623	9199145	9199667	9200189	9200711	523
832	9201233	9201755	9202277	9202799	9203321	9203842	9204364	9204886	9205407	9205929	521
833	9206450	9206971	9207493	9208014	9208535	9209056	9209577	9210098	9210619	9211140	521
834	9211661	9212181	9212702	9213222	9213743	9214263	9214784	9215304	9215824	9216345	520
835	9216865	9217385	9217905	9218425	9218945	9219465	9219984	9220504	9221024	9221543	520
836	9222063	9222582	9223102	9223621	9224140	9224659	9225179	9225698	9226217	9226736	519
837	9227255	9227773	9228292	9228811	9229330	9229848	9230367	9230885	9231404	9231922	518
838	9232440	9232958	9233477	9233995	9234513	9235031	9235549	9236066	9236584	9237102	518
839	9237620	9238137	9238655	9239172	9239690	9240207	9240724	9241242	9241759	9242276	517
840	9242793	9243310	9243827	9244344	9244860	9245377	9245894	9246410	9246927	9247444	517
841	9247960	9248476	9248993	9249509	9250025	9250541	9251057	9251573	9252089	9252605	516
842	9253121	9253637	9254152	9254668	9255184	9255699	9256215	9256730	9257245	9257761	515
843	9258276	9258791	9259306	9259821	9260336	9260851	9261366	9261880	9262395	9262910	515
844	9263424	9263939	9264453	9264968	9265482	9265997	9266511	9267025	9267539	9268053	515
845	9268567	9269081	9269595	9270109	9270622	9271136	9271650	9272163	9272677	9273190	514
846	9273704	9274217	9274730	9275243	9275757	9276270	9276783	9277296	9277808	9278321	513
847	9278834	9279347	9279859	9280372	9280885	9281397	9281909	9282422	9282934	9283446	512
848	9283959	9284471	9284983	9285495	9286007	9286518	9287030	9287542	9288054	9288565	511
849	9289077	9289588	9290100	9290611	9291123	9291634	9292145	9292656	9293167	9293678	511

LOGARITHMS.

TABLE of Logarithms.

N	0	1	2	3	4	5	6	7	8	9	Diff.
850	9294189	9294704	9295211	9295722	9296233	9296743	9297254	9297764	9298275	9298785	510
851	9294296	9294806	9300316	9300826	9301336	9301847	9302357	9302866	9303376	9303886	510
852	9304399	9304907	9305415	9305925	9306434	9306944	9307453	9307963	9308472	9308981	510
853	9309101	9309609	9310108	9310617	9311126	9311635	9312144	9312653	9313162	9313670	509
854	9314579	9315087	9315596	9316104	9316612	9317121	9317629	9318137	9318645	9319153	509
855	9316561	9320169	9320677	9321185	9321692	9322200	9322708	9323215	9323723	9324230	508
856	9324738	9325245	9325752	9326259	9326767	9327274	9327781	9328288	9328795	9329301	507
857	9329808	9330315	9330822	9331328	9331835	9332341	9332848	9333354	9333860	9334367	506
858	9334873	9335379	9335885	9336391	9336897	9337403	9337909	9338415	9338920	9339426	506
859	9339932	9340437	9340943	9341448	9341953	9342459	9342964	9343469	9343974	9344479	506
860	9344985	9345489	9345994	9346499	9347004	9347509	9348013	9348518	9349023	9349527	505
861	9350032	9350536	9351040	9351544	9352049	9352553	9353057	9353561	9354065	9354569	504
862	9355073	9355576	9356080	9356584	9357087	9357591	9358095	9358598	9359101	9359605	504
863	9360108	9360611	9361114	9361617	9362120	9362623	9363126	9363629	9364132	9364635	503
864	9365137	9365640	9366143	9366645	9367148	9367650	9368152	9368655	9369157	9369659	502
865	9370161	9370663	9371165	9371667	9372169	9372671	9373172	9373674	9374176	9374677	502
866	9375179	9375680	9376182	9376683	9377184	9377686	9378187	9378688	9379189	9379690	502
867	9380191	9380692	9381193	9381693	9382194	9382695	9383195	9383696	9384196	9384697	501
868	9385197	9385698	9386198	9386698	9387198	9387698	9388198	9388698	9389198	9389698	500
869	9390198	9390697	9391197	9391697	9392196	9392696	9393195	9393695	9394194	9394693	500
870	9395193	9395692	9396191	9396690	9397189	9397688	9398187	9398685	9399184	9399683	499
871	9400182	9400680	9401179	9401677	9402176	9402674	9403172	9403670	9404169	9404667	498
872	9405165	9405663	9406161	9406659	9407157	9407654	9408152	9408650	9409147	9409645	497
873	9410142	9410640	9411137	9411635	9412132	9412629	9413126	9413623	9414120	9414617	497
874	9415114	9415611	9416108	9416605	9417101	9417598	9418095	9418591	9419088	9419584	497
875	9420081	9420577	9421073	9421569	9422065	9422562	9423058	9423553	9424049	9424545	496
876	9425041	9425537	9426032	9426528	9427024	9427519	9428015	9428510	9429005	9429501	495
877	9429996	9430491	9430986	9431481	9431976	9432471	9432966	9433461	9433956	9434450	494
878	9434945	9435440	9435934	9436429	9436923	9437418	9437912	9438406	9438900	9439395	494
879	9439880	9440373	9440867	9441361	9441855	9442348	9442842	9443336	9443830	9444323	493
880	9444827	9445320	9445814	9446307	9446800	9447294	9447787	9448280	9448773	9449266	493
881	9449759	9450252	9450745	9451238	9451730	9452223	9452716	9453208	9453701	9454193	493
882	9454686	9455178	9455671	9456163	9456655	9457147	9457639	9458131	9458623	9459115	492
883	9459607	9460099	9460591	9461082	9461574	9462066	9462557	9463049	9463540	9464031	492
884	9464523	9465014	9465505	9465996	9466487	9466978	9467469	9467960	9468451	9468942	491
885	9469433	9469923	9470414	9470905	9471395	9471886	9472376	9472866	9473357	9473847	491
886	9474337	9474827	9475317	9475807	9476297	9476787	9477277	9477767	9478257	9478747	490
887	9479236	9479726	9480215	9480705	9481194	9481684	9482173	9482662	9483151	9483641	490
888	9484130	9484619	9485108	9485597	9486085	9486574	9487063	9487552	9488040	9488529	489
889	9489518	9489996	9490475	9490954	9491433	9491912	9492391	9492870	9493349	9493828	489
890	9493900	9494378	9494857	9495336	9495815	9496294	9496773	9497252	9497731	9498210	487
891	9498689	9499168	9499647	9500126	9500605	9501084	9501563	9502042	9502521	9503000	487
892	9503479	9503958	9504437	9504916	9505395	9505874	9506353	9506832	9507311	9507790	486
893	9508269	9508748	9509227	9509706	9510185	9510664	9511143	9511622	9512101	9512580	486
894	9513469	9513948	9514427	9514906	9515385	9515864	9516343	9516822	9517301	9517780	485
895	9518259	9518738	9519217	9519696	9520175	9520654	9521133	9521612	9522091	9522570	485
896	9523469	9523948	9524427	9524906	9525385	9525864	9526343	9526822	9527301	9527780	484
897	9528689	9529168	9529647	9530126	9530605	9531084	9531563	9532042	9532521	9533000	484
898	9533479	9533958	9534437	9534916	9535395	9535874	9536353	9536832	9537311	9537790	484
899	9538269	9538748	9539227	9539706	9540185	9540664	9541143	9541622	9542101	9542580	483

LOGARITHMS.

TABLE of Logarithms.

N	0	1	2	3	4	5	6	7	8	9	Diff.
900	9542425	9542908	9543390	9543873	9544355	9544837	9545319	9545802	9546284	9546766	482
901	9547248	9547730	9548212	9548694	9549176	9549657	9550139	9550621	9551102	9551584	482
902	9552065	9552547	9553028	9553510	9553991	9554472	9554953	9555434	9555916	9556397	481
903	9556878	9557358	9557839	9558320	9558801	9559282	9559762	9560243	9560723	9561204	480
904	9561684	9562165	9562645	9563125	9563606	9564086	9564566	9565046	9565526	9566006	480
905	9566486	9566966	9567445	9567925	9568405	9568885	9569364	9569844	9570323	9570803	479
906	9571282	9571761	9572241	9572720	9573199	9573678	9574157	9574636	9575115	9575594	479
907	9576073	9576552	9577030	9577509	9577988	9578466	9578945	9579423	9579902	9580380	479
908	9580858	9581337	9581815	9582293	9582771	9583249	9583727	9584205	9584683	9585161	478
909	9585639	9586117	9586594	9587072	9587549	9588027	9588505	9588982	9589459	9589937	478
910	9590414	9590891	9591368	9591845	9592322	9592800	9593276	9593753	9594230	9594707	476
911	9595184	9595660	9596137	9596614	9597090	9597567	9598043	9598520	9598996	9599472	475
912	9599948	9600425	9600901	9601377	9601853	9602329	9602805	9603281	9603756	9604232	475
913	9604708	9605183	9605659	9606135	9606610	9607086	9607561	9608036	9608512	9608987	475
914	9609462	9609937	9610412	9610887	9611362	9611837	9612312	9612787	9613262	9613736	475
915	9614211	9614686	9615160	9615635	9616109	9616583	9617058	9617532	9618006	9618481	475
916	9618955	9619429	9619903	9620377	9620851	9621325	9621799	9622272	9622746	9623220	474
917	9623693	9624167	9624640	9625114	9625587	9626061	9626534	9627007	9627481	9627954	473
918	9628427	9628900	9629373	9629846	9630319	9630792	9631264	9631737	9632210	9632683	472
919	9633155	9633628	9634100	9634573	9635045	9635517	9635990	9636462	9636934	9637406	472
920	9637878	9638350	9638822	9639294	9639766	9640238	9640710	9641181	9641653	9642125	472
921	9642596	9643068	9643539	9644011	9644482	9644953	9645425	9645896	9646367	9646838	472
922	9647309	9647780	9648251	9648722	9649193	9649664	9650135	9650605	9651076	9651546	471
923	9652017	9652488	9652958	9653428	9653899	9654369	9654839	9655309	9655780	9656250	470
924	9656720	9657190	9657660	9658130	9658599	9659069	9659539	9660009	9660478	9660948	470
925	9661417	9661887	9662356	9662826	9663295	9663764	9664233	9664703	9665172	9665641	469
926	9666110	9666579	9667048	9667517	9667985	9668454	9668923	9669392	9669860	9670329	469
927	9670797	9671266	9671734	9672203	9672671	9673139	9673607	9674076	9674544	9675012	468
928	9675480	9675948	9676416	9676884	9677351	9677819	9678287	9678754	9679222	9679690	468
929	9680157	9680625	9681092	9681559	9682027	9682494	9682961	9683428	9683895	9684362	467
930	9684829	9685296	9685763	9686230	9686697	9687164	9687630	9688097	9688564	9689030	466
931	9689497	9689963	9690430	9690896	9691362	9691829	9692295	9692761	9693227	9693693	466
932	9694159	9694625	9695091	9695557	9696023	9696488	9696954	9697420	9697885	9698351	466
933	9698816	9699282	9699747	9700213	9700678	9701143	9701608	9702074	9702539	9703004	465
934	9703469	9703934	9704399	9704863	9705328	9705793	9706258	9706722	9707187	9707652	465
935	9708116	9708581	9709045	9709509	9709974	9710438	9710902	9711366	9711830	9712294	464
936	9712758	9713222	9713686	9714150	9714614	9715078	9715542	9716005	9716469	9716932	464
937	9717396	9717859	9718323	9718786	9719249	9719713	9720176	9720639	9721102	9721565	463
938	9722028	9722491	9722954	9723417	9723880	9724343	9724805	9725268	9725731	9726193	462
939	9726656	9727118	9727581	9728043	9728506	9728968	9729430	9729892	9730354	9730816	462
940	9731279	9731741	9732202	9732664	9733126	9733588	9734050	9734511	9734973	9735435	462
941	9735896	9736358	9736819	9737281	9737742	9738203	9738664	9739126	9739587	9740048	461
942	9740509	9740970	9741431	9741892	9742353	9742814	9743274	9743735	9744196	9744656	460
943	9745117	9745577	9746038	9746498	9746959	9747419	9747879	9748340	9748800	9749260	460
944	9749720	9750180	9750640	9751100	9751560	9752020	9752479	9752939	9753399	9753858	459
945	9754318	9754778	9755237	9755697	9756156	9756615	9757075	9757534	9757993	9758452	459
946	9758911	9759370	9759829	9760288	9760747	9761206	9761665	9762124	9762582	9763041	459
947	9763500	9763958	9764417	9764875	9765334	9765792	9766251	9766709	9767167	9767625	459
948	9768083	9768541	9769000	9769458	9769915	9770373	9770831	9771289	9771747	9772204	458
949	9772662	9773120	9773577	9774035	9774492	9774950	9775407	9775864	9776322	9776779	457

LOGARITHMS.

TABLE of Logarithms.

N ^o	0	1	2	3	4	5	6	7	8	9	Diff.
950	9777236	9777693	9778150	9778607	9779064	9779521	9779978	9780435	9780892	9781348	457
951	9781805	9782262	9782718	9783175	9783631	9784088	9784544	9785001	9785457	9785913	457
952	9786369	9786826	9787282	9787738	9788194	9788650	9789106	9789562	9790017	9790473	456
953	9790929	9791385	9791840	9792296	9792751	9793207	9793662	9794118	9794573	9795028	456
954	9795484	9795939	9796394	9796849	9797304	9797759	9798214	9798669	9799124	9799579	455
955	9800034	9800488	9800943	9801398	9801852	9802307	9802761	9803216	9803670	9804125	455
956	9804579	9805033	9805487	9805942	9806396	9806850	9807304	9807758	9808212	9808666	454
957	9809119	9809573	9810027	9810481	9810934	9811388	9811841	9812295	9812748	9813202	454
958	9813655	9814108	9814562	9815015	9815468	9815921	9816374	9816827	9817280	9817733	453
959	9818186	9818639	9819092	9819544	9819997	9820450	9820902	9821355	9821807	9822260	453
960	9822712	9823165	9823617	9824069	9824522	9824974	9825426	9825878	9826330	9826782	452
961	9827234	9827686	9828138	9828589	9829041	9829493	9829945	9830396	9830848	9831299	452
962	9831751	9832202	9832654	9833105	9833556	9834007	9834459	9834910	9835361	9835812	451
963	9836263	9836714	9837165	9837616	9838066	9838517	9838968	9839419	9839869	9840320	451
964	9840770	9841221	9841671	9842122	9842572	9843023	9843473	9843923	9844373	9844823	450
965	9845273	9845723	9846173	9846623	9847073	9847523	9847973	9848422	9848872	9849322	450
966	9849771	9850221	9850670	9851120	9851569	9852019	9852468	9852917	9853366	9853816	450
967	9854265	9854714	9855163	9855612	9856061	9856510	9856959	9857407	9857856	9858305	449
968	9858754	9859202	9859651	9860099	9860548	9860996	9861445	9861893	9862341	9862790	448
969	9863238	9863686	9864134	9864582	9865030	9865478	9865926	9866374	9866822	9867270	448
970	9867717	9868165	9868613	9869060	9869508	9869955	9870403	9870850	9871298	9871745	447
971	9872192	9872640	9873087	9873534	9873981	9874428	9874875	9875322	9875769	9876216	447
972	9876663	9877109	9877556	9878003	9878450	9878896	9879343	9879789	9880236	9880682	446
973	9881128	9881575	9882021	9882467	9882913	9883360	9883806	9884252	9884698	9885144	446
974	9885590	9886035	9886481	9886927	9887373	9887818	9888264	9888710	9889155	9889601	445
975	9890046	9890492	9890937	9891382	9891828	9892273	9892718	9893163	9893608	9894053	445
976	9894498	9894943	9895388	9895833	9896278	9896723	9897167	9897612	9898057	9898501	444
977	9898946	9899390	9899835	9900279	9900723	9901168	9901612	9902056	9902500	9902944	443
978	9903389	9903833	9904277	9904721	9905164	9905608	9906052	9906496	9906940	9907383	443
979	9907827	9908271	9908714	9909158	9909601	9910044	9910488	9910931	9911374	9911818	443
980	9912261	9912704	9913147	9913590	9914033	9914476	9914919	9915362	9915805	9916247	443
981	9916690	9917133	9917575	9918018	9918461	9918903	9919345	9919788	9920230	9920673	442
982	9921115	9921557	9921999	9922441	9922884	9923326	9923768	9924210	9924651	9925093	442
983	9925535	9925977	9926419	9926860	9927302	9927744	9928185	9928627	9929068	9929510	442
984	9929951	9930392	9930834	9931275	9931716	9932157	9932598	9933039	9933480	9933921	441
985	9934362	9934803	9935244	9935685	9936126	9936566	9937007	9937448	9937888	9938329	440
986	9938769	9939210	9939650	9940090	9940531	9940971	9941411	9941851	9942291	9942731	440
987	9943172	9943612	9944051	9944491	9944931	9945371	9945811	9946251	9946690	9947130	440
988	9947560	9948009	9948448	9948888	9949327	9949767	9950206	9950645	9951085	9951524	440
989	9951963	9952402	9952841	9953280	9953719	9954158	9954597	9955036	9955474	9955913	439
990	9956352	9956791	9957229	9957668	9958106	9958545	9958983	9959422	9959860	9960298	439
991	9960737	9961175	9961613	9962051	9962489	9962927	9963365	9963803	9964241	9964679	438
992	9965117	9965554	9965992	9966430	9966868	9967305	9967743	9968180	9968618	9969055	437
993	9969492	9969930	9970367	9970804	9971242	9971679	9972116	9972553	9972990	9973427	437
994	9973864	9974301	9974738	9975174	9975611	9976048	9976485	9976921	9977358	9977794	437
995	9978231	9978667	9979104	9979540	9979976	9980413	9980849	9981285	9981721	9982157	437
996	9982593	9983029	9983465	9983901	9984337	9984773	9985209	9985645	9986080	9986516	436
997	9986952	9987387	9987823	9988258	9988694	9989129	9989564	9990000	9990435	9990870	435
998	9991305	9991741	9992176	9992611	9993046	9993481	9993916	9994350	9994785	9995220	435
999	9995655	9996090	9996524	9996959	9997393	9997828	9998262	9998697	9999131	9999566	435

LOGARITHMS.

Description and Use of the preceding Table.—In the above table are contained the logarithm of all numbers, from 1 to 10,000, which may be found by inspection, according to the method described below; but it will be proper, before we enter upon that subject, to make a few remarks with regard to the index, or characteristic, of logarithms, which are omitted throughout, and must therefore be supplied by the operator, according as the case may require. It has been shewn that the base, or radix of the system, is 10; and since

$$10^0 = 1, 10^1 = 10, 10^2 = 100, 10^3 = 1000, \&c.$$

therefore the log. of $1 = 0$, the log. of $10 = 1$, the log. of $100 = 2$, the log. of $1000 = 3$, &c ; and, consequently, the logarithm of any number between 1 and 10 has its logarithm greater than 0, and less than 1; a number between 10 and 100 has its logarithm greater than 1, and less than 2; between 100 and 1000 the logarithm is greater than 2, and less than 3, and so on; therefore, the integral part of the logarithm, or its index, is always one less than the number of its integral places. Again, since

$$\frac{1}{10} = 10^{-1}, \quad \frac{1}{100} = 10^{-2}, \quad \frac{1}{1000} = 10^{-3},$$

it follows, that the logarithm of $.1 = -1$, of $.01 = -2$, of $.001 = -3$, &c.; consequently, the logarithm of a number between 1 and $.1$ has its index properly 0, and its decimal part negative; but for the greater convenience, and this is one great advantage attending Briggs's logarithms, we may assume the index negative, and the decimal part positive; that is, instead of subtracting the decimal part from unity, and making the result negative, we retain the decimal as it arises, and make the index negative: whence, the logarithm of a decimal greater than $.1$, has its index $= -1$; if it be less than $.1$, but greater than $.01$, the index is -2 ; if it be less than $.01$, but greater than $.001$, the index is -3 ; and so on: whence it follows, that the index of the logarithm of any decimal is negative, and always one more than the number of ciphers which precede the first effective figure. Or both rules, *viz.* for integers and decimals, may be reduced to one, which is as follows. The index of the logarithm of any number is always equal to the number of places that the decimal point is distant from the unit's place, being positive if the decimal point be to the right of the unit's place, and negative if it be to the left of it. What has been said will be illustrated by the following examples:

Numbers.	Logarithms.
34560	4.5385737
3456 0	3.5385737
345 60	2.5385737
34.560	1.5385737
3.4560	0.5385737
.34560	— 1.5385737
.034560	— 2.5385737
.0034560	— 3.5385737
.00034560	— 4.5385737

These examples will illustrate all that has been said with regard to the index, and at the same time will shew the great advantage of the present system of logarithms; for here the tabular part of the logarithm is the same throughout, whereas with any other radix, each of the numbers would have required a different logarithm; and, consequently, much more extensive tables than any of those now in common use would be necessary under those circumstances.

To find the logarithm of any number by the table.—If the number consists of less than three figures, annex a cipher to it, or two if necessary, considering it as a decimal, and look

for the number thus increased in one of the first columns of the table, marked N, and the number in the adjacent column is the decimal part of the logarithm, to which prefix the proper index according to the above rule.

If the number consists of three figures, it may be found immediately in one of the first columns, and its logarithm in the adjacent column, to which prefix the proper index as above.

If the number consists of four figures, look for the first three in the column marked N, and seek the fourth figure in the line at the head of the page; and trace it down to the line in which the three first figures are found, and the meeting of the two lines will give the logarithm required; to which prefix the proper index. Thus,

The log. 34 = log. 34.0 = 1.5314789
 The log. 6 = log. 6.00 = 0.7781513
 log. 456 = 2.6589648
 log. 4569 = 3.6590506
 log. 45.69 = 1.6590506.

If the number consists of more than four places, find the logarithm answering to the first four as above, and for the rest multiply the number standing in the corresponding column of difference, by the remaining figures of the proposed number, and cut off from the right hand of the product as many figures as the multiplier consists of, and add the other part of it to the right-hand figures of the logarithm before found; then prefix to that sum the proper index, according to the rule above given. Thus, to find the logarithm of 34.6782;

$$\begin{array}{r} \log. \quad 34.67 = 1.5391604 \\ \qquad\qquad\qquad 102 \\ \hline \log. \quad 34.6782 = 1.5391706 \\ \hline \end{array} \qquad \begin{array}{r} \text{Diff.} = 125 \\ \qquad\qquad 82 \\ \hline \qquad\qquad 250 \\ \qquad\qquad 1000 \\ \hline \qquad\qquad 102(50) \end{array}$$

and in the same manner the logarithm of any number whatever may be found.

To find the number answering to any given logarithm by the table.—Seek for the decimal part of the logarithm in one of the columns of the table, and if it be found there *exactly*, the corresponding number is that required, the first three figures of which will be found in the column marked N, and the fourth in the head line of the table. Then point off the proper number of integers or decimals by the converse of the rule given in the preceding article, *viz.* the unit's place must stand so many places to the right or left of the first figure, as is denoted by the index; to the right if that index be positive, and to the left if negative.

Thus, the natural number answering to the logarithms

2.5434472 is 349.5
 -2.5434472 is 0.03495

when 9 in the first, and 0. in the second, are made the places of units agreeably to the rule. But if the logarithm be not found exactly in the table, then seek the next greater and the next less, as also the difference between the less and the given logarithm, and between the less and the greater; which will be found in the corresponding column of difference; divide the former difference by the latter, and annex the quotient to the right-hand of the four figures before taken out, which will be the number required. remembering to point off the decimals according to the rule.—Note, The above quotient cannot be depended upon for more than two places

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Find the number corresponding to the logarithm

$$2.5430987.$$

$$\text{Next greater log. } 2.5431086 \quad \text{Given log. } 2.5430987$$

$$\text{Next less log. } 2.5430742 \quad \text{Next less } 2.5430742$$

$$\text{Tabular differ. } 1244 \quad \text{Differ. } 245$$

$$1244)245.00(19$$

$$1244$$

$$12060$$

$$11196$$

$$864$$

Therefore 349.219 is the number sought, the first four figures being the number answering to the least logarithm.

To perform arithmetical operation by logarithms.

Multiplication by logarithms.—Take out the logarithms of the factors from the table, and their sum will be the logarithm of the product sought; then, by means of the table, find the natural number answering to that logarithm, which will be the product required. Observing to add what is carried from the decimal part of the logarithm to the affirmative index, or indices, or subtract it from the negative. Also adding the indices together if they are of the same kind; *viz.* all positive, or all negative, but to subtract them if they be of different kinds, prefixing the sign of the greater to the remainder. Thus,

$$\text{Multiply together } .7684, 68.42, \text{ and } .34876$$

$$\text{log. of } .7684 = -1.8855874$$

$$\text{log. of } 68.42 = 1.8351831$$

$$\text{log. of } .34876 = -1.5425267$$

$$\text{Product } 18.3357 = 1.2632972$$

Division by logarithms.—Here the logarithms are to be taken out as above, and then the logarithm of the divisor must be subtracted from that of the dividend, and the remainder will be the logarithm of the quotient sought, observing to change the sign of the index of the divisor from affirmative to negative, or from negative to affirmative; then take the sum of the indices, if they be of the same kind, or subtract them if they be of different kinds, prefixing the sign of the greater for the index. Also, if *r* is borrowed in the left-hand place of the decimal part of the logarithm, add it to the index of the divisor when that index is affirmative, but subtract it when negative; then let the sign be changed, and worked with as before. Thus, for example,

$$\text{Divide } 37.149 \text{ by } 523.67$$

$$\text{log. } 37.149 = 1.5699471$$

$$\text{log. } 523.67 = 2.7190577$$

$$\text{Quotient } .0709397 = -2.8508894$$

Evolution, or raising of powers by logarithms.—Multiply the logarithm of the given number by the index of the power to which it is to be raised; and the product will be the logarithm of the power required. But in multiplying a logarithm with a negative index, the product will be negative, but what is carried from the decimal part will be positive, and must, therefore, in that case, be subtracted from that product.

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Hence, to find the cube of .327146

$$\text{log. of } .327146 = -1.4873479$$

$$3$$

$$\text{Power } .0289758 \quad -2.4620347$$

Evolution, or the extraction of roots by log. with ns.—Divide the logarithm of the given number by the index of the power, the root of which is to be extracted, and the quotient will be the logarithm of the root required; observing, that if the index of the logarithm be negative, as many units must be borrowed as will make it exactly divisible, and so many units must then be carried to the decimal part of the logarithm, and the division carried on as usual.

Required the cube root of .12345

$$\text{log. } 12345 \quad 3) -1.0914911$$

$$\text{Root } .497925 \quad -1.6971637$$

These are the most simple cases in which logarithms are introduced into arithmetical operations; the application of them to more complex cases, as in Trigonometry, Mensuration, &c. will be explained under the respective heads.

LOGARITHM, *Imaginary*, is used for the logarithm of negative and imaginary quantities, such as $-a$, $\sqrt{-a}$, &c. Thus, also, the fluents of certain imaginary fluxionary expressions, such as $\frac{x}{x\sqrt{-1}}$, $\frac{a\sqrt{-1}}{2bx\sqrt{-1}}$, &c. are imaginary logarithms. Euler Anal. Infin. vol. i. p. 72. 74.

The expression $\frac{x}{x}$ represents the fluxion of the logarithm of x , and the fluent, therefore, of $\frac{x}{x}$ is the logarithm of x ;

but no logarithm can represent the fluent of $\frac{x}{x\sqrt{-1}}$, which is therefore called an imaginary logarithm.

However, when these imaginary logarithms occur in the solutions of problems, they may be transformed into circular arcs or sectors; that is, the imaginary logarithm, or imaginary hyperbolic sector becomes a real circular sector. See Bernoulli, Oper. tom. i. p. 400. and p. 512. MacLaurin's Fluxions, art. 702, seq. Walmsley, Anal. des Mes. p. 63.

LOGE, in *Geography*, a town of Germany, in the county of Hoya; 20 miles S.W. of Nienburg.

LOGGERHEAD KEY, or *El Cento*, a small island in the bay of Honduras, near the coast of Yucatan. N. lat. 21° 25'. W. long. 87° 45'.

LOGGERHEAD, in the *Sea Language*, denotes a large round ball of iron, with a long handle for heating pitch.

LOG-HOUSES, houses in America, which are generally the first that are erected on any new settlement, and which are cheaper than any others in a country where wood abounds. The sides consist of trees just squared, and placed horizontally one upon the other; the ends of the logs of one side resting alternately on the ends of those of the adjoining sides, in notches; the interstices between the logs are stopped with clay; and the roof is covered with boards or shingles, which are small pieces of wood in the shape of slates or tiles, &c. which are used for that purpose, with few exceptions, throughout America. These habitations are not very tightly, but when well built they are warm and comfortable, and last for a long time. Some of them are built with brick.

or stone, or else constructed with wooden frames, sheathed on the outside with boards.

LOGIC, the art of thinking justly; or of making a right use of our rational faculties, in defining, dividing, and reasoning: or, as it is defined by an excellent writer on this subject, logic is the art of using reason well in our enquiries after truth, and the communication of it to others. Watts.

The word is Greek, λογικόν, derived from λογος, *sermo, discourse*; in regard thinking is only an inward, mental discourse, wherein the mind converses with itself.

Logic is also sometimes called *dialectica*; and sometimes the *canonical art*, as being a canon, or rule for directing us in our reasonings.

As, in order to think aright, it is necessary that we apprehend, judge, discourse, and dispose, or methodize, rightly: hence perception or apprehension, judgment, discourse or reasoning, and disposition, whence results method, become the four fundamental articles of this art; and it is from our reflections on those operations of the mind that logic is, or ought to be, wholly drawn.

Lord Bacon divides logic into four branches, according to the ends proposed in each: for a man reasons, either to find what he seeks, or to judge of what he finds, or to retain what he judges, or to teach what he retains; whence arise so many arts of reasoning; *viz.* the art of *inquisition*, or invention; the art of *examining*, or judgment; the art of *preserving*, or of memory; and the art of *elocution*, or delivery.

Logic, having being extremely abused, is now in some disrepute. The schools have so clogged it with barbarous terms and phrases, and have run it out so much into dry useless subtleties, that it seems rather intended to exercise the mind in wrangling and disputation than to assist it in thinking justly. It is true, in its original, it was rather intended as the art of cavilling than of reasoning; the Greeks, among whom it had its rise, being a people who piqued themselves mightily upon their being able to talk *extempore*; and to argue, by turns, on either side of the question.—Hence their dialectic, to be always furnished with arms for such rencontres, invented a set of words and terms, rather than rules and reasons, fitted for the use of contention and dispute.

Logic, then, was only an art of words, which frequently had no meaning, but served well enough to hide ignorance instead of improving knowledge; to baffle reason instead of assisting it: and to confound the truth instead of clearing it. Much of that heap of words, and rules, which we have borrowed from the old logic, is of little use in life; and is so far out of the common usage, that the mind does not attend to them without trouble: and finding nothing in them to reward its attention, it soon discharges itself, and loses all ideas it had conceived of them.

But logic, disengaged from the jargon of the schools, and reduced into a clear and intelligible method, is the art of conducting the understanding in the knowledge of things, and the discovery of truth.

From its proper use we gain several very considerable advantages: for, 1. The consideration of rules incites the mind to a closer attention and application in thinking: so that we hereby become assured, that we make the best use of our faculties. 2. We hereby more easily and accurately discover and find out the errors and defects in our reasoning; for the common light of reason, unassisted by logic, frequently observes an argumentation to be faulty, without being able to determine wherein the precise failure consists. 3. By these reflections on the order and manner of the op-

erations of the mind, we are brought to a more just and complete knowledge of the nature of our own understanding. See SOUL and UNDERSTANDING.

LOGICAL CONCRETE. See CONCRETE.

LOGICAL Part. See PART:

LOGINOV, in *Geography*, a town of Russia, in the government of Tobolsk, on the Irtysh; 16 miles S.E. of Tara.

LOGISTA, the title of an officer at Athens, whose business was to receive and pass the accounts of magistrates when they came out of their office.

The logistæ were in number ten; they were elected by lot, and had ten euthym, or auditors of accounts, under them.

LOGISTIC, or LOGARITHMIC Line, a curve so called, from its properties and uses, in constructing and explaining the nature of logarithms.

If the right line A X (*Plate XI. Analysis, fig. 4.*) be divided into any number of equal parts, and to the points of those divisions, A, P, p, &c. be drawn lines continually proportional, the points N, M, m, &c. form the logistic or logarithmic line or curve.

Here the abscissas A P, A p, &c. are the logarithms of the semiordinates P M, p m, &c.

Hence, if A P = x, A p = v, P M = y, p m = z, and the logarithms of y and z = l y and l z; x will be = l y, and v = l z; consequently x : v = l y : l z; that is, the denominators of the ratios A N : P M, and A N : p m, are to one another as the abscissas A P and A p.

Hence it follows, that there may be infinite other logistic lines invented: provided x m : v m :: l y : l z, that any of the roots, or powers, may be the logarithms of the semiordinates. The logistic will never concur with the axis, except at an infinite distance; so that A X is its asymptote. See LOGARITHMIC Curve.

LOGISTIC, *Quadrature of the.* See QUADRATURE.

LOGISTIC, or Logarithmic spiral, a line whose construction is as follows: Divide the quadrant of a circle into any number of equal parts, in the points N, n, n, &c. (*Plate XI. Analysis, fig. 5.*) and from the radii C N, C n, C n, &c. cut off C M, C m, C m, &c. continually proportional, the points M, m, m, &c. form the logistic spiral.

The arcs, therefore, A N, A n, &c. are the logarithms of the ordinates C M, C m, &c. whence also it follows, that there may be infinite logistic spirals. See SPIRAL.

LOGISTICA, or LOGISTICAL Arithmetic, a denomination sometimes given to the arithmetic of sexagesimal fractions, used by astronomers in their calculations.

It was so called from a Greek Treatise of one Barlaamus Monachus, who wrote about sexagesimal multiplication very accurately; and intitled his book *Αριθμητική*. This author Vossius places about the year 1350, but he mistakes the work for a treatise of Algebra.

Shakerly, in his *Tabule Britannicæ*, has a table of logarithms adapted to the sexagesimal fractions; which, therefore, he calls logistical logarithms; and the expeditious arithmetic of them, which is by this means obtained, and by which all the trouble of multiplication and division is saved, he calls logistical arithmetic.

LOGOGRAPHI, Λογιστογράφοι, among the *Ancients*, were the secretaries of the logistæ, and kept an account of the public revenues.

LOGOGRAPHY, derived from λογος, *word*, and γραφή, *I write*, a new mode of printing, in which the types correspond to whole words, and not, according to the usual method, to single letters. For this mode of printing a patent was obtained some years ago, and in the year 1783

the origin and utility of the art were stated in a treatise written by Henry Johnson. From the year 1778 he made several successful attempts for the practice of this art. The author has undertaken to demonstrate several advantages belonging to this method of printing; *viz.* 1. That the compositor shall have less charged upon his memory than in the common way. 2. That it is much less liable to error. 3. That the type of each word is as easily laid hold of as that of a single letter. 4. That the decomposition is much more readily performed, even by novices, than that of mere letters. 5. That no extraordinary expence nor greater number of types is required in the logographic than in the common method of printing. For other particulars, we must refer to the author's own account of the invention. See STEREOGRAPHY.

LOGOGRIPIHUS, from the Greek *λογος*, *discourse*, and *γρίπος*, or *γρίπος*, *net*, a kind of symbol, or riddle, proposed to students for their solution, in order to exercise and improve the mind.

The logogriphus usually consists in some equivocal allusion, or mutilation of words; which, literally taken, signify something different from the thing intended by it; so that it is a kind of medium between a rebus and proper enigma.

According to Kircher, logogriphi are a kind of canting arms: thus a person called Leonard, who bore in his arms a lion and nard, or spokenard, according to that father, made a logogriphus. *Ædip. Egypt.*

In another place, the same author defines logogriphus to be an enigma; which, under one name or word, will bear various meanings, by adding or retrenching some part of it. This kind of enigmas is well known to the Arabs; among whom are authors who treat expressly of it.

LOGONE, in *Geography*, a town of Hindooistan, in Viliapour; 10 miles N. of Poonah.

LOGONI, a town of Sardinia; nine miles E. of Cagliari.

LOGORAS, a town of Syria; 15 miles N. of Antioch.

LOGOS, *λογος*, Gr. *לוגה*, Chald. (*memra*), or *word*, Eng. in *Philosophy* and *Theology*, a term very differently understood and applied by both ancient and modern writers. Those who believe that the logos was the personification of the divine intellect, or of the divine attributes of wisdom, power, &c. trace this doctrine to the ancient Platonists, from whom, as they conceive, it was adopted by the Christian fathers. It must be acknowledged, however, that Plato expresses himself with a considerable degree of obscurity on this subject. Whilst he ascribes the origin of the universe to the Supreme God, whom he denominates *αγαθος*, or the good, without the instrumentality of any subordinate being whatever, and who is represented as having formed it according to a pattern previously formed in his own mind; he sometimes leads us to conceive that he regarded this pattern or idea of the divine mind as a *second principle* of things, and the world itself, which was produced from those ideas, as a *third principle*. But it does not satisfactorily appear that he made the divine mind, *i. e.* *νοος* (*nous*) or *λογος* (*logos*) a distinct intelligent being. His Demiurgus, or immediate maker of the world, seems to have been the Supreme Being himself, and not any subordinate agent or principle whatever. The reason, or logos, which, according to him, comes from God, and by which he made the universe, seems, in his view of it, to have been synonymous with *διάνους* and *επιστημης*, of his understanding, and not any other proper person or agent. In the writings of Plato, logos has only two acceptations, *viz.* those of *speech*, and of *reason*, such as is found in man. But when this philosopher

speaks of *νοος*, or *λογος*, as something distinct from the Divine Being himself, as a power or property belonging to him, and all divine power and properties being *substance*, it would be very natural and easy to transform this divine power into a substantial person; and this we shall find to have been the case with respect to the later Platonists, agreeably to one of the Platonic maxims, *viz.* that *being* and *energy* are the same thing. Philo, a learned Jew of Alexandria, and contemporary with the apostles, approached more nearly to a real personification of the logos than Plato himself, or his immediate followers. Although he did not proceed so far as some of the Platonizing Christians, and make a permanent intelligent person of the divine logos, he made of it an occasional one, representing it as the visible medium of all the communications of God to man, and of the instrument by which he both made the world and maintained an intercourse with the patriarchs of the Old Testament. Philo dignifies this logos with the appellation of God; but in order to distinguish him from the Supreme God, he says, that the latter is known by the term God with the article prefixed to it, *the God*; whereas the logos, like other inferior gods, is only called *God*, without the article. Whilst he ascribes proper creation to God the father only, he attributes the *forming* of created matter to the logos. The Jews did not, in general, use the term logos, or *לוגה* (*memra*) which corresponds to it in the Platonic sense, but as synonymous to God, or the mere token, or symbol, of the divine presence. Instances occur in various passages of the Old Testament, and a similar phraseology may be found in the "Wisdom of Solomon," which some have ascribed to Philo. The Christian Platonists, deriving their notions from the school of Alexandria, and the resemblance discernible in some of the doctrines of Plato to those of the sacred scriptures, could not help thinking, that he had actually borrowed them from the writings of Moses, with which, as they thought, he might have been acquainted during his residence in Egypt, or on his travels in the East. This opinion is frequently expressed and inculcated by Justin Martyr, and others of the fathers. A modern writer (see Priestley's *Early Opinions*) affirms, that Justin was the first, or one of the first, who advanced the doctrine of the permanent personality of the logos; of whom he says, "Jesus Christ is the only proper son of God, being his logos, first born and powerful." Many of the Christian fathers, however, maintained that the logos was an *attribute* of the Father, and that this attribute became the person of the Son, and was afterwards united to Jesus Christ. But we should enlarge this article far beyond its proper limits, if we cited more authorities in relation to this subject. We must therefore content ourselves with presenting to our readers a brief account of the sentiments of modern divines with regard to the logos. It has been very generally allowed that this name belongs, in a peculiar and appropriate sense, to Jesus Christ; of whose nature and rank of being different notions have been entertained. (See ARIANS, SABELLIANS, SOCINIANS, TRINITARIANS, and UNITARIANS. See also PRE-EXISTENCE of Christ and TRINITY.) We shall here subjoin a brief abstract of these opinions from some of the principal writers on this subject. The Pseudo-Athanasians, as they are denominated by the author of "The Apology of Ben Merdecas &c." seem to maintain, that the logos, or word of God, and that God, with whom he was in the beginning, and whose son he is, and the Holy Spirit, who proceeds from them both, are each of them, *singly*, the one Supreme God; and yet the three all *together* are the same Supreme God. To this purpose Dr. Clarke, in his "Scripture Doctrine of the Trinity," mentions the interpretation which some have

given of the phrase, "the word was God" (John i. 1.) The *logos*, or *word*, is conceived by such persons to be another self-existent, underived, independent person, co-ordinate in essential supreme authority and dominion with the Father Almighty: and this, says Dr. Clarke, whatever metaphysical union may be imagined of two such co-ordinate persons, will always and necessarily, in the religious and moral sense, be real polytheism; subverting that first and great foundation of all religion, both natural and revealed, the monarchical unity of the great King and God of the universe; and directly contrary to that first and great commandment in both Testaments (Deut. vi. 4. and Mark xii. 29.) "Hear, O Israel, the Lord our God is one Lord, &c."

Another opinion with respect to the *logos*, is that which supposes the appellation to designate a pre-existent spirit, of inconceivably exalted rank, and possessing supereminent power and perfection, which derives being from an immediate act of the power and will of God, in contradistinction to existence by mere necessity of nature, and called only begotten because it is thus derived from the Father in a singular and inconceivable manner, and so as to be thus distinguished from all other beings. This pre-existent spirit, or *logos*, according to the doctrine of Apollinarius about the year 370, and the Arians, descended from heaven, and supplied the place of a soul in Christ. To this purpose Mr. Whitton says, "the scripture, and earliest antiquity, never affirm, that Christ took a human rational soul; they never say, he took a whole human nature: they never say, that he was in that sense a true and perfect man; but that he was made flesh; had a body prepared for him; was the Word, or a God incarnate; was made in the likeness of man; was found in fashion as a man, while he was God the word. Nay, Ignatius directly affirms, that it was the Word, and not a human soul, which inhabited in that body; and almost all the ancients agree in the same doctrine; even Athanasius himself, before the council of Nice." It is said by Ben Mordecai, that notwithstanding the pains that were taken to discourage this opinion, it appeared again, in different shapes, in the Christian church in the doctrine of the Monothelites; who held, that Christ had only one will, which, without doubt, is sufficient for one person. Agreeably to this same use of the appellation *logos*, Dr. Clarke interprets the several passages that pertain to it in the 1st chapter of the gospel of St. John. In this sense "the word was with God;" not *ἐν τῷ θεῷ*, in God, as reason or understanding is *in* the mind, but *πρὸς τὸν θεόν*, with God, as one person is present with another; and "the word was God;" not *θεὸς ὢν*, is God, but *θεὸς πρὸς*, was God, or that visible person, who under the Old Testament appeared from the beginning *ἐν μορφῇ θεοῦ*, the visible image of the invisible God, in whom the name of God was, the angel of the Lord, &c. Phil. ii. 6. Col. i. 15. Exod. xxiii. 21. Zech. xii. 8. &c. &c. If this be the right interpretation of the text, then the words, *ἐν ἀρχῇ πρὸς τὸν θεόν*, in the beginning was the word, and *ὁ λόγος σὰς ἐγένετο*, the word was made flesh, mean, that the same person who in the fulness of the time was made man and dwelt with us, did before dwell with God, and acted in the capacity of a divine person, as the visible image of the invisible God, by whom God made all things, and by whom all things were from the beginning transacted between God and the creature; and as he is styled (1 Cor. i. 24.) the Power of God, and the Wisdom of God, upon account of the wisdom and power of God being manifested in and by him; so here he is styled (*ὁ λόγος*) the Word, because he does *ὡς λόγος*: he does, as Revealer, Lawgiver, and Judge, declare the will, the laws, the sentence of his Father. These who adopt this opinion also maintain,

that Christ was the person, by whom God created and governs the world, and that in and by him the Deity appeared to men under the Old Testament by the name of Jehovah, the Angel of the covenant, and similar appellations. The apostle tells us (Heb. i. 2. xi. 3.) that it was by Christ God made the world, *ἀρχαί*, the ages or dispensations; i. e. by whom, says Ben Mordecai, God formerly disposed and ordered those eminent and remarkable periods of time: the Antediluvian, the Patriarchal, the Mosaic, and the Present, being put under his government, according to the will of the Father. Now the ages or dispensations before Christ, we know from our own scriptures, were ordered by the angel Jehovah; and if he were not the Christ, the Old and New Testament contradict one another; by ascribing the same government to two different beings. St. Paul therefore could mean no other person by Christ, than the same *logos* or word of God; whom Philo, and all of that age, understood to be the angel of the covenant, or the angel Jehovah. The same truth is confirmed by many other references in the gospels and epistles; in which the sense is defective, upon any other principle.

There is another opinion concerning the *logos*, which has had many advocates among modern divines, and especially among those who are denominated Unitarians. Persons of this description understand by the *logos*, either not a real person, or God himself. Accordingly some of them interpret the passage above cited in the following manner: "In the beginning was Reason, and Reason was with God, and Reason was God." But the sense of these propositions amounts to nothing more, as Dr. Clarke has stated it, than that God always was a rational being; or if we understand by *logos*, the wisdom, or power, or any of the attributes of God, the conclusion will be much the same. This, we must allow, is in itself a certain truth; and, as to the manner of the expression, it might perhaps in some sense, by a figurative way of speaking, be affirmed, that the reason of God, or any one of his attributes, is God; yet this is nothing to the purpose of (what St. John is here treating of) the incarnation of Christ. For the reason of God is no otherwise God, than the reason of a man is the man himself. According to this interpretation, therefore, all those declarations of scripture, in which it is affirmed that "the word was made flesh and dwelt among us (John i. 14.), that Christ "came forth from the Father (John xvi. 28.), that "he came down from heaven (John iii. 13.), that "he came down from heaven, not to do his own will, but the will of him that sent him (John vi. 38.), that he "took part of flesh and blood (Heb. ii. 14.), that, having been "in the form of God," he did (*κεῖται ἑαυτοῦ*) empty himself of that form, "and was made in the likeness of man," and "found in fashion as a man," (Phil. ii. 6, 7, 8.):—All these expressions (according to this last interpretation of the words, *θεὸς πρὸς ὁ λόγος*), will in reality mean nothing more than that "the wisdom of the Father dwelt in the "Man Christ Jesus;" that is, that Christ was only in a more perfect and continued manner than other prophets, "an inspired man." Nothing, says Dr. Clarke, can be more forced and unnatural than this interpretation. It is reducing the whole doctrine of the humiliation and incarnation of the son of God to a mere figure of speech; and under the appearance of speaking of Christ as the Supreme God, making him really nothing but a mere man. This, however, would serve the purpose of those who are advocates for the simple humanity of Christ.

Dr. Lardner, in his "Letter on the Logos, written in the year 1730," professes, that he was once favourable to the supposition, that the *logos* was the soul of our Saviour; but being at a loss to conceive how that high being, the first and only

only immediately derived being by whom God made the world, should gain any exaltation by receiving after his resurrection and ascension, a bright resplendent human body, and being made the king and lord of all good men in this world, and the judge of mankind, and being made higher than the angels, to whom he was vastly superior before, abandoned this hypothesis, as throughout inconceivable, and irreconcilable to reason. Having stated some difficulties, which have been since repeatedly urged by Unitarians, and which those who are advocates for the pre-existent dignity of Christ are far from thinking to be incapable of a satisfactory solution, and having given interpretations of the passages that seem to intimate and to express the doctrine of our Saviour's pre-existence, he proceeds to explain the introduction to St. John's gospel. "In the beginning was the Word." By beginning he understands not the beginning of the gospel, as others of similar sentiments have understood it, but of the creation, or rather always from eternity. "was the Word." "And the word was with God;" that is, was always with God, though not fully manifested, till these last days of the world. "And the word was God;" sometimes rendered, though not correctly, "And God was the word." Notwithstanding the seeming tautology, he is of opinion, that God here is the same God that was mentioned before; and that St. John intends the one true God, not any inferior deity.

These passages still remain unsatisfactorily interpreted, whatever be the hypothesis concerning the *Logos* that is admitted; but this is not the place to pursue more at large the discussion of this point. Our theological readers will be led by this article to seek further information from those commentators and critics, who have expressly written on this subject.

LOGOTHETA, an officer under the emperors of the East, who kept an account of the various branches of public and private expence.

There were several kinds of them distinguished by the particular branch they superintended, as the *logotheta taxonomus*, or *post-master general*; *logotheta taxonomus*, or *master of the household*, &c.

LOGRONO, in *Geography*, a town of Spain, in Old Castile, on the Ebro; containing a court ofquisition, five parishes, eight convents, and about 5000 inhabitants. The environs produce fruit, legume, flax, hemp, excellent wine, oil, and silk: 20 miles N.W. of Calahorra. N. lat. 42° 23'. W. long. 3° 24'. Also, a town of South America, in the province of Quito; 40 miles E.S.E. of Cuenca.

LOGSTOR, or **LIXTOER**, a town of Denmark, in North Jutland, on Lynford gulf; 21 miles W. of Aalborg. N. lat. 57°. E. long. 9° 15'.

LOGSTOWN, a town of America, on the W. side of the Ohio; 18 miles from Pittsburg.

LOGUR, a town of Hindoostan; 20 miles W.N.W. of Poona.

LOGWOOD, in *Botany*, the wood of a tree; for the botanical characters of which, see *HEMATOXYLUM*. The wood of this tree is brought in logs of about three feet in length, to Europe, where it is used for dyeing purples, and for the finest blacks; and therefore it is a very valuable commodity.

The use of logwood in dyeing was established in this country by 13 & 14 Car. II. cap. 11. before which time it was prohibited as a pernicious material. A considerable part of the whole portion of the wood is taken up both by water and alcohol, but much more by the latter, and these menstrua become tinged by it of a deep purple-red or brown. To acids be added to the watery decoction, it is

turned yellow, but alkalies give a very deep purple colour, without yielding any precipitate. Alum, added to the decoction of logwood, causes a violet precipitate or lake, and the supernatant liquor also remains violet, and gives a fresh portion of lake on the effusion of an alkali. The salts of iron give an inky black with all the solutions of logwood, under the same circumstances as with galls, whence the presence of gallic acid in logwood is proved. The solutions of tin form a very fine violet-coloured lake with the decoction of logwood, and wholly precipitate the colouring matter, so that the supernatant liquor is quite clear and colourless. In dyeing, logwood gives its own natural purple, with shades or variations according to the mordant used, or it heightens and improves the common black with iron and galls. In this latter way it gives a peculiar gloss and lustre, on which account it is a very valuable dyeing material.

Logwood is used in miniature painting to make a purple wash; which may be varied to a more red or blue colour by the addition or omission of Brazil wood. The wash may be prepared by boiling an ounce of ground logwood in a pint of water, till one-half of the fluid be wasted: strain it then through flannel, while of a boiling heat; and add to it, when strained, about ten grains of pearl-ashes. To make it more red, add half an ounce of Brazil wood, or in proportion as the colour wanted may require; using in this case the pearl-ashes very sparingly. This wood has a sweetish subastringent taste, but a remarkable smell. It gives a purplish-red tincture to watery and spirituous infusions, and tinges the stools, and sometimes the urine, of the same colour; but it does not appear to colour the bones of animals.

Besides its use among dyers, it is employed medicinally as an astringent and corroborant. In diarrhoeas it has been found peculiarly efficacious; also in the latter stages of dysentery, when the obstructing causes are removed, it serves to obviate that extreme laxity of the intestines usually superinduced by repeated dejections. *Extractum ligni campechensis* is ordered in the pharmacopoeias, and may be given in the dose of one scruple or two, repeated according to the urgency of the symptoms. The extract is obtained by inspissating the decoctions. To promote the extraction, the wood should be reduced into a fine powder, which is to be boiled in the water, in the proportion of a pound to a gallon, till half the liquor is wasted. Some digest the powdered wood in as much spirit as will cover it to the height of about four inches, and afterwards boil it in water; the matters taken up by the watery and spirituous menstrua may be united into one extract, by inspissating the watery decoction to the consistence of honey, and then gradually stirring in the spirituous tincture.

Logwood Country, in *Geography*, a district of America, that lies N.W. of the Mosquito shore, at the head of the bay of Honduras, and extends from Vera Paz to Yucatan, from 15 to 18° N. lat. The whole end is overpread with islets, keys, and shoals, and the navigation is intricate.

Logwood Lager, a bay or gulf on the N.E. coast of Yucatan. N. lat. 20° 57'. W. long. 88° 21'.

Logwood Mill, in the *Manufactures*, is a machine for reducing logwood, or other dyeing woods, to small chips or raspings, that the colouring matter may be more readily extracted from them by the dyer. These machines are of two kinds: one, by means of knives fixed to a large wheel, which rips the wood across the grain into small fragments, which are afterwards reduced to a fine powder, by grinding them beneath a pair of rolling stones: this is called a *clipping engine*. The other kind operates by a steel bar, with a great number of notches in the edge, which rips and cuts the end of the wood into powder: this is called the *rasping engine*. Both machines require

require an immense power to actuate them, and are generally worked by water-wheels or by steam-engines. A plan and elevation of a rasping engine is given in *Plate XXXI. Mechanics*, *figs. 1 and 2*, where *A* is an iron cog-wheel, turned round by the large cog-wheel of a water-mill or steam-engine; its axis has an iron cylinder *B* fixed upon it, and this has a number of steel bars or knives *a* fixed in its circumference. The pieces of wood to be rasped are placed in a strong wooden trough, *DD*, in which an iron bar, *E*, slides, and forces the wood down to the cylinder, being moved by two racks, *F, F*, turned by pinions on an axis, *G*. At one end of this is a handle, *g*, and at the other a wheel, *h*, which is turned by a pinion, *k*, at the extremity of a long spindle, *HI*, which is turned by a wheel, *K*, whose teeth are engaged by threads of a worm or endless screw, *l*, cut on the end of the main axis. By this means the pinions are constantly turning round with a very slow motion, and advance the wood towards the cylinder, which is at the same time in motion, and its rasps cut the wood into powder. A section of the rasp cylinder is shewn in *fig. 3*, where the same letters are used. In this *m* is the groove in which tenants at the ends of the bar, *E*, slide. This bar has many large spikes in it, which fasten into the wood. At *n* is a strong iron plate at the end of the trough, to defend it from wearing away by the great pressure of the wood down upon it. The wood is kept down in the trough by the cross-bar, *L*, *fig. 2*, fixed down over them. The iron cylinder, *B*, is cast with 24 grooves in it lengthways, and in these are laid as many steel bars, *Y, Z*, *fig. 3*, the section of which is *X*. The angle, *r*, being ground to a sharp edge, and the side, *r s*, cut with teeth, as seen at *Z*, so that the edge is serrated, as shewn by *Y*, the knives are held in their grooves by a strong hoop, *n*, *fig. 2*, driven on the ends of the cylinder over the knives, and they are wedged in fast by small iron wedges. When the wood in the engine is all rasped, and it needs a fresh supply, the pinion, *k*, is disengaged from the wheel *h*, and then the wheel, *g*, being turned by a man, the racks are withdrawn. To disengage the pinion, *k*, its bearing is fixed in a beam, *O*, which swings on a hinge at the upper end, and the lower end has a rod, *p*, jointed to it, which is engaged by a catch, *r*, when the handle, *t*, at the extremity of the rod, is moved away from the cylinder, so as to engage the pinion, *k*, with its wheel, *h*. But on moving the end of the rod towards the cylinder, it is relieved from the catch, and the pinion is disengaged from the wheel; and to prevent the bar, *E*, going so far as to endanger its teeth meeting the rasps, a pin is fixed into a particular part of one of the racks, *f*, which takes hold of the rod, *p*, when it has got as far as intended, and removes the rod from the catch, *r*, and then the racks do not advance any farther to the rasps. The wheel at *R, S*, joining in the axes *H* and *I*, is called a friction box: it consists of an iron box, *R*, fixed on the end of the axis, *I*; its cavity receives a conical plug, *S*, fitted upon the end of the other axis, *HI*, and pressed into the box by a lever, *T*, loaded with a weight. By this means, if the wood does not rasp away so fast as the motion of the racks would advance it, the cone, *S*, slips round in the box, *R*, and allows for the difference of the movements, which would otherwise break the machine. The cylinders of rasping engines generally turn round from 15 to 20 times per minute, and will reduce a great quantity of wood to a powder in a short time. *Figs. 4 and 5* are two elevations of a *chipping engine*: here *A* is part of a strong iron axis, turned with a considerable velocity by water or steam: upon the end is a small circular flange, *B*, to which is bolted a circular iron-plate, *D*, in which four knives are fixed, so that their edges project a very small quantity before the

surface of the wheel in the manner of a plane iron. *E* is an iron frame containing the bearing for the pivot of the wheel; it has a small trough, *F*, cast all in one piece with it. All this iron work is screwed down to the wood framing, *G G*. The wood, *II*, is in this machine presented to the knives in the wheel by a man who holds it in the trough, and advances it as the knives cut away the end. These chips are cut across the grain but obliquely, as is evident from *fig. 4*: they are afterwards ground to a fine powder by a rolling stone, or runner upon edge. A large and heavy fly-wheel is usually fixed on the axis, *A*, of the chipping wheel to regulate its movement. A method of reducing logwood has been lately introduced by sawing it with a circular saw (see *SAW*), which cuts off a flake from the end of a piece of wood *x*, so that the jar of the saw shatters the flake all into powder. By this means, at every cut the saw cuts away as much wood as its thickness in saw dust and the flake, which is as much more, is reduced at the same time, so that all the wood is reduced, though only one-half is cut, whereas, in the rasping engine, every particle must be cut by the machine. This improvement merits the attention of the woollen manufacturers, whose numerous logwood mills would be much improved by the adoption of this method.

LOHA, a town of Algiers; 28 miles E. of El Callah.

LOHARCANA, a town of Nepal; 10 miles S. of Batgaon.

LOHARINAPPAUL, a town of Nepal; 15 miles S. of Catmandu.

LOHAROO, a town of Hindoostan, in Dooab; 10 miles N.W. of Patniary.

LOHE, a town of Austria; 12 miles W.S.W. of Crems.

LOHEIA, a town of Arabia, in the province of Yemen, on the coast of the Red sea, founded, about three centuries ago, by a Mahometan saint, who built a hut on the shore where the town now stands, and spent the rest of his days there as a hermit. After his death, a "Kabbat," or house of prayer, was erected over his tomb, and it was afterwards gradually embellished and endowed. Some devout persons resorted hither, and built huts for themselves about his tomb. The harbour of Macabra, a neighbouring town, being about this time filled up, the inhabitants who deserted it settled at Loheia, and transferred the seat of government to this place. The territory of Loheia is arid and barren; and the harbour is indifferent, so that at ebb-tide, laden boats cannot approach near it; but, notwithstanding this disadvantage, a considerable trade in coffee, brought from the neighbouring hills, is carried on in this town. The coffee is not so good as that which is procured by way of Mocha and Hodeida from Beit el Fakih, but it is purchased on more reasonable terms, and the carriage to Jidda is less expensive. On this account several merchants from Cairo reside at Loheia, and others annually resort hither for the purchase of coffee. In this town are also 40 poor Banians, who are employed in different trades. Loheia has no walls, but is defended by 12 towers garrisoned by soldiers, and placed at equal distances round it. The height of their gates render it necessary to ascend them by means of ladders. It is but one of these towers that admits of being defended by cannons. Thus exposed to the depredations of the Arabs, the inhabitants have been sometimes reduced to the necessity of leaving the town, and of taking refuge in a small island, whither they carry with them their most valuable effects. Several of the houses in Loheia are built of stone; but they are generally huts, constructed after the Arabian fashion; the walls consisting of mud mixed with dung, and the roof thatched with a sort of grass which is

common

common here. Around these walls is a range of beds made of straw, affording convenience for sitting or lying. These houses are not large enough to admit of being divided into separate apartments; they have seldom any windows, and the door is only a straw-mat. When an Arab has a family and cattle, he builds for their accommodation several such huts, and incloses the whole with a strong wooden fence. Lime is prepared in the neighbourhood of the town, by the calcination of coral from the sea in the open air, and without a furnace. The water at Loheia is very bad, and therefore they are supplied from the distance of $2\frac{1}{2}$ leagues, which is brought to them in earthen jars upon camels or asses. Within two leagues of the town is a small hill which affords considerable quantities of mineral salt. The inhabitants are curious, intelligent, and polished in their manners. The women wear large veils in the streets, and yet they have no objection to throw them aside before strangers. One of these females, who presented herself to view, had her brow, cheeks, and chin, ornamented with black spots, impressed into the skin, and her eyes were also artificially blackened. In this town they have all the instruments necessary for distilling brandy; they have also a sort of wine, prepared from an infusion of dry grapes in water, in a pot which is buried in the ground in order to make the liquor ferment. They have also a thick, white liquor, called "Bufa," prepared from meal mixed with water, and brought into a state of fermentation. Niebuhr.

LOHMEN, a town of Saxony, in the margravate of Meissen; 10 miles E.S.E. of Dresden.

LOHNIN, a town of Brandenburg; 10 miles S.E. of Brandenburg.

LOHOCK. See LOCH.

LOHORPOUR, in *Geography*, a town of Hindoostan, in Oude; 20 miles S. of Mahomdy.

LOHR, a town of Germany, in the county of Rieneck, on the Maine; 21 miles N.W. of Wurzburg.

LOHR Hampton, a town of Germany, in the county of Hanau-Munzenburg; 22 miles E. of Hanau.

LOHRY, a town of Hindoostan, in Behker, on the Sinde; 15 miles S. of Behker.

LOHTO, a town of Sweden, in the government of Wafa; 18 miles N.E. of Gamla Karleby.

LOHURDEGA, a town of Bengal, in the circle of Nagpour; 22 miles N.N.W. of Doela. N. lat. $23^{\circ} 20'$. E. long. $84^{\circ} 51'$.

LOHURSEY, a town of Bengal, at which is a pass across the mountains; 18 miles N.N.E. of Pelamow.

LOIBERSTORFF, a town of Austria; 14 miles S. of Vienna.—Also, a town of Austria; 10 miles S.W. of St. Polten.

LOIHL, a range of mountains between Carinthia and Carniola.

LOIMAJOKI, a town of Sweden, in the government of Abo; 32 miles N.N.E. of Abo.

LOINS, in *Anatomy*, the lower and posterior part of the trunk of the body, or the space situated between the upper edge of the pelvis, and the last ribs. The inferior end of the vertebral column occupies the middle of this region; it is called the lumbar portion of the spine, and the vertebrae composing it are the lumbar vertebrae. (See SPINE.) The lowest of these rests on the upper surface of the sacrum, and thus joins the chest to the pelvis. This part of the spine is the centre of the reciprocal motions of the chest and pelvis; it is covered on each side, towards the back, by a thick mass of muscle, forming two convex prominences, with a hollow between them, corresponding to the spinous processes. These muscles are the great powers concerned

in extending the spine, and maintaining it erect. (See DORSI longissimus, and SACROLUMBALIS.) They are affected in strains of the trunk, and in lumbago, in which cases all motions of the loins are performed with great difficulty and pain. The sides of the lumbar region of the spine are covered by the psoas muscles, which belong to the hip-joint. The collections of matter forming serous abscesses are found in the cellular substance about these muscles. Close to the side of the spine, the interval between the crista of the os innominatum and the last rib is occupied by the quadratus lumborum muscle. (See LUMBORUM.) In front of this muscle, and of the psoas, the kidney lies, surrounded by loose cellular substance, which separates it from the peritoneum. (See KIDNEY.) The loins in front form a part of the posterior surface of the abdomen; and this is called the lumbar region.

LOJO, in *Geography*, a town of Sweden, in the province of Nyland; 30 miles W. of Helsingfors.

LOJOBI, a town of Servia; 16 miles S.S.E. of Passarowitz.

LOIR and CHER, one of the nine departments of the central region of France, so called from the names of the rivers which traverse it, the former in the southern part, the other in the north, and composed of Blois and Sologne, districts of Orleansais, is situated in $47^{\circ} 40'$ N. lat., S.E. of Sarthe, and bounded on the N. by the department of the Eure and Loire, on the N.E. by the Loiret, on the E. and S.E. by the Cher, on the S. by the Indre, and on the W. by the Indre and Loire, and Sarthe. It is 34 French leagues in length, and 23 broad, and contains $6717\frac{1}{2}$ kilometres, or about 339 square leagues, and 211,152 inhabitants. It is divided into three districts or circles, 24 cantons, and 309 communes; the circles are Vendome, containing 68,330, Blois, including 103,268, and Romorantin, comprehending 39,554 inhabitants. Its contributions amount to 2,432,733 francs, and its expences to 270,286 fr. and 19 cents. Its capital is Blois. The soil of this department is partly sandy and partly fertile; yielding grain, wine, fruits, and pastures. It abounds in lakes, marshes, and heaths, with considerable forests, iron-mines, &c.

LOIRE, one of the 11 departments of the eastern region of France, formerly Forez, situated in $45^{\circ} 30'$ N. lat., west of the Rhone, 24 French leagues long and 12 broad, contains 5135 kilometres, or 259 square leagues, and 292,588 inhabitants. It is divided into three circles, 48 cantons, and 327 communes. The circles are Roanne, containing 95,668, Montbrison, 97,659, and St. Etienne, 90,261 inhabitants. The contributions amount to 2,745,417 fr. and its expences to 244,800 fr. and 66 cents. Its capital is Montbrison. This department is diversified with plains, hills, and mountains. Both banks of the river Loire, from which it derives its appellation, are level, yielding grain, hemp, and pastures. The gentle eminences near Roanne are covered with vines. Mont-Pilat, a ridge of high mountains, is situated at the S.E. extremity of the department, near the confines of Ardèche. Here are forests and mines of iron, lead, and coal.

LOIRE, *Upper*, one of the 12 departments of the south-east region of France, composed of Vevay and Cevennes, situated in 45° N. lat., south of Loire and Puy de Dôme, 26 Fr. leagues long and 17 broad, contains 5282½ kilometres, or 264 square leagues, and 237,901 inhabitants. It is divided into three circles, 28 cantons, and 272 communes. The circles are Brioude, containing 70,596, Le Puy 103,068, and Yssengeaux, 64,237 inhabitants. The capital is Le Puy. The contributions amount to 1,509,642 fr.

fr. and the expences to 219,838 fr. 23 cents. This territory, though mountainous and covered with snow six months in the year, yields grain, fruits, &c. sufficient for the inhabitants, with good pastures, mines of antimony, &c.

LOIRE, *Loire*, one of the nine departments of the western region of France, formerly Upper Bretagne, a maritime territory on either hand of the Loire, is situated in 47° 15' N. lat., is 30 Fr. leagues long and 27 broad, and contains 7600 kilometres, or 382 square leagues, and 368,506 inhabitants. It is divided into five circles, 45 cantons, and 209 communes. The circles are Savenay, comprehending 91,132, Chateau-Briant, 50,244, Ancenis, 36,049, Nantes, 157,940, and Paimboeuf, 32,241 inhabitants. Its capital is Nantes. Its contributions amount to 2,900,662 fr. and its expences to 345,171 fr. This department produces wheat, rye, flax, wine, and excellent pastures, with mines of iron, coal, quarries of marble, &c. Savenay yields cyder and wine of an inferior quality. The second circle is almost one continued forest. Nantes is agreeably diversified and fertile. From the marshes of Paimboeuf much salt is extracted.

LOIRET, one of the nine departments of the central region of France, a portion of Orléanais, E. of Loir and Cher, is situated in 47° 50' N. lat., is 30 Fr. leagues long, and 24 broad; and contains 7047½ kilometres, or 356 square leagues, and 280,728 inhabitants. It is divided into four circles, 31 cantons, and 303 communes. The circles are Pithivier, containing 55,061, Montargis, 61,912, Gien, 37,395, and Orleans, 135,360 inhabitants. Its capital is Orleans. Its contributions amount to 3,778,705 fr. and its expences to 337,821 fr. 52 cents. The soil of the second circle is sandy, yielding little grain. The products of the other districts are grain, wine, hemp, flax, fruits, and pastures.

LOIRON, a town of France, in the department of the Mayenne, and chief place of a canton, in the district of Laval; six miles W. of Laval. The place contains 1559, and the canton 13,810 inhabitants, on a territory of 280 kilometres, in 15 communes.

LOITSCH, or LOITZ, a town of Upper Carniola; 15 miles W. of Laybach.

LOITZ, a town of Anterior Pomerania; 24 miles S. of Stralsund. N. lat. 53° 56'. E. long. 13° 5'.

LOKACZ, a town of Poland, in Volhynia; 30 miles W.S.W. of Lucko.

LOKALAX, a town of Sweden, in the government of Abo; 27 miles N.W. of Abo.

LOKE, in *Mythology*, the name of one of the deities of the northern nations, answering to the Arimanes among the Persians, whom they represent as at enmity both with gods and men, and the author of all the evils which desolate the universe. Loke is described in the Edda as producing the great serpent which incircles the world; which seems to have been intended as an emblem of corruption or sin; he also gives birth to Hela or death, the queen of the infernal regions; and also to the wolf Fenris, that monster who is to encounter the gods and destroy the world. North. Ant. vol. ii. p. 85, &c.

LOKE, in *Rural Economy*, a provincial word used in Norfolk for a close narrow lane.

LOKMAN, in *Biography*, surnamed *Al-Hakim*, or the Wise, a philosopher in considerable estimation among the eastern nations, to whom is attributed a collection of maxims and fables, which are calculated to display the moral doctrines of the ancient Arabians. There have been many hypotheses concerning the country in which he lived, and the period at

which he flourished, but the greater part of the Mussulman doctors make him contemporary with David and Solomon. It has been supposed that he was a native of Ethiopia or Nubia, and in rather a servile condition; that he had been a slave in different countries, and that he was at length sold among the Israelites. His wisdom has been ascribed to divine inspiration, which he received in the following manner; while asleep at noon-day, angels came to the place where he was reposing, saluted him, without rendering themselves visible, and declaring that God would make him a monarch and his lieutenant on earth. He signified his submission to the will of his maker, but would rather have preferred to remain in a low condition. On account of this answer, God bestowed upon him wisdom in so eminent a degree that he was enabled to instruct mankind by a great variety of maxims, sentences, and parables, amounting to ten thousand in number. The anecdotes which are recorded concerning the life of Lokman are found scattered in the writings of several of the orientals; of these we shall notice only a few. As he was once seated in the midst of a circle of auditors, a man of high rank asked if he was not that black slave whom he had before seen attending upon the flocks in the field; he replied, he was; how then, said the other, have you attained to such wisdom and so high a reputation; "By following exactly," said Lokman, "these three precepts; always to speak the truth; to keep inviolably the promises made; and never to meddle with what does not concern me." It was Lokman who said that "the tongue and the heart, were both the best and the worst parts of men." Mahomet frequently refers to the authority of Lokman in support of his own opinions and doctrines, and he is still regarded by the followers of the Mahometan religion as a saint and a prophet. They represent him to have been as virtuous and pious as he was wise, and on that account was peculiarly blessed of God. Some writers assert that he embraced the Jewish religion, and entered into the service of king David, who entertained a high esteem for him, and that he died at a very advanced age. The scanty relics of the fables of Lokman were published by Erpenius, in Arabic and Latin, and Tannaquil Faber gave an edition of them in elegant Latin verse. Gen. Biog.

LOKMAN, in *Geography*, a town of the Arabian Irak, on the Tigris; 10 miles N. of Bagdad.

LOKO, a small island on the E. side of the gulf of Bothnia. N. lat. 60° 51'. E. long. 20° 59'.

LOKOHAR, a town of Hindoostan, in Bahar; 36 miles N.E. of Durbunga.

LOKTEVA, a town of Russia, in the government of Kolivan; 30 miles S.W. of Kuznetzk.

LOLBAZAR, a town of Bengal; 37 miles S.W. of Beyhar.

LOLBINIÈRE, a town of Canada, on the river St. Lawrence; 25 miles S.W. of Quebec.

LOLDONG, a town and fortress of Almora; 85 miles N.N.E. of Delhi. N. lat. 29° 47'. E. long. 78° 36'.

LOLGUNGE, a town of Hindoostan, in Oude; 16 miles N. of Manickpour.—Also, a town of Hindoostan, in Benares; 22 miles S.W. of Mitzapour.—Also, a town of Hindoostan, in Oude; 20 miles S. of Azemgur.

LOLICHMIUM, in *Greek Muses*, according to Pausanias, was the name given to the gymnasium at Olympia, which was always open for those who wished to contend in literature, poetry, or music; and Aelian tells us, that in the 94th olympiad, Euripides and Xenocles disputed the prize in dramatic poetry at the Olympic games; at which time they were accompanied by instruments.

LOLIUM, in *Agriculture*, the name of a kind of grasses,

of which there are several species, some of which are highly useful to the farmer, as the *lolium perenne*.

LOLIUM, in *Botany*, a Latin word of unknown origin.—Darnel, or Darnel-grass. Virgil calls it "*infelix lolium*," not only as being a weed amongst corn, but probably alluding to an idea, long prevalent, that corn was transformed into it. This opinion of the change of one kind of gramineous plant into another, as wheat into rye, rye into barley, barley into darnel, darnel into brome-grass; and of the latter by becoming oats or rye, in a fertile soil, returning again to a more improved state; all this, however absurd, was so generally believed, that Linnæus thought proper to write a dissertation against it. See *Tranmutatio Frumentorum*, Amoen. Acad. v. 5. 106.—Linn. Gen. 38. Schreb. 53. Willd. Sp. Pl. v. 1. 461. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 148. Aut. Hort. Kew. ed. 2. v. 1. 174. Juss. 31. Lamarck Illustr. t. 48. Class and order, *Triandria Digynia*. Nat. Ord. *Gramina*.

Gen. Ch. *Cal.* Common receptacle elongated into a spike, the flowers, which are disposed in two ranks, being pressed close to an angle of the stalk. Glume of one valve, awl-shaped, permanent, fixed, opposite to the stalk. *Cor.* of two valves; the lowermost lanceolate, narrow, convoluted, pointed, the length of the calyx; the uppermost shorter, linear, blunter, concave above. Nectary of two small, ovate, obtuse leaflets, gibbous at their base. *Stam.* Filaments three, capillary, shorter than the corolla; anthers oblong. *Pist.* Germen turbinate; styles two, capillary, reflexed; stigmas feathery. *Peric.* none; the corolla embracing the seed, and finally opening to let it fall. *Seed* one, oblong, convex beneath, with a broad shallow furrow above, compressed.

Obs. The sessile spikelets stand in the same plane with the stalk, so that the latter supplies the place of an inner valve to the calyx, which nevertheless is sometimes present, though diminutive.

Ess. Ch. Calyx of one valve, fixed, many-flowered. Florets two-ranked.

1. *L. perenne*. Perennial Darnel; Red Darnel; or Ray-grass. Linn. Sp. Pl. 122. Engl. Bot. t. 315. Mart. Rust t. 4. Knapp. t. 100.—Spike awnless. Spikelets longer than the calyx. Florets lanceolate.—A common European grass, in rather fertile ground, about the borders of fields, road sides, pastures, &c. flowering in June.—The root is fibrous, downy, perennial. Stem a foot high, erect or ascending, bent at the bottom, jointed, leafy, round in the upper part, striated, smooth. Leaves linear, keeled, smooth, dark green, with smooth, striated sheaths, and a short obtuse stipula. Spike nearly erect, very flat, often a little twisted.

A variety with a compound spike is figured by Leers, t. 12. f. 1; and another with a remarkably short broad and dense spike, in Scheuchz. Prodr. t. 2. Vaillant's t. 17. f. 3, with long awns, cited by Willdenow after Reichard, surely cannot belong to this species.

2. *L. tenue*; Linn. Sp. Pl. 122. Willd. n. 2, appears to be only a starved variety of *perenne*, with very few florets in each calyx.

3. *L. temulentum*. Bearded Darnel. Linn. Sp. Pl. 122. Fl. Dan. t. 160. Leers. 48. t. 12. f. 2. Engl. Bot. t. 1124. Knapp. t. 104. Host. Gram. Austr. v. 1. t. 26. Schreb. Gram. t. 36.—Spike awned. Spikelets shorter than the calyx. Florets elliptical. Stem rough in the upper part.—Native of European corn-fields, among barley, wheat, or flax, flowering in July.—Root annual, of a few downy fibres. Stem nearly solitary, twice as tall and stout as the former; erect, firm, of about three knots; very

smooth and shining in the lower part; rough above. Leaves lanceolate, spreading, ribbed, rough, of a lighter green than in *perenne*. Sheaths roughish. Stipula very short, crenate. Spike erect, larger and more turgid than in the former. Calyx without awns; in the lower spikelets often furnished with a minute, elliptical, inner valve. Florets numerous, ovate, swelling, slightly ribbed, rough, each tipped with an awl-shaped, whitish, rough, erect awn, twice its own length, from a little below the top.—The seeds are said to be intoxicating to men, beasts and birds, and even to bring on convulsions and death. We know of no mischiefs from it in this country, where it is far from common.

4. *L. arvense*. Annual Beardless Darnel. Withering 168. Engl. Bot. t. 1125. Knapp. t. 102. (*L. temulentum*; Hudf. 55.)—Spike almost beardless. Spikelets about the length of the calyx. Florets elliptical. Stem very smooth.—Native of fields in England and Scotland, as well as other parts of Europe. Willdenow indicates it as a variety of the last. It differs however, not only in being not at all, or very shortly, awned, but in the total smoothness of its stem and spike. The leaves are occasionally rough, but on their upper side only. Dr. Withering, who first defined this species, says the calyx has two valves; but we usually find only one. The awns are too large in the plate of *English Botany*.

5. *L. maximum*. Great West-Indian Darnel. Willd. n. 4.—"Calyx as long as the many-flowered compressed spikelet; of which the upper florets are awned."—Native of Jamaica. Root annual. Whole grass twice as large as *L. temulentum*, from which also it differs in having the calyx equal in length to the spikelet; and while the upper florets have long awns, the rest are beardless. Yet Willdenow, from whose work we adopt this species, suspects it may be but a variety of the second.

6. *L. distachyon*. Double-spiked Indian Darnel.—Linn. Mant. 187.—Spikes in pairs. Calyx single-flowered. Corolla fringed.—Sent by Koenig from the coast of Malabar.—Stems partly decumbent, slender, branched, smooth. Leaves short, narrow, with long, smooth, rather tumid sheaths. Spikes in pairs, terminal, equal, slender, two or three inches long. Flowers in two ranks, but directed to one side. Calyx of one valve, single-flowered. Corolla ovate, densely fringed with fine, long, white hairs. A singular grass, whose genus is at least doubtful. In some points it resembles a *Panicum*.

LOLIUM Perenne, the botanical name of the grass usually known to the farmers by the name of ray-grass: it has a perennial fibrous creeping root. The stems, several from the same root, prostrate or oblique at the base, but the flowering stem upright, smooth, from six inches to eighteen, twenty and twenty-four inches in height, according to the soil: they have several joints near the base, at a small distance from each other, but on the upper part only one or two. On a great number of plants of a middling size three joints, and never more than four, were counted by Miller, the flowering-stem running up from eleven to fourteen inches above the last joint. They are frequently russet-coloured at the joints; the leaves are four or five inches long, and from two to four lines wide, lengthened out into a point; the leaf on the stem above twice as broad as those next the root and on the runners. The sheath covers the stem for several inches above the upper joint; both that and the leaves are smooth. The flowers are in a spike, which is from four to six or seven, and even nine inches in length, composed of many two to eighteen spikelets, ranged at a little distance from each other, in two rows alternately along the rachis of a common receptacle. The spikelets gene-

vally flat, but sometimes nearly cylindrical; and it sometimes shews a disposition to become branched, particularly towards the bottom. The rachis is flexuous, or changes its direction in a curve line from one spikelet to another; and each spikelet being lodged at the base in a hollow of it, has no occasion for an inner valve to the calyx for protection, and therefore is not provided with one. The number of flowers in each spikelet varies from three or four to six, seven or eight, and even sometimes nine, ten, or eleven; but six or seven is the most common number. The valve of the calyx tapers to a point; and the terminating calyx is two-leaved. The two inner husks, which are the valves of the corolla, are both of the same length, or nearly so. The germ is placed between the upper of these, and two small white semitransparent tubercles, which Linnaeus terms the *nectaries*: the seed easily quits the chaff or covering.

This is a grass which is called in English a *ray-grass*, from the French *raye*, which is their name for another species, this being termed *Fausse raye*. It is corruptly termed by farmers *rie*, or *rye-grass*, but it bears no resemblance to *rie*, or *rye*, that being a name appropriated to a very different grass (*Hordeum pratense*). It has, likewise, by Ray been distinguished by the title of *Red Darnel-grass*; and in some places it is called *Crap*; in Devonshire, *Easer*; in Norfolk, *White Nonsuch*.

There are several varieties of this grass which differ chiefly in the size or colour of the stem and spike, as well as the number of flowers in each spikelet. Also the flowers are now and then found with awns or beards; and the spikelets are also sometimes clustered, and sometimes branched, or divided.

It is a sort of grass that has been long in cultivation as an early pasture and hay grass. See *ARTIFICIAL Grass*, and *RAY-GRASS*.

LOLLARDS, in *Eccllesiastical History*, a religious sect, differing in many religious points from the church of Rome, which arose in Germany about the beginning of the fourteenth century; so called, as many writers have erroneously imagined, from Walter Lollard, who began to dogmatize in 1315; and was burnt at Cologne: but it is evident that Lollard was no surname, but merely a term of reproach applied to all heretics who concealed the poison of error under the appearance of piety.

The monk of Canterbury derives the origin of the word Lollard, among us, from *lolum*, a *tare*; as if the Lollards were the tares sown in Christ's vineyard. Abilly says, that the word Lollard signifies *praising God*, from the German *loben*, to *praise*, and *herr*, *lord*; because the Lollards employed themselves in travelling about from place to place, singing psalms and hymns.

Others, much to the same purpose, derive *lollard*, *lullbard*, or *lollert*, *lullert*, as it was written by the ancient Germans, from the old German word *lullen*, *lullen*, or *lullen*, and the termination *bard*, with which many of the High Dutch words end. *Lullen* signifies to sing with a low voice, and, therefore, *lollard* is a singer, or one who frequently sings; and in the vulgar tongue of the Germans, it denotes a person who is continually praising God with a song, or singing hymns to his honour. The Alexians or Cellites were called Lollards, because they were public singers who made it their business to enter the bodies of those who died of the plague, and sang a dirge over them in a mournful and indistinct tone as they carried them to the grave. The name was afterwards assumed by persons that dishonoured it; for we find, among those Lollards who made extraordinary pretences to piety and religion, and spent the greatest part of their time in meditation, prayer, and such acts of piety, there were

many abominable hypocrites, who entertained the most ridiculous opinions and concealed the most enormous vices under the specious mark of this extraordinary profession. And many injurious aspersions were propagated against those who assumed this name, by the priests and monks; so that by degrees, any person who covered heresies or crimes under the appearance of piety, was called a Lollard. Thus the name was not used to denote any one particular sect, but was formerly common to all persons and all sects, who were supposed to be guilty of impiety towards God or the church, under an external profession of extraordinary piety. However, many societies, consisting both of men and women, under the name of Lollards, were formed in most parts of Germany and Flanders, and were supported partly by their manual labours, and partly by the charitable donations of pious persons. The magistrates and inhabitants of the towns, where these brethren and sisters resided, gave them particular marks of favour and protection, on account of their great usefulness to the sick and needy. They were thus supported against their malignant rivals, and obtained many papal constitutions, by which their institute was confirmed, their persons exempted from the cognizance of the inquisitors, and subjected entirely to the jurisdiction of the bishops; but as these measures were insufficient to secure them from molestation, Charles, duke of Burgundy, in the year 1472, obtained a solemn bull from pope Sixtus IV. ordering that the Cellites, or Lollards, should be ranked among the religious orders, and delivered from the jurisdiction of the bishops; and pope Julius II. granted them yet greater privileges in the year 1506. Mosheim informs us that many societies of this kind are still subsisting at Cologne, and in the cities of Flanders, though they have evidently departed from their ancient rules. Eccl. Hist. vol. iii. 8vo.

Lollard and his followers rejected the sacrifice of the mass, extreme unction, and penances for sin; arguing, that Christ's sufferings were sufficient. He is likewise said to have set aside baptism as a thing of no effect; and repentance, as not absolutely necessary, &c. In England, the followers of Wickliffe were called, by way of reproach, Lollards, from some affinity there was between some of their tenets; though others are of opinion, that the English Lollards came from Germany.

They were solemnly condemned by the archbishop of Canterbury and the council of Oxford.

LOLLCUNGE, in *Geography*, a town of Bengal; 20 miles E.N.E. of Purneah.

LOLLI, in *Biography*, a performer on the violin of great celebrity, who came into England at the beginning of 1785; but by a caprice in his conduct equal to his performance, he was seldom heard. And then so eccentric was his style of composition and execution, that he was regarded as a madman by most of his hearers. And yet we are convinced, that in his lucid intervals he was, in a serious style, a very great, expressive, and admirable performer. In his freaks nothing can be imagined so wild, difficult, grotesque, and even ridiculous as his compositions and performance. After playing at the oratorio, and making the grave and ignorant laugh at very serious difficulties upon which he had, perhaps, but ill bestowed his time, he suddenly left the kingdom, *à la fardine*; perhaps, at last, to shun difficulties of another kind.

LOLLIEI, in *Geography*, a town of Thibet; 110 miles N. of Goreah. N. lat. 35° 15'. E. long. 84° 28'.

LOLLONADO, a town of the island of Cuba; 140 miles S.W. of Havana.

LO-LOS, the name of a particular people dispersed through the province of Yun-nan, in China, distinct from the

the Chinese. They were formerly governed by their own sovereigns, but upon submitting to the emperor of China they obtained peculiar privileges. These people are well made, and inured to labour. They have a peculiar language of their own, and a mode of writing which seems to be the same with that of the bonzes of Pegu and Ava. These cunning priests have acquired an influence over the Lo-los in the western part of Yun-nan, and have introduced among them the worship and religious ceremonies of their country; and they have even induced them to build large temples of a different architecture from that of the Chinese. The princes of the Lo-los are absolute masters of their subjects, and have a right of punishing them, even by death, without waiting for the answer of the viceroy. These princes have many officers and men under their command; and their militia is composed of cavalry and infantry, who are armed with bows and lances, and sometimes muskets. The iron and copper mines which are lodged in their mountains, enable them to make their own armour. These mountains also abound with mines of gold and silver. The dress of the Lo-los consists of plain drawers; a vest of cotton hanging to their knees, and a straw hat; their legs are bare, and they wear only sandals. The women have a long robe, covering the whole body down to the feet, above which they tie a small cloak that reaches no further than the girdle. In this dress they appear on horseback, at marriage ceremonies, or when they pay visits, accompanied by the females in their train, who are also on horseback, and by several domestics. Grofier.

LOLPOUR, a town of Hindoostan, in the circar of Jyenagur; 15 miles S.S.E. of Jypour.

LQM, a town on the E. coast of the island of Gilolo. S. lat. 0° 16'. E. long. 128°.

LOMABLEM, or **LOMBLEM**, an island in the East Indian sea, about 120 miles in circumference. S. lat. 8° 18'. E. long. 123° 56'.

LOMATIA, in *Botany*, from *λμα*, a border, because the seeds are terminated by a bordered ring. Brown Tr. of Linn. Soc. v. 10. 199. Prodr. Nov. Holl. v. 1. 389. Ait. Hort. Kew. ed. 2. v. 1. 212.—Class and order, *Tetrandria Monogynia*. Nat. Ord. *Proteaceae*, Juss. Brown.

Gen. Ch. *Cal.* none. *Cor.* Petals four, irregular, distinct, oblong, obliquely twisted toward one side; their summits dilated, concave, bearing the stamens. Nectary three glands at one side of the base of the stalk supporting the germen. *Stam.* Filaments four, extremely short, in the hollows of the petals; anthers roundish, sunk in the said hollows. *Pist.* Germen superior, stalked, half-ovate, erect; style permanent, incurved; stigma oblique, dilated, roundish, nearly flat. *Peric.* Follicle stalked, half-ovate, coriaceous, crowned with the style of one cell. *Seeds* many, imbricated in two rows, elliptical, compressed, with a terminal bordered wing, whose disk is without veins.

Eff. Ch. Petals four, irregular. Stamens sunk in the cavities of the limb. Three glands, on one side, at the base of the stalk of the germen. Stigma oblique, flattish. Follicle coriaceous, of one cell. Seeds many, with a terminal bordered wing.

Eight species of this genus, some found in New Holland, others in South America, are defined by Mr. Brown. They are "shrubs, with alternate leaves, which are in many cases divided or toothed, rarely entire, sometimes various on the same individual plant. Clusters terminal, sometimes axillary, elongated, loose, occasionally short and corymbose; their partial stalks in pairs, with one common bractea to each pair. Flowers yellowish-white. Involucrum none. Nucleus

of the seed besprinkled with sulphur-coloured powder." Brown.

1. *L. filifolia*. Cut-leaved Lomatia. Sims in Curt. Mag. t. 1272. (*Embothrium filifolium*; Sm. Bot. of New Holl. 23. t. 8. *E. herbaceum*; Cavan. Ic. v. 4. 58. t. 384.)—Leaves doubly pinnatifid, very smooth; segments linear-wedge-shaped, or lanceolate, acute, pointed, reticulated with veins. Clusters very smooth, elongated, simple or divided.—Native of light sandy fields and heaths, on the east coast of New Holland, near Port Jackson. It is said to have been sent to Kew garden, by sir Joseph Banks, in 1792. We first saw it in flower at Messrs. Greenwood's, Kensington, in the summer of 1793, where it was kept in the stove; but the shelter of a greenhouse is sufficient. It is propagated either by seeds or layers. The whole plant is very rigid and smooth, three or four feet high, but little branched. Leaves dark green, with various, more or less compound, decurrent segments, much resembling some of the umbelliferous tribe. Flowers white, inodorous, in long, terminal clusters, whose stalks have occasionally a reddish tinge. Fruit about an inch long. Every part turns quite black in drying. See *EMBOTHRIUM*.

2. *L. tinctoria*. Colouring Lomatia. Labill. Nov. Holl. v. 1. 31. t. 42, 43.—Leaves once or twice pinnatifid, or undivided, smooth; segments pectinate, single-ribbed, almost veinless, bluntish, pointed. Clusters elongated, smooth, unbranched.—Gathered by Labillardiere and Brown in hilly places and fields at Van Diemen's land. The stem is six feet high. Leaves very various, usually very neatly pinnatifid, with numerous, parallel, linear-lanceolate, sometimes subdivided, segments; more rarely undivided, slightly notched at the tip. Clusters loose, with fewer flowers, on longer stalks than the former. The sulphur-coloured powder which covers the seeds, is said by Labillardiere to give out a rose-coloured dye to water.

3. *L. ferruginea*. Rusty Lomatia. (*Embothrium ferrugineum*; Cavan. Ic. v. 4. 59. t. 385.)—Leaves doubly pinnatifid, downy; segments ovate or lanceolate. Clusters shorter than the leaves.—Gathered by Louis Née at St. Carlos de Chiloe, South America, in places occasionally overflowed by the sea, flowering in February. The stem is ten or twelve feet high, rarely straight; its branches downy. Leaves doubly pinnatifid, acute; the down of the young ones rusty, of the old ones grey. Petals red within; yellowish-green without.

4. *L. polymorpha*. Various-leaved Lomatia.—Leaves linear-lanceolate; entire, toothed, or pinnatifid; downy, like the branches and flower-stalks, beneath. Clusters corymbose, terminal. Corolla somewhat hairy. Pith very smooth.—Gathered on the southern hills of Van Diemen's land, by Mr. Brown, who conceives this species to have been confounded by Labillardiere under our second, when he says "the leaves of that are sometimes besprinkled at their back with short russet down." Two varieties of *L. polymorpha* are indicated; one whose leaves are undivided, their downiness grey, and their seed-vessels but half an inch long; the other with generally cut or pinnatifid leaves, rusty underneath, and their seed-vessels near an inch in length.

5. *L. ilicifolia*. Hlex-leaved Lomatia.—"Leaves oblong-ovate, acute, with fine spinous teeth, reticulated, quite smooth, as well as their footstalks. Clusters elongated, terminal."—Native of barren fields at the sides of hills on the southern coast of New Holland, near port Phillip, where Mr. Brown gathered it, after the flowers were fallen.

6. *L. longifolia*. Long-leaved Lomatia. (*Embothrium myricoides*; Gærtn. v. 3. 215. t. 218? Br.)—Leaves li-

near-lanceolate, elongated, smooth, distantly serrated. Clusters axillary. Flower-stalks and corolla rather hairy. Petal very smooth.—Gathered by Mr. David Burton, as well as Mr. Brown, on the stony banks of rivers and rivulets near Port Jackson. This is a branched bushy *shrub*, with angular young *branches*, clothed with rusty hairs, as are also the *flower-stalks*, *bracts*, and in some degree the *flowers*. The *leaves* are numerous, alternate, on short broadish stalks, lanceolate, acute, veiny, three or four inches long, about half an inch broad, smooth except the lower portion of their rib at the upper side; sharply and distantly serrated upwards, tapering and mostly entire in their lower half. *Clusters* axillary, solitary, simple or branched, about as long as the leaves. *Stigma* very broad, with a small point. *Follicle* smooth, above an inch long, semi-ovate.

7. *L. dentata*. Toothed Lomatia. (*Embothrium dentatum*; Fl. Peruv. et Chil. v. 1. 62. t. 94. a. Br.)—Leaves oval, with tooth-like serratures, smooth, as well as their foot-stalks. Clusters lateral, short. Corolla hairy. Germen downy.—Native of woods and groves in Chili.

8. *L. obliqua*. Oblique Lomatia. (*Embothrium obliquum*; Fl. Peruv. et Chil. v. 63. t. 97. B. hirsutum; Lamarck Dict. v. 2. 355.)—Leaves ovate, serrated, smooth. Clusters axillary. Flower-stalks and corolla hairy. Stigma deciduous.—Found on hills in the provinces of the Concepcion of Chili and Puchacay.

Mr. Brown mentions that the wings of the seed in these two last species, which have not been seen by him, require examination.

LOMAZY, in *Geography*, a town of Lithuania, in the palatinate of Brzesc; 36 miles S.S.W. of Brzesc.

LOMAZZO, GIOVANNI PAOLO, in *Biography*, an historical painter, born at Milan in 1538, and pupil of Gio. Battista Cerva. Before he became blind, which happened about the 33d year of his age, he painted much, with more whim than originality. He afterwards wrote several treatises on painting, in which, with the most tedious prolixity, he interweaves anecdote and useful precept, with chemic and astrologic nonsense. Fuseli's Pilkington.

LOMBARD, PETER, a bishop of Paris, who flourished in the twelfth century, and known under the title of "Master of the Sentences," was a native of Novara in Lombardy, from which he derived his surname. He received his education at Bologna, celebrated at that time for its university, and its very eminent professors of the civil law. His mind was bent on theological pursuits, and he was encouraged to devote himself to them by the bishop of Lucca, who recommended him to St. Bernard, by whose assistance he was enabled to prosecute his studies at Rheims. He afterwards removed to Paris, and from his reputation for learning, obtained a professorship in the university, and was presented with the canonry of Chartres, which was followed by his elevation to the episcopal dignity, for which he was indebted to the regard entertained for him by his pupil, Philip, son of Lewis le Gros. This prince was educated for the church, and in 1159 was elected bishop, an honour which he declined in favour of his old master, as a mark of personal regard for him. Lombard did not long enjoy the dignity; he died in the year 1164. His celebrity in the schools was derived from his work entitled "Sententiarum, lib. iv." in which he endeavoured to illustrate the doctrines of the church by a collection of sentences and passages drawn from the fathers whose contradictions he attempted to reconcile. This work was received with universal applause, and acquired so high an authority among the schoolmen, that the most learned doctors were employed in illustrating and expounding it. The abbé Fleury makes

the number of commentators on it amount to two hundred and forty-four. It was first printed at Venice in 1477, and has undergone a multitude of impressions at different times and in different places. Moreri.

LOMBARDS, or rather LANGOBARDS, which was their original name, deduced from the peculiar length and fashion of their beards, *lang* signifying *long*, and *baert*, *beard*, whereas the corrupt appellation of *Lombards* was diffused in the 13th century by the merchants and bankers, who were the Italian posterity of the savage warriors to whom the name originally belonged, denote a tribe of people who arose from an obscure and small beginning to occupy the most considerable rank in Europe. The Scandinavian origin of these people is maintained by Paul the Deacon, contended by Cluverius, and defended by Grotius. It would be tedious, and also unsatisfactory to the reader, if we were to make an attempt at pursuing the migrations of the Lombards through unknown regions and marvellous adventures. About the time of Augustus and Trajan these fierce people were discovered between the Elbe and the Oder. They were fierce beyond the example of the Germans, and they took pleasure in propagating the tremendous belief, that their heads were formed like the heads of dogs, and that they drank the blood of their enemies whom they vanquished in battle. From the north they gradually descended towards the south and the Danube; and after an interval of 400 years, they again appear with their ancient valour and renown. Their manners were not less ferocious. The assassination of a royal guest was executed in the presence, and by the command, of the king's daughter, who had been provoked by some words of insult, and disappointed by his diminutive stature. The victories of the Lombards recommended them to the friendship of the emperors; and at the solicitation of Justinian, they passed the Danube, to reduce, according to their treaty, the cities of Noricum and the fortresses of Pannonia. But urged onward by a spirit of rapine, they wandered along the coasts of the Adriatic as far as the Dyrrachium, and presumed, as the historian says, with familiar rudeness, to enter the towns and houses of their Roman allies, and to seize the captives who had escaped from their audacious hands. These acts of hostility, charged upon some loose adventurers, were disowned by the nation, and excused by the emperor: but the arms of the Lombards were more seriously engaged by a contest of 30 years, which was terminated only by the extirpation of the Gepide. Of the cause and event of the quarrel between the Lombards and the Gepide we have already given an account under the biographical article *Alboin*. In consequence of the victory gained by the Lombards, assisted by the Avari, a Scythian horde, over the Gepide, A.D. 566, no further obstacle could impede the progress of the confederates, and they faithfully executed the terms of their agreement. Having captured Milan, the capital of Liguria, the Lombards, with joyful acclamations, proclaimed and installed Alboin king of Italy; raising him upon a shield in the midst of the army according to the custom of their nation, and presenting him with a lance, which among them was the ensign of royalty. From this time, A.D. 570, historians date the beginning of the kingdom of Lombards in Italy, which lasted above 200 years. After this event he extended his conquests, and his progress was rapid in the reduction of the greatest part of Italy. Pavia held out for more than three years; but it was at length constrained to surrender to the arms of Alboin; and as it was a city of great strength, and conveniently situated, this sovereign and his successors chose it for the place of their residence; and thus it became the metropolis of the kingdom of the Lombards. After his death (see *ALBOIN*,) Clepho, one of the noblest Lombard

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Lombard chiefs, was unanimously elected as his successor: his reign was terminated before the expiration of eighteen months by the hand of an assassin, and during the minority of his son Autharis, Italy was divided and oppressed by a ducal aristocracy of 30 tyrants. After an interval of distraction, which lasted 10 years, Autharis attained the strength and reputation of a warrior. Under the standard of their new king, the conquerors of Italy withstood their successive invasions; and the victorious Autharis asserted his claim to the dominion of Italy. However, he allowed the dukes, who for 10 years had exercised absolute authority in their respective dukedoms, to continue in their governments; but he obliged them to contribute one moiety of their revenue to the maintenance and support of his royal dignity. He also bound them, by an oath, to assist him in time of war to the utmost of their power. As he did not deprive them of their dukedoms, except in cases of treason, he did not transfer them to others, but when their male issue failed: and this was the origin of fiefs in Italy. Some, indeed, have imagined that fiefs were first introduced by the Lombards, and from them adopted by other nations. But it appears, that fiefs had been introduced into Gaul by the Franks some years before the reign of Autharis, who first established them in Italy. All the customs and laws which were afterwards introduced and published concerning fiefs, are owing to the Lombards, who gave them a certain and regular form; so that, among all other nations, successions, acquisitions, inheritances, and every thing else relating to fiefs, were regulated by the customs and laws of the Lombards. Hereupon a new body of laws sprung up, which were called feudal laws, and which continued in some provinces of Italy, and particularly in the kingdom of Naples, to be the chief part of the jurisprudence.

Autharis, having settled matters with the dukes in the manner now mentioned, enacted several reasonable and salutary laws against theft, rapine, murder, adultery, and other crimes which at that time prevailed among his subjects. He was also the first of the Lombard kings, who, renouncing Paganism, embraced the Christian religion, and his example was followed by most of his subjects.

At the foot of the Rhatian Alps, Autharis subdued the resistance, and rifled the hidden treasures of a secluded island in the lake of Comum; and at the extreme point of Calabria, he touched with his spear a column on the sea-shore of Rhegium, proclaiming that a certain landmark to stand the immovable boundary of his kingdom. Autharis closed his life and reign at Pavia, A.D. 590. Agilulf, his successor, renounced the opinions of Arius, which had been countenanced by Autharis, and embraced the Catholic faith. Agilulf was succeeded A.D. 615, by his son Adalund, who being deposed, had for his successor Ariovald, under whose government the Lombards enjoyed tranquillity both at home and abroad. Upon his death, A.D. 636, Rotharis ascended the throne, who is the first who gave written laws to the Lombards. From the year 638 to the reign of Luitprand, no acts of hostility occurred between the exarchs and the kings of the Lombards: the latter being satisfied with their new conquests, and the former being glad to enjoy unmolested the territories that remained under the dominion of the emperor. Luitprand, who ascended the throne A.D. 711, may be accounted, next to Rotharis, the chief law-giver of the Lombards: but induced by ambition he undertook to drive the Romans out of Italy, and this enterprise occasioned the ruin of the kingdom of the Lombards in that country. Luitprand invaded the exarchate, and reduced Ravenna, and several other cities of the exarchate, which he formed into a dukedom. Ravenna was af-

terwards recovered by the exarchate: but taken again by Astulphus, who changed it into a dukedom. The popes had been alarmed, and made application to Pepin, king of France, for assistance and protection. Accordingly Pepin was persuaded to make war upon the Lombards: and, in the year 754, entered Italy, and besieged Astulphus in his metropolis. Rome was twice rescued from the attacks of the Lombards, A.D. 754. At length the passes of the Alps, and the walls of Pavia, were their only defence: the former were surprised, and the latter were invested by Charlemagne, the son of Pepin; and after a blockade of two years, Desiderius, the last of their native princes, surrendered his sceptre and his capital, A.D. 774. Thus ended the kingdom of the Lombards in Italy, after they had possessed that country for 206 years. Under the dominion of a foreign king, but in the possession of their national laws, the Lombards became the brethren, rather than the subjects, of the Franks; who derived their blood, and manners and language, from the same Germanic origin. *Anc. Univ. Hist.* vol. 7. Gibbon.

During a period of 200 years Italy was unequally divided between the kingdom of the Lombards and the exarchate of Ravenna. (See EXARCH.) From Pavia the royal seat, the kingdom of the Lombards was extended to the maritime coast, and the west, as far as the confines of the Avarian, Slavonian, and the Franks of Aultraia and Burgundy. In the language of modern geography it is now represented by the Terra firma of the Venetian republic, Tyrol, the Milanese, Piedmont, the coast of Genoa, Mantua, Parma, and Modena, the grand duchy of Tuscany, and a large portion of the ecclesiastical state from Perugia to the Adriatic. The dukes, and at length the princes of Beneventum, survived the monarchy and propagated the name of the Lombards. From Capua to Tarentum, they reigned near 500 years over the greatest part of the present kingdom of Naples. In process of time, the disposition and manners of the Lombards underwent a very important change. So rapid, indeed, was the influence of climate and example, that the Lombards of the fourth generation surveyed with curiosity and affright the portraits of their savage forefathers. The government of the Lombards was an elective monarchy: and the public revenues arose from the produce of land and the profits of justice. The Lombards were at first a cruel and barbarous people; but divesting themselves, by degrees, of their native ferocity and barbarity, especially after they had embraced the Christian religion, they governed with such equity and mildness, that most other nations envied the happiness of those who lived under their administration.

As they had no other kingdom, nor dominions, Italy became their own country; whence the natives esteemed their kings as their natural princes, not thinking themselves governed, much less kept in slavery, by a foreign nation, as it happened to them afterwards, when, by frequent changes, they groined under the heavy yoke, sometimes of one nation, and sometimes of another. Under the government of the Lombards, says Paulus Diaconus, no violence was committed, no one unjustly dispossessed of his property, none oppressed with taxes; theft, robberies, murder, and adultery, were seldom heard of: every one went, without the least apprehension of danger, whither he pleased: and indeed their many wholesome laws, restraining and severely punishing all sorts of crimes; the magnificent churches, and rich monasteries, with which they filled that part of Italy which was subject to them; the many bishoprics which they erected; the towns and cities which they either built, or repaired, in most provinces of Italy; their generosity even to the bishop of Rome, their avowed enemy: and,

finally, the great number of persons among them, whose sanctity and eminent virtues have been acknowledged by the popes themselves, must convince every impartial reader, that the Lombards were not such a savage, barbarous, and inhuman nation, as they are described by some of the popes, especially by Adrian, the chief author of the ruin of their kingdom. They were the only power in Italy capable of defeating the ambitious views of the bishops of Rome, whom they would not suffer to enrich themselves with the spoils of the emperors, but considered them as their own by right of conquest; and hence arose the inveterate hatred which the popes bore them, and could not help betraying in all their writings. But their laws are convincing proofs of their justice, humanity, and wisdom, and, at the same time, a full confutation of the many calumnies, with which the popes, and their partisans, have endeavoured to asperse them. Their laws were found so just and equitable, that they were retained in Italy, and observed some ages after their kingdom was at an end.

LOMBARDS, a name given in the Netherlands, France, and England, to lending-houses. (See *LOAN-banks*.) It is well known that in the thirteenth and following centuries many opulent merchants of Italy, which at those periods was almost the only part of Europe that carried on an extensive trade, were invited to their countries, where there were few mercantile people able to engage deeply in commerce. For this reason they were favoured by governments in most of the large cities; but in the course of time they became objects of universal hatred, because they exercised the most oppressive usury, by lending at interest and on pledges. They were called *Longobardi* or *Lombardi*, as whole nations are often named after a part of their country, in the same manner as all the Helvetians are called Swiss, and the Russians sometimes Moscovites. They were, however, called frequently also Caorini, Catureini, Caurisini, Cawarini, Cawartini, Bardi, and Amanati; names which, in all probability, arose from some of their greatest houses or banks. We know, at any rate, that about those periods the family of the Corsini were in great consideration at Florence. They had banks in the principal towns for lending money; they demanded exorbitant interest; and they received pledges at a low value, and retained them as their own property if not redeemed at the stated time. They eluded the prohibition of the church against interest when they found it necessary, by causing the interest to be previously paid as a present or premium; and it appears that some sovereigns borrowed money from them on these conditions. In this manner did Edward III., king of England, when travelling through France, in the year 1329, receive 5000 marks from the bank of the Bardi, and give them in return, by way of acknowledgment, a bond for 7000. When complaints against the usurious practices of these Christian Jews became too loud to be disregarded, they were threatened with expulsion from the country, and those who had rendered themselves most obnoxious on that account, were often banished, so that those who remained were obliged to conduct their employment with more prudence and moderation. It is probable that the commerce of these countries was then in too infant a state to dispense altogether with the assistance of these foreigners. In this manner were they treated by Louis IX. in 1268, and likewise by Philip the Bold; and sometimes the popes, who would not authorise interest, lent their assistance by prohibitions, as was the case in regard to Henry III. of England in 1240.

In the fourteenth century, the Lombards, in the Netherlands, paid to government rent for the houses in which they carried on their money transactions, and something besides

for a permission. Of this we have instances at Delft in 1313, and at Dordrecht in 1342. As in the course of time the original Lombards became extinct, these houses were let, with the same permission, for the like employment; but governments at length fixed the rate of interest which they ought to receive, and established regulations for them, by which usurious practices were restrained. Of leases granted on such conditions, an instance occurs at Delft in the year 1655. In 1578, William prince of Orange recommended to the magistrates of Amsterdam Francis Masafia, one of the Lombards, as they were then called, in order that he might obtain for him permission to establish a lending-house; as many obtained permission to keep billiard-tables, and Jews letters of protection. In the year 1611, the proprietor of such a house at Amsterdam, who in the latter years of his lease had gained by his capital at least thirty-three and a half per cent. offered a very large sum for a renewal of his permission; but, in 1614, the city resolved to take the lombard or lending-house into their own hands, or to establish one of the same kind. However detailed this plan might be, a dispute arose respecting the legality of it, which Murets and Claude Saumaise endeavoured to support. The public lending-house or lombard at Brussels was established in 1619; that at Antwerp in 1620, and that at Ghent in 1622. All these were established by the archduke Albert, when he entered on the governorship, with the advice of the archbishop of Mechlin; and on this occasion the architect Wenceslaus Coberger was employed, and appointed inspector-general of all the lending-houses in the Spanish Netherlands. Some Italians assert, that the Flemings were the first people who borrowed money on interest for their lending-houses; and they tell us that this practice began in the year 1619. We are assured also, that, after long deliberation at Brussels, it was at length resolved to receive money on interest at the lending-houses. It however appears certain, that in Italy this was never done, or at least not done till a late period, and that the capitals of the lending-houses there were amassed without giving interest.

This beneficial institution was always opposed in France; chiefly, because the doctors of the Sorbonne could not divest themselves of the prejudice against interest; and some in modern times who undertook there to accommodate people with money on the like terms, were punished by government. A lending-house, however, was established at Paris, under Louis XIII. in 1626; but the managers next year were obliged to abandon it. In 1695, some persons formed a capital at Marseilles for the purpose of establishing one there according to the plan of those in Italy. The *mont de piété* at Paris, which has had sometimes in its possession forty casks filled with gold watches that have been pledged, was, by royal command, first established in 1777. Beckmann's *Hist. of Inventions*, vol. iii.

LOMBARDY, in *Geography*, a country in the northern part of Italy, very much corresponding with the Cisalpine Gaul of the Romans. It derived its name from the Lombards, (see the article *LOMBARDS*.) who founded the kingdom in the middle of the sixth century. This country was divided into several states, subject to the house of Austria, the republic of Venice, and the king of Sardinia; such as the duchies of Milan and Mantua, called Austrian Lombardy; the Paduan, Veronese, Vicentin, Brescian, Comasco, Bergamasco, belonging to Venice;—Monferrat and Nice, annexed to Piedmont, subject to the king of Sardinia;—together with many others, as the duchies of Modena, Reggio, Parma, Piacenza, Mirandola, and several smaller principalities and states. The vicissitudes which Lombardy has undergone, and more especially those which have occurred

to it since the French revolution, are briefly detailed under *Cisalpine Republic*, and *ITALY*. See likewise each of the above enumerated articles.

LOMBES, a town of France, and principal place of a district in the department of the Gers, the see of a bishop before the revolution; 16 miles S.E. of Auch. The place contains 1443, and the canton 12,145 inhabitants, on a territory of 290 kilometres, in 39 communes.

LOMBOK, an island in the East Indian sea, about 40 miles from N. to S. and from 18 to 30 broad, chiefly inhabited by Gentoos; between which and Cumbava is a passage, called the "Straits of Lombok."—Also, a town on the E. coast of the same island. S. lat. 8° 42'. E. long. 116° 2'.

LOMBUZZKOL, a small island in the Frozen ocean; near the coast of Russia; 180 miles E. of Kola. N. lat. 67° 55'. E. long. 40° 14'.

LOMBY, a town of Hindoostan, in the Carnatic; 20 miles N.W. of Tiagar.

LOMEIR, JOHN, in *Biography*, a learned Dutch Protestant divine, pastor of the church of Dotekum in Zutphen, was author of a curious little work abounding in erudition and deep research, in which he has undertaken to give historical and critical notices of the most celebrated libraries in ancient and modern times. It is entitled "*De Bibliothecis Liber Singularis*;" 12mo. The author's plan gave rise to a larger work on the same subject, by Maderus, a learned German, who published at Helmstadt a treatise "*De Bibliothecis*," in two vols. 4to., in which he has inserted Lomeir's piece.

LOMENTACEÆ, in *Botany, a natural order of plants, the 33d among the *Fragmenta* of Linnæus, named, as it should seem, from *lomentum*, the meal of beans, in allusion to the pulse-like nature of the plants in question, so as to keep in view their analogy with the *Papilionaceæ*. They are included in the three first sections of Jussieu's *Leguminosæ*, or nearly so; see that article. *Polygala* indeed, placed here by Linnæus, is referred by Jussieu to the *Pedicularis*.*

LOMENTUM, a word used by the old writers on medicine to express a meal made of beans, or bread made of this meal, and used as a wash. See *DETERSORIUM*.

Others have applied it to the French chalk, or morochthus, used by the sewers of clothes, which is brought over in large cakes, resembling loaves or cakes of bread.

LOMGRAD, in *Geography*, a town of Bulgaria, at the conflux of the river Lom with the Danube; 20 miles S.S.E. of Viddin.

LOMI, a town of Russia, in the government of Irkutsk, on the Amur; 16 miles N. of Stretensk.

LOMMETSCH, or **LUMTSCH**, a town of Saxony, in the margravate of Meissen; seven miles N.W. of Meissen. N. lat. 51° 11'. E. long. 13° 13'.

LOMMIUS, JONOCUS, (VAN LOM, in his native language,) in *Biography*, a medical writer of reputation, was born at Beren, in Guelderland, about the commencement of the sixteenth century. His father, who was town-clerk of that place, took great care of his education. He was already well versed in the Latin and Greek languages, when he turned his attention to medicine, which he studied principally at Paris, where his talents and assiduity obtained him the friendship of Fernel. It is not known where he took his degree; but he practised for a considerable time at Tournaï, to which city he was pensionary-physician in 1557; and he removed to Brussels, at an advanced period of life, about the year 1560. He was living in this city in 1562,

beyond which period there is no record of him. He left three small works, which are still held in estimation in consequence of the purity and elegance of the Latin in which they are written: these are "*Commentarii de Sanitate tuenda in primum librum C. Celsi*," Louvain, 1558, 12mo. This is an ample commentary upon Celsus, taken entirely from the ancients. "*Observationum Medicinarum Libri tres*," Antwerp, 1560. This work has passed through many editions: it consists of histories of disease, related with the simple perspicuity of Celsus, and containing many useful and valuable observations on the diagnostics, prognostics, and cure. "*De curandis Febris continuis Liber*," Antwerp, 1563. This little treatise, like the foregoing, has been several times printed and translated. These works were published together at Amsterdam, in 1745, in three vols. 12mo., under the title of "*Opera omnia*," Eloy Did. Hist.

LOMNITZ, in *Geography*, a town of Bohemia, in the circle of Königgrätz; six miles N. of Gitschin.—Also, a town of Moravia, in the circle of Brunn; 15 miles N.N.W. of Brunn. N. lat. 49° 24'. E. long. 16° 18'.

LOMNITZ Peak. See *CARPATHIAN Mountains*.

LOMOND, **LOCH**, a lake situated in the county of Dunbarton, Scotland. It is the finest and most beautiful expanse of water in that country, and not surpassed, in variety and magnificence of scenery, by any in Great Britain. This lake extends about twenty-six miles in length from north to south, and varies from one to eight miles in breadth. The broadest portion is towards the south. As it approaches the north, it gradually contracts. Here it is much deeper than in the broader parts. At the foot of Benlodon the depth is about 120 fathoms, but in the south division it is not generally much above 14 fathoms. The northern and deeper part of this lake is never covered with ice even in the severest frosts, but south from Luss, it is often frozen over so completely, that not only men but loaded horses can pass over it to the different islands in perfect safety.

Loch Lomond is supplied with water from several rivers, besides smaller streams from the mountains. It has, however, but one way of discharging itself, and this is the reason why it swells in wet seasons even so high as six feet above its usual level. Fish are caught here in great abundance, particularly salmon trout, eels, and perch, as likewise a species called pollocks, which resemble in appearance and flavour the large herrings.

The beauties of this lake have often been the subject of description, both in poetry and prose. These seem chiefly to arise from the woods in its vicinity, the number and variety of its islands, and the near approach of the terrific Grampians, which afford a striking contrast to the more placid scenery immediately adjacent. At the house of Cameron, placed at the southern extremity of the lake, the whole charms of this delightful expanse are in full view. After passing this mansion, the road skirts along the western bank, sometimes losing itself among the natural foliage that clothes the brow of the mountains, and at other times emerging into a more free space; thereby presenting in succession a variety of views of the lake, islands, and neighbourhood, highly captivating and delightful.

The islands in Loch Lomond, small and great, are usually reckoned to be thirty in number. Most of them are finely wooded, but not above ten are of any considerable size. The principal ones are the property of the duke of Montrose and sir James Colquhoun of Luss. Inchcailloch, or the island of old women, so called from a nunnery formerly there, was at one time the site of the church of Bueloch.

in Stirlingshire. Inchmurin is the most valuable island in the lake, and has a deer park belonging to the duke of Montrose. The island of Inch-tavanach, *i. e.* the island of the monk's-house, derives its name from the circumstance of a monk having fixed his residence here at a very remote period. The other islands are not deserving of particular notice, except as all contributing, by the beauty of their verdure, to render the whole scenery more interesting and varied than it otherwise would be.

Loch Lomond has long been celebrated for three wonders, "fish without fins, waves without wind, and a floating island." The fish without fins are manifestly vipers, which abound here in great plenty, and sometimes twin from one island to another. Waves without wind are common to this lake, with all extensive deep waters, when a calm immediately succeeds a storm. The floating island is now fixed near the west shore of the isle of Incheonagan, and if it ever did float, must be considered as a mossy fragment bound together by the matted roots of coarse grasses, willows, Dutch myrtles, &c.

The waters of this lake are supposed to be rising in height. Across the channel of a stream called Falloch, at the northern extremity, there are a number of stones fixed regularly, and evidently intended for enabling passengers to cross from one side to the other, which are now however covered with at least five feet of water. Near the middle of the bay of Camstraddan, when the water is low, there is a heap of stones visible, which is said to have formerly composed the residence of the Colquhouns of Camstraddan. Camden, in his *Atlas Britannica*, mentions an island existing here in his day, with a house and garden upon it. About five miles to the south of this heap of stones there is another, said to be the ruins of an ancient church: the field opposite to it is still called Church-field.

The village of Luss is delightfully seated on the western bank of the lake, and on the post road from Glasgow to Inverary. In the immediate vicinity of this village, Rosedoe, the mansion house of Sir James Colquhoun of Luss, is placed on a rich peninsula, projecting so far into the lake as to appear insulated. The ground is finely wooded, and a tower of the ancient castle, or habitation of the family, forms an excellent contrast to the modern house. Some very bold and rugged mountains compose the back ground of this charming scenery. Between Luss and Tarbet the road diminishes in breadth very rapidly. Passing the water of Uglas, which discharges itself into the lake, it ascends a lofty promontory, projecting considerably in the lake, which is called the point of Firkin. The ascent to the summit of this eminence is abrupt, difficult, and tedious, but the view which displays itself from it amply repays the admirer of nature for the labour attending it. Nearly opposite to this point Benlomond rears his lofty head on the eastern side. For a description of this mountain and its scenery, see the article BENLOMOND.

LOMOND Hills, two beautiful conical hills situated in the county of Fife, Scotland. The eastern one is by far the most beautiful, and rises 1650 feet above the level of the town of Falkland, which is placed at a short distance from its base. It appears to have been the seat of a fort in ancient times. On the very summit is a small lake, which has probably been the crater of an extinct volcano. On this hill a mine of lead has been lately opened with good prospects of success to the proprietors. It likewise contains coal and limestone in considerable abundance, but neither of them are wrought. The other hill, which is called Western Lomond, from its situation with respect to the former, is

much higher than it, and perhaps commands a more extensive view. On the top is one of those heaps or tumuli of stones which are denominated cairns.

LOMONOZOF, in *Biography*, accounted the father of Russian poetry, was born at Kolmogori in 1711, where his father was a dealer in fish. He possessed the rare advantage of persons in his station, of learning to read his native language, and caught a flame of poetical inspiration by perusing a translation of Solomon's song into rude verse. His love of learning induced him to leave his father, and take refuge in a monastery at Moscow, where he laid a good foundation in the learned languages, and displayed such talents, that he was sent by the Imperial Academy for improvement to the German university of Marburg. He studied under Wolf and the other celebrated professors. On his return to his native country he was elected adjunct, and then member of the Imperial Academy, and professor of chemistry, in which science he was a considerable adept, having studied it under Kunckel at Freyburg in Saxony. In 1764 he was honoured with the title of counsellor of state. He died in the same year. His reputation as a literary man is founded on his poetical compositions, which are numerous and various in their kinds. His odes are admired for their spirit and sublimity, in which he is said to rival Pindar. In these, and in his other poems, he was the creator of various measures new to Russian verse, so that he ranks as its greatest benefactor. He was author likewise of tragedies, idylls, and epistles, and he left a fragment of an epic poem on Peter the Great. He published some chemical and philosophical tracts, and two short pieces on the history of Russia, and he enriched the language of his country with some translations from the Greek and Latin.

LOMPAR, in *Geography*, a small island in the Baltic, near the S.E. coast of Åland. N. lat. 60° 10'. E. long. 20° 9'.

LOMWIA, in *Ornithology*, the name of a web-footed water-fowl common on the English shores, and called in different places the *guillem*, *guillemot*, *sea-hen*, *kidlaw*, and *skout*: the last name, however, is somewhat equivocal, as the Scotch call the common *razor-bill* by this name. See COLUMBUS TROLE.

LOMZA, in *Geography*, a town of the duchy of Warsaw, situated on the Narew; 80 miles N.E. of Warsaw. N. lat. 53°. E. long. 22° 40'.

LONAS, in *Botany*, Adans. Fam. v. 2. 118. Gærtn. v. 2. 396. t. 165, a genus established by those authors upon the *Achillea inodora*, Linn. Sp. Pl. 1265, *Athanasia annua*, Syst. Veg. ed. 14. 741.

LONATO, or LONADO, in *Geography*, a town of Italy, in the department of the Veneto; 12 miles E.S.E. of Brescia.

LONCHITIS, in *Botany*, a name derived from *λόνχη*, a spear, borrowed from the Greeks, and applied by Tournefort to what he esteemed a distinct genus of ferns, characterized by having auricled leaflets. Linnæus has retained it for one of the same family, better defined by the fructification, of which we are now to speak. The *λόνχη* of Dioscorides has always been a subject of dispute, though his description is more full and precise than usual. Some have thought it *Iris tuberosa*, others *Serapias Lingua*. His *λόνχη* however does appear to be a fern.—Linn. Gen. 560. Schreb. 757. Mart. Mill. Dict. v. 3. Sm. Mem. de l'Acad. de Turin. v. 5. 413. Tracts 244. Swartz. Syn. Fil. 93. Sprengel. Crypt. 127. t. 4. f. 27. Juss. 15. Lamarck Illustr. t. 868.—Class and order, *Cryptogamia Filices*. Nat. Ord. *Filices*, Linn. Juss.

Gen.

Gen. Ch. *Capsules* annulated, numerous, assembled in crescent-shaped, short, when young often divided, lines, in the margin of each sinus of the leaves. *Involucrum* membranous, proceeding from the margin of the leaf, inflexed, often divided in the middle.

Eff. Ch. Fructification in crescent-shaped spots, in the sinuses of the leaves. *Involucrum* from the inflexed margin of the leaf, separating inwards.

1. *L. aurita*. Linn. Sp. Pl. 1536. (*Filix latifolia*, spinulis mollibus et nigris aculeata; Plum. Fil. 14. t. 17. Petiv. Fil. t. 4. f. 4.—Frond pinnate; pinnatifid; the lower pair of leaflets divided; lobes obtuse, smooth, wavy, toothed at the summit. Stalk prickly.—This species, which Plumier only appears to have seen, was gathered by him in the course of a valley, in a district of Martinico, commonly called *le Prescheur*. The root consists of numerous, black, entangled fibres. *Fronde* five or six, erect, about a foot and a half high; their stalks brownish, polished, clothed with numerous, horizontal, black, plant prickles. The upper half of the plant consists of a few nearly opposite pairs of long and broadish, pinnatifid, pointed leaves, or *pinnae*, very thin, membranous, smooth, delicate, and finely veined, of a bright green. Their segments are separated rather more than half way to the rib, broadish, wavy at the edges, toothed at their blunt apex, and bearing at their sinuses, between each other, a crescent-shaped thick mass of *fructification*, which seems not to be cloven or divided.

2. *L. hirsuta*. Linn. Sp. Pl. 1536. (*Filix villosa*, pinulis quercinis; Plum. Fil. 16. t. 20. Petiv. Fil. t. 4. f. 5.)—Frond hairy, doubly pinnate; deeply pinnatifid; lobes sinuated, obtuse, wavy, many-flowered.—Gathered by Plumier by rivers in Martinico; by R. Shakespear in Jamaica. We have also specimens from J. V. Thompson, esq. collected by him in some part of the West Indies; yet this species is very rare. It differs widely from the former in its hairiness and much greater size, being five or six feet high, and the stalks near an inch thick. The frond moreover is doubly pinnate, either in an alternate or opposite manner; its leaves very deeply pinnatifid, pointed, their obtuse segments also pinnatifid, or at least deeply sinuated, each sinus bearing a crescent-shaped mass of seeds, or rather two separate masses, each with its own roundish *involucrum*, most unlike that of an *Adiantum*, though they finally, for the most part, coalesce.

3. *L. javanica*. Lamarck Dict. v. 3. 594. Swartz Syn. Fil. 94.—Frond hairy, once or twice pinnate; deeply pinnatifid; lobes sinuated, pointed, crenate, many-flowered. *Involucrum* simple.—Gathered by Commerçon in Java, according to Lamarck, though the specimen given to the younger Linnæus by Thouin is marked as coming from the Mauritius. It seems at any rate to be of East, not West, Indian origin, and differs essentially from the foregoing. How often the frond is decomposed, we have not materials to determine. Our specimen has two opposite *pinnae* only, each above a foot long, pointed, very deeply pinnatifid, clothed with fine soft pubescence, beautifully reticulated with veins; dark-green above, brighter beneath. The segments are likewise sharp-pointed, about fifteen pair, deeply sinuated, crenate. One thick, brown, semilunar mass of *fructification*, stands in each sinus, and is, as far as we can discern, simple and undivided, as well as its *involucrum*.

4. *L. glabra*. Swartz. n. 3. Bory de St. Vincent Voy. v. 1. 321.—“Frond doubly compound, smooth; leaves somewhat pinnate; their divisions deeply crenate.”—Native of the isle de Bourbon. We know nothing of this species

but the above character, which, except as to smoothness, gives no very precise information.

5. *L. repens*. Linn. Sp. Pl. 1536. (*Filix aculeata repens*; Plum. Fil. 11. t. 12. Petiv. Fil. t. 4. f. 6.)—Frond thrice pinnate; leaves deeply pinnatifid; lobes sinuated, obtuse, crenate. Stalks prickly. Root creeping.—Gathered by Plumier in Martinico. He described the root as extremely long, creeping like couchgrasses, half the thickness of the finger, black both within and without. *Fronde* spreading horizontally and very widely. Their general and partial stalks prickly, twice pinnate, in an alternate order. *Leaves* about six inches long, pointed, very deeply pinnatifid, if not pinnate; their segments oblong, obtuse, deeply sinuated. *Fructification* small, apparently solitary in each sinus. We know not on what grounds Linnæus fixed the genus of this species, which no other botanist than Plumier appears to have seen. As far as his figure goes, it may belong to *Dicksonia*, or *Cyathea*, as probably as to *Lonchitis*.

The *L. pedata* of Linnæus, Sp. Pl. 1536, like a few others named or published by different botanists, belong rather to *Pteris*, betwixt which genus and the present, it is not always easy to draw a line.

LONCHIURUS, in *Natural History*, a genus of fishes of the order thoracici: pectoral fins separate; tail lanceolate. There is only one species, viz. the *barbatus*, brown, with two cirri under the chin, which is about ten inches long, and inhabits the rivers of Surinam.

LONDINIARES, in *Geography*, a town of France, in the department of the Lower Seine, and chief place of a canton, in the district of Neufchâtel; 7 miles N. of Neufchâtel. The place contains 764, and the canton 5691 inhabitants, on a territory of 225 kilometres in 32 communes.

LONDON, the metropolis of the British empire, the most wealthy, most extensive, and probably the most populous and powerful city in the world, is seated in a fertile and salubrious plain or valley, on the banks of the river Thames, which divides the town into two irregular parts, and passes through it, from the west to the east, in its progress to the sea. Many cities and towns of antiquity have been famous in the annals of nations: Nineveh was noted for its towers and walls of vast circumference, height, and breadth; Babylon, for the hanging gardens, and other objects of human labour; Persepolis, for its natural fortifications; Palmyra and Balbeck, for sumptuous buildings; and Athens and Rome, for the civilization, refinement, and high accomplishment of their inhabitants. But London may be denominated the modern wonder of the world. The prodigious increase of houses, inhabitants, trade, commerce, and wealth, with the refinement and luxury which now prevail, render it superior to all the cities of modern Europe; and must excite the astonishment of such foreigners and Englishmen as have studied the local and comparative histories of places of note. It may be regarded as the focus of the British empire; for within its jurisdiction are concentrated the royal, legislative, juridical, civil, commercial, scientific, and literary concerns of Great Britain. Many writers have been employed, at different periods, to narrate the annals of this great town; and several volumes in folio, quarto, octavo, &c. have been exclusively devoted to the topographical history of London: but all are imperfect and unsatisfactory: the largest works being mostly tedious, trivial, and prolix; and the smaller publications are very superficial and inaccurate. At the end of this account will be given a list of several of these works; to point out the sources of the present

essay, and to furnish the reader, who may require more circumstantial information, with a guide to facilitate his researches. The following article will comprehend a general view of the history and local characteristics of this metropolis, with some particular descriptions; but for detailed accounts of many buildings, places, and objects, the reader is referred to the following heads, in different parts of this work: *BANK of England*, *BRIDEWELL*, *BRIDGES*, *COMPANY*, list of 91 in London, and accounts of the principal; *COLLEGE of Civilians*, or *Doctors-Commons*, *COLLEGE of Herolds*, *COLLEGE of Physicians*, *COLLEGE, Sign*, *COLLEGE of Surgeons*, *COLLEGE, Veterinary*, *ROYAL EXCHANGE*, *CUSTOM of London*, *DOCKS of London*, *EXCISE*, *FLEET-PRISON*, *GRESHAM COLLEGE*, *GUILDHALL*, *HOSPITALS of Bethlehem*, *Bridewell*, *Christ*, and *Foundling*, *INNS of Court*, *INSURANCE Companies*, *ISLINGTON*, *LAMBETH*, *HACKNEY*, *MARY-LE-BONE*, *PADDINGTON*, *MIDDLESEX*, *SERRY*, *NEWINGTON-BUTTS*, *THAMES*, *POLICE*, *PARLIAMENT*, *NEW-RIVER*, *LIMEHOUSE*, *STRATFORD-LE-BOW*, *SOUTHWARK*, *WESTMINSTER*.

The centre of London, or St. Paul's church, is ascertained to be in latitude $51^{\circ} 31' N.$, and in longitude $5^{\circ} 37' W.$ of Greenwich, where the royal national observatory is established. The distance of London from the principal cities of Europe is as follows: from Edinburgh 395 miles S.; from Dublin 338 S.E.; from Amsterdam 190 miles W.; from Paris 225 miles N.N.W.; from Copenhagen 610 miles S.W.; from Vienna 820 miles N.W.; from Madrid 860 miles N.E. by E.; from Rome 950 miles N.N.W.; from Constantinople 1660 miles; from Moscow 1660 miles E.S.E.; from Stockholm 750 miles; from Petersburg 1140 miles; from Berlin 540 miles; and from Lisbon 850 miles.

London, as considered in the aggregate, comprises the city and its liberties, with the city and liberties of Westminster, the borough of Southwark, and nearly thirty of the contiguous villages of Middlesex and Surry. The greatest portion is built on the northern bank of the Thames, or in Middlesex; whilst Southwark, with Lambeth, and several connecting villages, extend along the southern shore of the same river, in the county of Surry. The extent of London, from west to east, or from Knightsbridge to Poplar, is full seven miles and a half; whilst its breadth, from north to south, or from Newington Butts to Islington, is nearly five miles. The circumference of the whole, allowing for various inequalities in the extension of streets, &c. at the extremities, cannot be less than thirty miles. Hence it may be fairly estimated, that the buildings of this metropolis cover at least eighteen square miles, or 11,520 square acres. Out of this must be deducted the space occupied by the river Thames, which extends about seven miles, or 12,320 yards in length, by one quarter of a mile, or 400 yards in width; making 1120 square acres.

Independently of various local and civil divisions, London may be said to consist of five distinguishing parts, or popular portions: viz. the west end of the town, the city, the east end of the town, Westminster, and the Borough. The "west end of the town," extending from Charing-Cross to Hyde-park, and from St. James's park to Paddington, is considered the best and most fashionable part of the town, and is laid out in the two great thoroughfares, called Oxford road and Piccadilly, with various handsome squares and streets, which are chiefly occupied by the town-houses of the nobility and gentry, and the most fashionable shops. The "city" includes the central part, and most ancient division of the metropolis. This is the emporium of com-

merce, trade, and business; and is occupied by shops, warehouses, public offices, and houses of tradesmen and others connected with business. The "east end of the town," and its inhabitants, are devoted to commerce, to ship-building, and to every collateral branch connected with merchandize. This division of London has assumed a novel character since the commencement of the present century, by the vast commercial docks and warehouses that have been formed and constructed here. The southern bank of the Thames, from Deptford to Lambeth, bears some resemblance to the east end of the town; being occupied by persons engaged in commercial and maritime concerns; docks, wharfs, and warehouses being abundant. But this part of London has one distinguishing feature from any other, as it abounds with numerous and various manufactories; iron-foundries, glass-houses, soap-boilers, dye-houses, boat-builders, snut and hat manufactories, &c. and many other similar establishments. From the great number of fires employed in these houses, and offensive effluvia arising from some of the works, this district is rendered extremely unpleasant, if not unhealthy, for human residence. It is therefore mostly inhabited by workmen, labourers, and the lower classes of society. Many improvements have lately been made, and several respectable houses erected on St. George's field. In Westminster are the houses of lords and commons, the courts of justice, and many offices belonging to government. Another part of the metropolis, not hitherto noticed, but which may be considered as the last enlargement, and the most regular and systematic in its arrangement of squares, streets, &c. is the northern side of the town; comprehending a large mass of new buildings between Holborn and Somers-town, and in the parishes of Mary-le-bone and Paddington. Nothing shews the increased and increasing growth of the English metropolis more decisively than the vast number of new squares, streets, rows, and places, that have been recently erected, and are now in the progress of building, all round the metropolis. London is computed to contain nearly 70 squares, and 8000 streets, lanes, rows, courts, &c. According to a census obtained in the year 1811, the population of London, Westminster, and their suburbs, was 1,099,104 persons; being an increase of 133,139 within the course of ten years. Well might Cowper exclaim,

"Opulent, enlarged, and still increasing London."

It would be both amusing and interesting to trace the progressive growth or expansion of London; to describe it at different and remote periods; and delineate, with a careful and accurate pencil, the natural and artificial, the political and civil, the moral and commercial characteristics of the British metropolis, at different epochs. Some of these features will be noticed in the progress of our survey; but many must necessarily be omitted, from the peculiar nature of the present publication.

Ancient History and Antiquities of London.—It is generally admitted by topographers, that the present site of London was occupied as a British town before the arrival of the Romans. Of this, however, there is no evidence: for Geoffrey of Monmouth is not to be trusted, nor is his assertion entitled to respect. We are informed by Tacitus, that about the year 61, Londinium, or Colonia-Augusta, "was the chief residence of merchants, and the great mart of trade and commerce, though not dignified with the name of a colony." (Ann. lib. xiv. c. 33.) Boadicea, the amazonian queen of the Britons, headed a large body of natives, and, after conquering Camalodunum and Verulam, took posses-

tion of Londinium. At this time, it appears that Londinium was not fortified in the Roman manner, and was inferior to either of the other places just named. In a few years afterwards, the Romans made it a permanent station; surrounded it with a fortified wall of stone and brick, and governed the inhabitants by Roman laws. The course and extent of the walls were as follows: commencing at a fort, near the present tower of London, the wall was carried in a line directly north to Ald-gate; thence it made a curve to the south-west, to Bishops-gate, from which it continued in a straight line to Cripple-gate and Alders-gate; here it turned to the south, and proceeded to New-gate, where it made almost a right angle, turning to the south, to Lud-gate, and on to the banks of the Thames. The circuit of this part of the boundary, according to Stow, was nearly two miles and one furlong. Another wall, of about one mile in length, extended along the northern bank of the Thames, from the fort near the Tower to another fort near the present Black-friars bridge. These walls were defended, at different distances, by strong towers and bastions. The height of the wall is said to have been 22 feet, and the towers 40 feet. The superficial contents of the area thus enclosed have been computed at about 400 acres. Nearly through the middle of this station passed a stream, since called Wall-brooke. Dr. Stukeley, in his "Itinerarium Curiosum," has given a plan of Londinium, shewing the extent and form of the station, with the number of gates in the walls, and the military roads that branched off from it. The burial-places were without the walls, on the north and eastern sides of the town. Londinium was advanced from a *præfectura*, i. e. a town governed by a Roman præfect, to the rank of a colony. It also became the seat of the vicarius Britanniarum, and of the commissioners of the treasury under the Roman emperors. To enter into accounts of all the various remains of the Romans, which have been discovered at different times within the limits of London, would lead us into a long dissertation: it must suffice to state, that tessellated pavements, urns, coins, pottery, foundations of buildings, and other evident relics of the Romans, have been frequently found beneath the present surface. At the Bank, near the India house, and in Lombard street, some pavements have been taken up; and in various other parts of the city have been found evident traces of Roman habitations, and Roman customs. The London stone in Cannon street is considered, by most antiquaries, as part of a Roman millary. These are all particularly described in Brayley's Survey of London and Middlesex, vol. i. 1810.

Very little is known of London during the Anglo-Saxon dynasty; nor do we know of any buildings, or other local antiquities, which may be referred to that period. Under the Saxons, London, then called Lunden, Lundone, Lundenburg, Lundenes, Lundeneaster, gradually increased in extent and affluence; and, according to Bede, it then became the "emporium of many nations." Religious edifices were erected in the seventh century, on the sites of St. Paul's and Westminster Abbey. It is presumed there was a bridge across the Thames, near Westminster, previous to the year 994: as William of Malmesbury, when speaking of the repulse of the Danes under Sweyn and Olaf, says that "part of them were drowned in the river, because, in their hasty rage, they took no heed of the bridge." In the time of king Athelstan, a law was passed respecting coinage, by which it is specified that London was allowed eight minters, whilst only seven were appointed for the cities of Canterbury and Winchester.

Soon after the Roman conquest, a fortress or castle was built on the banks of the Thames; and this was enlarged

by Gundulph, Bishop of Rochester, who erected the White tower, within the Tower of London. In the same reign St. Paul's church was commenced; and the strong castles of Baynard and Montfichet, both of them standing on the banks of the Thames within the city walls, were erected by two of the Norman king's officers, named Baynard and Montfichet. During this and several succeeding reigns, the public buildings of London were greatly augmented in number, by the erection of several religious edifices, abbatial and episcopal residences. The royal palace at Westminster, which had been founded by Edward the Confessor, was considerably enlarged; and a large hall was built there by William Rufus. The reign of Henry I. was distinguished by the foundation and construction of many monastic houses; and several others were established during the Anglo-Norman and Plantagenet dynasties.

A list of the religious houses, with the time of their different foundations, will afford a tolerable idea of the gradual increase of the city, with respect to such establishments, and of the difference between ancient and modern London. The town appears to have contained no less than fifty-four monastic houses, such as abbies, priories, nunneries, hospitals, colleges, &c.

St. Paul's cathedral was first founded by Ethelbert, king of Kent; church rebuilt in 964; again in the time of William Rufus. The present church commenced in 1675.

The priory of St. Martin-le-Grand, founded by Withred, king of Kent, in the year 700; was given, in 1502, by Henry VII. to Westminster Abbey; the street of St. Martin-le-Grand is still annexed to Westminster.

The nunnery in Clerkenwell, founded in 1100, by sir Jordan Briset.

The hospital of St. John of Jerusalem, in Clerkenwell, was founded in 1100, by the same.

The Holy Trinity, or Christ-church, within Ald-gate, was founded by the empress Maud, in 1108, for Austin canons.

The priory of St. Bartholomew in West Smithfield was begun by Rahere, in 1123; the hospital soon afterwards.

A Benedictine nunnery of Haliwell, by Robert Fitz-Gelran, before 1127.

St. Katherine near the Tower, by the empress, before 1148.

The Old Temple of Holborn, in 1118; and the new one near Fleet-street, by the order, in 1185.

St. Mary Spittle, by Walter Brune, in 1197.

St. Thomas of Acre, in the end of Henry II.'s reign, by Thomas Fitz-Theobald.

The college of Allhallows Barking, by Richard I.

The nunnery of St. Helen's, in Bishops-gate-street, was founded by William Fitz-William, in 1210.

The Black Friars had a house near Chancery-lane, but afterwards begged or bought the ground near Caille Baynard, soon after 1221.

The Grey Friars, about 1224; afterwards in Newgate street.

The White Friars, by sir Rich Grey, in 1241.

A priory for Austin Friars was established in Broad-street, by Humphry Bohun, earl of Hereford, in 1253.

The Friars of the Sack, Old Jewry, 1257. Order dissolved, 1307.

The Crossed or Crutched Friars, by Ralph Hoesier and William Saberns, in 1298.

The Rolls, or Domus Converterorum, by Henry III. in 1231, for the conversion of Jews.

St. Mary Rouncivall in the Strand, about the same period.

L O N D O N.

The hospital or priory of St. Mary of Bethelam or Bedlam, was granted by Simon Fitz-Mary, in 1247.

The convent of St. Clare, in the Minories, by Edmund earl of Lancaster, in 1293.

A college and hospital, called Elsing Spittle, were founded by William Elsing, a citizen, in 1329.

Sir John Pountney founded a college in Cannon-street, in 1332.

St. Mary of Graces, or East-Minster, a Cistercian abbey, was founded by king Edward III. in 1350.

The Charter-House, before 1370, by sir Walter de Manny, and Michael de Northburgh, bishop of London. See CHARTREUSE.

The hospital of the Savoy, in 1505, by Henry VII.

Besides these, the guilds or fraternities of London were very numerous. There was a brotherhood and chapel of the Holy Trinity in Leadenhall, and several others were founded in most churches. The grand suppression of the whole commenced in 1537. Exclusive of the religious houses, the bishops and parliamentary abbots had each a town residence of state.

The abbot of St. Anslin's, Canterbury, house was in the parish of St. Olave's, Southwark.

The abbot of Eveham's, in the parish of St. Catherine Cree.

The abbot of Reading's, at Baynard castle, in the parish of St. Andrew Wardrobe.

The abbot of St. Mary's, York, at St. Peter's Place, Paul's Wharf.

The abbot of Glastonbury, in West Smithfield.

The abbot of Hyde, in the parish of St. Mary at Hill.

The abbot of Ramsey, in Whitecross-street.

The abbot of Bury St. Edmund's, in St. Mary-street, Aldgate.

The abbot of St. Alban's, in Lothbury.

The abbot of Peterborough, in the parish of St. Gregory.

The abbot of Salop, near St. Bartholomew's, West Smithfield.

The abbot of Leicester, in the parish of St. Sepulchre.

One instance of the service which was rendered to the public, even in London, by the monastic institutions, is worthy of note: the priory of St. Mary Spittle contained, at its dissolution about the year 1536, no less than 180 beds for the reception of sick persons and travellers. The hospitals which were suffered to remain, owed their continuance to sir Richard Gresham, mayor of London, in 1537, who petitioned the king to bestow the lands belonging to this, St. Bartholomew's, St. Thomas's, and the new abbey on Tower-hill, on the corporation, for the relief and use of the poor, the sick, and the vagrant.

Annals of London, from the Departure of the Romans to the Accession of Edward I.—When the Romans, from the distracted state of the empire, found it necessary, in the early part of the fifth century, to withdraw their troops from the distant provinces, London again became a British town, and is mentioned in the Saxon chronicle in the year 457, when the Britons fled thither on their defeat by the Saxons under Hengist, who, about twenty years afterwards, made himself master of London; but on his death, in 498, it was retaken by Ambrosius, and retained by the Britons during a considerable part of the next century. It afterwards became subjected to the newly-established Saxon kingdom of Essex. On the conversion of the East Saxons to Christianity, London was nominated as the bishop's see, Melitus being appointed the first bishop in the year 604: a cathedral church

was erected in 610, on the site of the present St. Paul's. During the period of the Saxon heptarchy, but few notices of London appear to have been recorded. In 664 it was ravaged by the plague; and in 764, 798, and 801, it suffered severely by fires; in that of 798 it was almost wholly consumed, and great numbers of the inhabitants perished. On the union of the Saxon kingdom under Egbert, London, though not the royal residence, or seat of government, as has been erroneously stated, was advancing in consequence, as appears from a Wittenagemot having been held here in 833, to consult on proper means to repel the Danes. By these invaders London was repeatedly pillaged and laid waste. In 925 king Athelstan had a palace here; the city increased in importance under the Danish sovereigns, and under Edward the Confessor; and on the successful invasion of William the Conqueror, the magistrates of London, conjointly with the prelates and nobility, invited him to accept the title of king of England. From this period London may be considered as the metropolis of the kingdom.

William, at the commencement of his reign, granted a charter to the citizens, which is beautifully written in the Saxon characters, and is still preserved among the city archives: it consists of only five lines on a slip of parchment, six inches long and one broad. In the year 1077 the greatest part of the city was destroyed by fire. In the following year the king founded the fortress, now called the White Tower, for the purpose of keeping the citizens in awe, as he had reason to suspect their fidelity. In 1086 another fire consumed the principal part of the city, together with the church of St. Paul. Maurice, then bishop of London, laid the foundation of the new church: "a worke," Stow observes, "that men of that time judged would never have been finished, it was then so wonderful." It is remarkable that Domesday book, though so minute in regard to other cities and towns, does not contain any notice of London. A vineyard is mentioned in Holborn belonging to the crown, and ten acres of land near Bishopsgate (now the manor of Norton-Falgate) belonging to the dean and chapter of St. Paul's. In November, 1090, above 600 houses and several churches were blown down by a tremendous hurricane, and Stow says, "the Tower of London was also broken." About two years afterwards another destructive fire happened. In the succeeding years William Rufus repaired the Tower, and strengthened it by additional works; and in 1097 he built a great hall at Westminster. Henry I., as a reward for the ready submission of the Londoners to his usurped authority, granted to the city an extensive charter of privileges, among which was the perpetual sheriffwick of Middlesex. On the death of Henry, the Londoners took a decided part in favour of Stephen in his contest with the empress, and greatly contributed to his establishment on the throne. In the first year of his reign a fire, beginning near London Stone, consumed all the houses eastward to Aldgate, and westward to St. Paul's, together with London bridge, which was then of wood. Henry II. does not appear to have held the citizens in any great degree of favour, probably resenting their attachment to Stephen; and we find that large sums of money were extorted from them under the specious name of Free-gifts. In 1176 the building of a new bridge of stone was commenced at London, but was not completed till the year 1209. On the coronation of Richard I. a dreadful massacre of the Jews, who were settled in London, was made by the brutal and ignorant populace. At the coronation-dinner, the chief magistrate of London, who at that time had the title of bailiff, acted as chief butler. Early in this reign

reign the appellation was changed to that of mayor, in the person of Henry Fitz Alwyn. Richard granted the city a new charter, confirming all its liberties, with additional privileges; and four years afterwards, on payment of 1500*l.* he granted another, providing for the removal of all weirs that had been erected on the river Thames; on this charter the corporation of London found their claim to the confederatorship of that noble stream. In 1196, a sedition arose in London, headed by William Fitz Osbert, who excited the common people to oppose the government, and gained associates to the amount of 50,000; but the leader being taken and executed, the commotion subsided. This is one of the first instances upon record of a tumultuous assemblage in defence of popular rights. In the reign of king John the civic importance of London was greatly increased; and its corporation finally assumed that form and predominancy, which, with a few alterations, it has maintained till the present time. John granted the city several charters; by one he empowered the "barons of the city of London" to choose a mayor annually, or to continue the same person from year to year, at their own pleasure. In 1212 a dreadful calamity took place, through a fire which commenced at the bridge end in Southwark, and occasioned a destruction almost unparalleled from such a cause: Stow relates that about 3000 persons perished. During the contest between the king and pope Innocent III. London severely felt the consequences of the interdict which was laid upon the kingdom. In the civil feuds, which marked the latter years of John, the Londoners sided with the barons; and when the humbled monarch was compelled to sign Magna Charta, it was therein expressly stipulated that the "city of London should have all its ancient privileges and free customs as well by land as by water." The long reign of Henry III. affords but few events worthy of notice respecting London: its growing prosperity was checked by a series of extortions and oppressions. In 1258, the price of corn was so excessive, that a famine ensued, and according to the chronicles of Evesham, 20,000 persons died of hunger in London only. In 1264 another massacre of the Jews took place; on a plea that one of that persecuted race had taken more than legal interest, and upwards of 500 Jews were put to death by the populace, and their houses and synagogues destroyed.

Annals of London from the Accession of Edward I. to that of Henry IV.—In the year 1279 all the Jews in England were apprehended in one day, on a charge of their being the authors of the great mutilations which had taken place in the coin during the preceding reign: 280 persons of both sexes were executed in London, besides many others in various parts of the kingdom. Between the years 1314 and 1317 the city, in common with the rest of the kingdom, suffered greatly from a scarcity of provisions, which eventually produced a complete famine. King Edward III., on the commencement of his reign, granted to the city two charters: by the first all the ancient privileges were confirmed and additional ones bestowed; by the other, the village of Southwark was granted to the citizens in perpetuity. In 1348, the terrible pestilence, which, breaking out in India, spread itself westward through every country on the globe, reached England. Its ravages in London were so great, that the common cemeteries were not sufficiently capacious for the interment of the dead; and various pieces of ground without the walls were assigned for burial places: amongst these was the waste land now forming the precinct of the Charter-house, where upwards of 50,000 bodies were then deposited. This destructive disorder did not entirely subside till 1357. The public entry of Edward the

Black Prince into London, May 24, 1356, after the victory he obtained at Poitiers, was celebrated with an unparalleled degree of splendour; and every street through which the cavalcade passed, exhibited an extraordinary display of riches and magnificence. The captive king of France, dressed in regal robes, was mounted on a white courser, while the victorious prince rode by his side on a small black horse, and appeared more like an attendant than a conqueror. In 1361, the plague having again broke out in France, every precaution was taken to prevent its spreading into England, but without effect; the pestilence reached London, and its ravages were so destructive, that upwards of 2000 persons fell victims in two days. In 1363, a sumptuous entertainment was given in the city by Henry Picard, alderman, to the kings of England, France, Scotland, and Cyprus, to Edward the Black Prince, and to a great number of nobility and gentry. The year 1378 is memorable in the city annals for the expedition fitted out by an individual, John Philpot, against Mercer, the Scottish pirate, who taking advantage of the inattention of government to naval affairs, carried off all the shipping from the port of Scarborough; and continuing to infest the northern coast, frequently made considerable prizes. The complaints of the merchants were but little regarded by the council; when Philpot prepared a fleet at his own expence, with a thousand men well armed, went himself on board as commander-in-chief, and failed in pursuit of the pirate. A long and desperate engagement ensued; but Philpot obtained the victory, and obliged the pirate to surrender, with most of his ships, among which were fifteen Spanish vessels richly laden. In November 1380, the fourth year of Richard II. an act of parliament was passed for levying a poll-tax on every person in the kingdom, male or female, above the age of fifteen years. This act was the occasion of producing, in the following year, one of the most dangerous insurrections that ever threatened the monarchy of this kingdom; and in which the metropolis particularly suffered. The tax was exacted with great rigour; and the insolence of the collectors was an additional cause of irritation, and kindled the sparks of sedition which soon after burst into an open flame. The insurrection began in Essex, but quickly spread through the neighbouring counties, and particularly in Kent, where the daughter of Wat Tyler, so called from his trade, having been indecently treated by a collector, the father killed him, and being supported by the insurgents, placed himself at their head. To his standard incredible numbers flocked from all parts of the kingdom; and on the 10th of June, 1381, having mustered on Blackheath a hundred thousand strong, they entered Southwark, where they set at liberty the prisoners from the King's Bench and Marshalsea prisons, and levelled the houses of all lawyers. They burnt the archbishop's palace at Lambeth, with the rich furniture, books, and registers, and destroyed the public stewes which were then tolerated on Bankside. For one day the bridge gate was shut against them; but they were afterwards, from prudential motives, admitted into the city. They then proceeded to the palace of the Savoy, which was one of the most magnificent structures in the kingdom. Having set fire to it in several places, they caused proclamation to be made, that no person should convert any part of the rich effects to his own use, and actually threw into the fire one of their companions who had reserved a piece of plate. They also burnt the Temple and the other inns of court. Dividing into three parties, one advanced to the rich priory of St. John of Jerusalem, near Smithfield, which they burned; a second division marched to the Tower, where they seized sir Robert Hales, lord treasurer, and Simon Sudbury;

Sudbury, archbishop of Canterbury, and lord chancellor (though guarded by 1200 soldiers), and hurrying them to the adjacent hill, beheaded them; the third division proceeded to Mile End, where the king met them, and promised to redress their supposed grievances, on which they dispersed. But Wat Tyler, with his party, under the pretence of reforming abuses, continued their ravages in London, liberated the prisoners from the Fleet and Newgate, plundered the houses of the Lombards who resided in the street, which yet retains their name, and dragging the merchants from the churches, whither they had fled for refuge, beheaded them in the streets. Not content with murdering many of the most eminent citizens, they made proclamation for beheading all lawyers and persons connected with the Exchequer, and even all who, in those days of ignorance, were capable of writing. The king made another effort for negotiation: attended only by forty horse, he met Tyler with 20,000 of his adherents in Smithfield. The behaviour of Tyler was so insolent, that the king ordered the mayor, sir William Walworth, to arrest him; on his resistance, sir William felled him to the ground with his sword, and the attendants dispatched him. The rebels prepared to revenge their leader's death; but Richard, though only fifteen years of age, with a prudence and bravery which did him more credit than any other action of his life, rode forward, exclaiming, "My friends, will you kill your king? Be not troubled for the loss of your leader; I will be your captain, and grant what you desire." They then marched under his direction to St. George's Fields, where, finding a thousand citizens completely armed to oppose them, they threw down their weapons, obtained their pardon, and immediately dispersed. Thus ended an insurrection unparalleled in the annals of this kingdom, and which for three weeks seemed to threaten a total subversion of the government. In 1390, the king appointed a tournament to be held in London, and sent heralds to proclaim his intention to all the principal courts of Europe, whence many princes and nobles came to attend the spectacle, which was continued with the greatest splendour for four days; open house being kept at the king's expence for all persons of distinction. The vast expenditure which this and similar festivities occasioned, frequently reduced Richard to great pecuniary difficulties; his enormous profusion led him to a system of oppression and extortion, which eventually caused his deposition and death.

Annals of London from the Accession of Henry IV. to that of Elizabeth.—At the coronation of the new king, the mayor, as usual, officiated as chief butler. The citizens were gratified by the repeal of some obnoxious statutes, and an extension of their privileges. In 1401, an act was passed for "burning obstinate heretics," entirely aimed at the Lollards, or followers of Wickliffe. The first victim was William Santer, parish priest of St. Ofyth, in Syth-lane, London. In 1407, the Plague again ravaged the kingdom, and swept away more than 30,000 of the inhabitants of the metropolis. In 1409, "a great play, of Matter from the Creation of the World," was acted at Skinner's-Well, near Clerkenwell. The exhibition lasted eight days; at which were present the king and most of the nobility and gentry of the realm. In the following year, John Bradley was condemned as a Wickliffite, and burnt in Smithfield, with circumstances of peculiar cruelty. In this year Guildhall was erected; the city hall before being a mean cottage in Aldermanbury. The return of king Henry V. after the glorious victory obtained at Agincourt in 1415, was celebrated in London with great magnificence. Neither this reign nor the following produced any events of peculiar import to the city, till the year 1450, when a new insurrection arose, of so formidable a

nature, that for some weeks all the power of the crown was insufficient to quell it. This tumult is supposed to have been raised by the instigation of the duke of York, in order to found the inclination of the people, and prepare the nation for his design of seizing that sceptre which Henry swayed so feebly. By the secret instructions of the duke, Jack Cade, who had served under him in the French wars, assumed the name of Mortimer, and collected a strong body of malcontents, under the popular pretext of redress of grievances. They entered the city in triumph, and for some time bore down all opposition; and beheaded the lord treasurer, lord Say, and several other persons of note. The insurgents at length losing ground, a general pardon was proclaimed, and Cade, finding himself deserted by his followers, fled: but a reward being offered for his apprehension, he was discovered, and refusing to surrender, was killed. The remainder of this reign was filled up with the dreadful contest between the Lancastrians and Yorkists, which ended in the deposition of Henry and the establishment of Edward IV. on the throne. The year 1472 will ever be memorable in the annals of the metropolis, for the introduction of printing into this country by William Caxton, citizen and mercer. The history of the kingdom during this reign and that of Richard III. does not in any particular manner affect the concerns of the city. Soon after the accession of Henry VII. in 1485, an epidemical disorder of a very singular nature, called the *sweating sickness* , raged with great violence in London. Those attacked by it were thrown into a violent perspiration, which generally occasioned their death within twenty-four hours. It appears from Hall's Chronicle, that two mayors and six aldermen died of this complaint in one week. This reign was particularly marked by oppression and extortion on the part of the king; and the tumults and insurrections occasioned thereby, particularly that in support of Perkin Warbeck, who was asserted to be Richard, duke of York, and the heir to the throne. In this event, though highly interesting to the kingdom, the city was not immediately concerned. In 1500 the kingdom was again visited by the Plague, of which 30,000 persons died in the metropolis and its vicinity. In the reign of Henry VIII. when he attempted to raise money without the aid of parliament, the citizens made such determined opposition to the measure, and their example had such an influence through the kingdom, that the king, in full council, abandoned his design, and granted a pardon to all who had opposed him. On the king's marriage with Anne Boleyn, in 1533, she was conveyed from Greenwich to the Tower, and thence through the city to Westminster, with all the magnificence and pageantry which unbounded prodigality could devise. The remainder of this reign was notorious for the tyranny and cruelty of the king, who, having thrown off the pope's supremacy, sacrificed all who adhered to it: yet professing a zealous attachment to the doctrines of the church of Rome, he put to death those persons who presumed to differ from him. Hence the promoters of reformation, and its opposers, perished in the same flames; the blood of the Catholic and Protestant was shed upon the same block; and Henry, whilst vehemently contending against the pope's infallibility, supported his own with the most vindictive cruelty. In these sanguinary scenes, London had its full share; great numbers, of all ranks, were continually executed, either for heresy or treason. The suppression of the monasteries now took place: opposition to the king's will was fatal; and the partial insurrections which broke out in consequence, only served to forward his measures, by giving the colour of necessity to the vengeance that was inflicted. Many improvements were made during this reign in the city and its suburbs.

suburbs. The police was better regulated; nuisances were removed; the streets and avenues were amended and paved; and various regulations were carried into effect for supplying the metropolis with provisions, to answer the demands of an increasing population. In the short reign of Edward VI. the reformation proceeded with steadiness and regularity; but on the accession of Mary the church of Rome again gained the ascendancy. On the projected union between the queen and the king of Spain, a formidable insurrection ensued, in which the city was particularly affected: the suppression of this revolt was followed by a dreadful scene of sanguinary triumph. The statutes against heretics were now also enforced with great severity. A number of persons were burnt in Smithfield: in the whole kingdom upwards of 200 were brought to the stake.

Annals of London from the Accession of Elizabeth to the Revolution in 1688—Elizabeth succeeded her sister amidst the acclamations of all ranks of people. Reformation again reared its head, and was in a short time firmly established. In 1561 the spire of St. Paul's cathedral was struck by lightning, and great part of the building consumed. In 1563 the Plague again made dreadful ravages, to which 20,000 persons fell victims in the city. In July 1566, the foundations of the Royal Exchange were laid by sir Thomas Greham, and the structure was completed in the following year. The year 1569 exhibited a novelty in London of most pernicious example. The first public lottery was then drawn at the west door of St. Paul's cathedral, and the drawing continued, without interruption, from January 11 to May 6. The prizes were of plate, and the profits were appropriated to the repair of the sea-ports. In 1586 a conspiracy was set on foot to assassinate Elizabeth, and free the queen of Scots from the captivity in which she had passed almost eighteen years. The plot was soon discovered, and the conspirators, fourteen in number, were executed in Lincoln's-inn-Fields. Mary was said to be implicated in the conspiracy; and this, whether true or false, furnished a plausible pretext for those proceedings, which soon after condemned her to the block. The sentence against her was proclaimed with great solemnity at different places in London and Westminster. In the preparations made to repel the threatened attack of the boasted Spanish Armada, London took a most distinguished share, in furnishing large supplies of money, men, and ships. The preparations for the coronation of king James were interrupted by a dreadful Plague, which ravaged the city with greater violence than any similar visitation since the time of Edward III. In 1604, the horrible conspiracy, known in history by the name of the "Gunpowder Plot," the grand object of which was to prepare the way for the restoration of the Catholic religion, was commenced by its daring contrivers, with every possible precaution that seemed necessary to ensure its success. The destruction of the king and parliament was the preliminary measure through which the conspirators thought to accomplish their design; and the blowing up of the parliament-house with gunpowder at the moment when the sovereign should be commencing the business of the session by the accustomed speech from the throne, was the dreadful means by which the destruction was intended to be accomplished. All the principal conspirators were bigotted Catholics, who had for many years been plotting the downfall of Protestantism in this country, and had even applied for aid to Spain and Flanders. Being disappointed of the assistance they required, they resolved to depend on their own efforts, and about Easter 1604, formed the idea of the gunpowder plot, to be carried into effect on the meeting of parliament in February

following. Accordingly Percy, one of the conspirators, hired a house immediately adjoining to the house of lords, and the operations commenced by digging through the foundation-wall, which was nine feet in thickness. Just at this juncture, a vault under the parliament-house, used as a depository for coals, was to be let, and the coals to be sold. As nothing could have happened more favourable for their purpose, Percy hired the cellar, and bought the coals, as if for domestic use, and without any appearance of concealment. The prorogation of parliament from February to October gave the conspirators sufficient leisure to further their design; and, at convenient opportunities, thirty barrels and four hogheads of gunpowder, which had been procured from Holland, were conveyed into the cellar by night, and covered with billets, faggots, iron-bars, and stones. This was done without exciting any suspicion: parliament had again been prorogued to November 5th; and the conspiracy wore every aspect of success. It had now been on foot eighteen months, and confided to more than twenty persons; yet nothing had led a single step toward discovery; when the plan was happily frustrated by a circumstance apparently trivial. One of the conspirators, wishing to save lord Monteagle, sent him a letter, advising him, in ambiguous terms, to absent himself from parliament, on account of a sudden danger to which he would be exposed. This notice Monteagle carried to the secretary of state, who laid it before the privy-council. A secret search was determined on, but, to prevent suspicion, was delayed till the eve of the meeting of parliament, and then made only by the lord chamberlain, as if in a formal discharge of his office. When he entered the cellar, and saw the great store of coals and wood, he enquired to whom it belonged, and was informed the cellar was let to Mr. Percy, and the fuel was for his consumption. The chamberlain heard this with seeming carelessness, and left the cellar with apparent negligence. But at midnight a further search was made; Guy Fawkes, a principal conspirator, to whom the final execution of the plot was assigned, was apprehended in the cellar: the fuel was removed, and the gunpowder discovered. Fawkes gloried in the plot, but refused to discover his accomplices; the sight of the rack, however, subdued him, and he made a full disclosure of the whole conspiracy. His associates fled into Warwickshire, where they endeavoured to excite a rising of the Catholics, but without effect. A proper force was sent against them, four were killed in resistance, and the rest were taken and brought to London, where, with Fawkes, they suffered the just punishment of their guilt. In the year 1609, the city acquired a considerable accession of power and property: almost the whole province of Ulster, in Ireland, having fallen to the crown, the king made an offer of the escheated lands to the city, on condition they would establish an English colony there. The proposal was accepted; and so rapid was the colonization forwarded, that within seven years arose the two capital towns of Londonderry and Coleraine. The commencement of Charles I.'s reign was marked by the return of the plague, which carried off in the metropolis 25,000 persons. To advert to all the important transactions that took place in London during the eventful struggle between Charles and his people would far exceed our limits. The excessive oppressions to which the nation was subjected, were more particularly felt in the metropolis than in other parts of the kingdom, from its being more directly within the vortex of the star-chamber and high-commission courts, and from the effects of the monopolies, which had a most pernicious influence on trade and

commerce. For the particulars of this important period, we refer our readers to Clarendon's History of the Great Rebellion.

The year 1665 became memorable in London by the dreadful ravages of the great Plague, which first made its appearance in December 1664, and had not entirely ceased till January 1666. Its progress, the first two or three months, was comparatively small, but continued to advance, notwithstanding every precaution was used to abate its fury: from May to October 1665, it raged with the greatest violence; the deaths progressively increased from five hundred to eight thousand weekly. The pestilence was now at its height: its ravages, which commenced in Westminster and the western suburbs, extended through the city to Southwark, and to all the parishes eastward of the Tower. The digging of single graves had long been discontinued, and large pits had been excavated, in which the dead were deposited with some little regularity and decent attention: but now all regard to ceremony became impossible. Deeper and more extensive pits were dug, and the rich and the poor, the young and the aged, the adult and the infant, were all promiscuously thrown together into one common receptacle. Whole families, and even whole streets of families, were swept away together. By day, the streets presented a most frightful aspect of desolation and misery; and at night the dead carts, moving with slow pace by torch-light, and with the appalling cry, "Bring out your Dead," thrilled horror through every heart that was not by suffering hardened to insensibility. The stoppage of public business was so complete, that grass grew within the area of the Royal Exchange, and even in the principal streets of the city: all the inns of court were shut up, and all law proceedings suspended. The entire number returned in the bills of mortality, as having died of the plague within the year, was 68,950; yet there can be no doubt that this total fell short, by many thousands, of those who actually fell by the infection, but whose deaths were not officially recorded. The aggregate is estimated at about 100,000. The whole number of deaths within that year, as given in the bills, was 97,306. Since this dreadful period, the plague has entirely ceased in London: a circumstance that must be regarded as the more remarkable, when it is considered how frequent had been its ravages for ages past, and when reference is had to the bills of mortality for the preceding part of this very century, when scarcely a year passed without some persons falling victims to the infection. For further particulars, see PLAGUE.

The most important event that ever happened in this metropolis, whether it be considered in reference to its immediate effects, or to its remote consequences, was the great Fire, which broke out in the morning of Sunday, September 2, 1666, and, being impelled by strong winds, raged with irresistible fury nearly four days and nights, nor was it entirely mastered till the fifth morning. The destructive extent of this conflagration was, perhaps, never exceeded in any part of the world, by any fire originating in accident. Within the walls it consumed almost five-sixths of the whole city; and without the walls, it cleared a space nearly as extensive as the one-sixth part left unburnt within. Scarcely a single building, that came within the range of the flames, was left standing. Public buildings, churches, and dwelling-houses were alike involved in one common fate; and, making a proper allowance for irregularities, it may fairly be stated, that the fire extended its ravages over a space of ground equal to an oblong square, measuring upwards of a mile in length, and half a mile in breadth. In the summary ac-

count of this vast devastation given in one of the inscriptions on the monument, and which was drawn up from the reports of the surveyors appointed after the fire, it is stated, that "the ruins of the city were 436 acres, viz. 373 acres within the walls, and 63 in the liberties of the city; that of the six-and-twenty wards it utterly destroyed fifteen, and left eight others shattered and half burnt; and that it consumed 400 streets, 13,200 dwelling-houses, 89 churches, besides chapels; four of the city gates, Guildhall, many public structures, hospitals, schools, libraries, and a vast number of stately edifices." The immense property destroyed in this dreadful conflagration could never be calculated with any tolerable degree of exactness; but according to the best estimations that have been made, the total value must have amounted to the immense sum of ten millions of pounds sterling. As soon as the general consternation had subsided, the rebuilding of the city became the first object of consideration; an act of parliament was passed for that purpose; and though all was not done that might have been, the city was principally rebuilt within little more than four years, and that in a style of far greater expence and regularity, and infinitely more commodious and healthful, than the ancient capital. In the system of tyranny and oppression which marked the reign of Charles II. the city largely participated; having its ancient liberties and privileges invaded, and magistrates arbitrarily forced on the citizen at the pleasure of the king. Every principle of law and justice was violated; and in this humiliating state London continued till the revolution.

Annals of London from the Revolution in 1688, to the present Time.—In the first year of William and Mary, an act was passed, by which all proceedings of former reigns against the city charters were reversed, and all the rights and privileges of the citizens were fully re-established. In 1692, during the king's absence in Holland, the queen borrowed 200,000*l.* of the city for the exigencies of government. In 1694, an infamous system of bribery was investigated by the house of commons, when it was proved, that a thousand guineas had been demanded and taken from the chamberlain of London by sir John Trevor the speaker, for forwarding the Orphan bill; in consequence of which he was expelled the house. In 1697, an act of parliament was passed for the suppression of the much abused privilege of sanctuary, heretofore attached to the following places, viz. the sanctuary in the Minories, Salisbury-court, White-friars, Ram-alley, and Mitre-court in Fleet-street; Fulwoods-rents in Holborn; Baldwin's-gardens in Gray's-inn-lane; the Savoy in the Strand; and Montague-cloise, Deadman's-place, the Clink, and the Mint, in Southwark. The year 1703 was remarkable for a dreadful storm of wind, which raged through the night of the 26th of November. The damage sustained by the city alone was estimated at two millions sterling; and in the suburbs the damage was proportionably great: the lead on the tops of several churches was rolled up like skins of parchment; and at Westminster-abbey, Christ's-hospital, St. Andrew's Holborn, and many other places, it was carried off from the buildings. The ships in the river were driven from their moorings; four hundred wherries were lost; more than sixty barges were driven foul of London-bridge, and as many more were sunk or flaved above the bridge. At sea the destruction was immense; twelve men of war, with more than eighteen hundred men on board, were lost within sight of their own shore. The year 1709 was marked by a circumstance highly creditable to the humanity of the nation. The cruel depredations of the French in the palatinate compelled the inhabitants to desert

desert their country; twelve thousand, in the most forlorn condition, sought refuge in London: the queen, for some time, supported them out of her privy purse; she was afterwards assisted by the benevolence of her subjects, and 22,038*l.* was paid into the chamber of the city for the relief of these distressed fugitives, who were finally disposed of as colonists to Ireland and North America.

The increase in the population of the metropolis having occasioned a great insufficiency in places for divine worship, an act of parliament was passed in 1711 for erecting fifty new churches in and about London: the expense of which was defrayed by a final duty on coals brought into the port of London for about eight years. The year 1720 will ever be famous in the annals of London, from the destructive system of speculation and fraud which history has denominated the South Sea bubble; and which so completely infatuated the people, that they became the dupes of the most barefaced impositions. (See BUBBLE, in *Commerce*.) The directors of the South Sea Company, encouraged by the prevalent spirit of avaricious enterprise, proposed to the government to take into their fund all the debts of the nation, under the plausible pretext of a speedier redemption. The amount of the debts was 31,664,551*l.*; for the liberty of adding the whole of which to their capital stock, they offered to pay to the public the immense sum of 7,723,809*l.* This bait was too tempting to be refused; the plan received the sanction of parliament, and the directors were empowered to raise the ready money necessary for so great an undertaking, "by opening books of subscription, and granting annuities to such public creditors as were willing to exchange the security of the crown for that of the South Sea Company, with the advantage of sharing in the emoluments that might arise from their commerce." So much was the public mind impressed with the idea of rapid gain, that before the act received the royal assent, the company's stock rose to 31*g*l. *per cent.*: it advanced so amazingly for three months, that books were then opened for a fresh subscription of four millions at 1000 *per cent.*; and such was the popular frenzy, that within a fortnight the new subscription was at 200 *per cent.* premium. Some alarm now prevailed: it had been whispered, that the directors and their friends had disposed of their own stock while the price was at the highest; and all confidence in the stability of their credit was destroyed. The confusion became general; every one was willing to sell, but no purchasers could be found, except at a vast reduction. Distraction and dismay spread through the city; the stock fell rapidly, and, before the end of the year, was reduced to 86 *per cent.* which was about its real value. The destruction to public and private credit, thus produced, was excessive: all trade was at a stand; and many of the most respectable merchants, goldsmiths, and bankers of London, who had unwisely lent large sums to the company, were obliged to abscond. A parliamentary investigation ensued; and the knavery of the directors was so apparent, that the greater part of their estates was confiscated for the benefit of those whom their villainy had ruined. The sum thus obtained amounted to 2,014,000*l.*

During the continuance of the infatuation which the South Sea delusion inspired into all classes of people, many other visionary projects were set on foot by speculators and gamblers; even chartered companies of established credit lent their countenance to schemes of impossible accomplishment: nearly two hundred subscription projects were afloat at one time. When the public confidence in the South Sea scheme was on the decline, the superior stability of the bank of England, East India, and African companies, was at once seen: Bank stock rose from 100 to 260; East India stock

from 100 to 405; and African stock from 100 to 200. The shares in the London and Royal Exchange Assurance Companies also experienced a prodigious rise. See INSURANCE.

The close of the year 1729 was attended by a great mortality in London; the deaths within the bills of mortality in the course of the year amounting to almost 32,000. The pernicious habit of dram-drinking had become to general, and so many disorders had been occasioned, and crimes committed in consequence of it, that in the year 1735 the legislature found it necessary to prohibit the selling of Geneva, except under certain restrictions. Previous to this, the magistrates had ascertained that the number of gin-shops in London and Westminster was 7044, besides garrets and cellars where the baneful liquor was sold privately. So determined were the retailers to carry on their trade, that the utmost exertions of the police were required to enforce the act; and within two years, 12,000 persons were convicted and fined under its provisions.

The winter of 1739—40 was memorable from the occurrence of one of the most intense frosts ever known in this country, and which is recorded in our annals by the appellation of the Great Frost; it commenced on Christmas-day, and lasted till the 17th of February: above bridge the Thames was completely frozen over, and numerous booths were erected on it for selling liquors, &c. to the multitudes who daily flocked thither. Great improvements were now made in different parts of the metropolis; and convenience, health, and safety, were more generally attended to than they had previously been. Westminster bridge was finished and opened for public use in the year 1750; the houses upon London bridge were pulled down in 1756; and in the two succeeding years the bridge was put into a course of repair. In 1760 Black-friars' bridge was commenced; most of the city gates were taken down; and an act of parliament was obtained for making alterations in the avenues of the city and its liberties; some of which have been carried into effect at different periods, yet many others remain to be executed. In the year 1763, the recent peace with France, the resignation of Mr. Pitt, afterwards earl of Chatham, as premier, and other political occurrences, set the metropolis into a complete ferment. The conduct of administration was such, as to augment rather than obviate the prevailing discontents. Hence the ministry were assailed with political publications; in particular by a periodical paper called "The North Briton;" the writers of which, the principal of whom was John Wilkes, were determined to expose the measures of the then administration to the contempt they deserved. The forty-fifth number of this paper contained such severe reflections on the king's speech to parliament, that the ministry thought they had an opportunity to crush their avowed enemy. Mr. Wilkes was apprehended and committed to the Tower under an illegal warrant, signed by the principal secretary of state; but the case being argued in the court of Common Pleas, before lord chief justice Pratt, the court directed him to be discharged. Mr. Wilkes brought actions against the earl of Halifax, secretary of state, for issuing the warrant, and against Mr. Wood, under-secretary, and obtained verdicts with damages; 400*l.* from the former, and 1200*l.* from the latter. Shortly after his release, Mr. Wilkes established a printing-press in his own house, and republished all the numbers of the obnoxious paper. This provoked the ministry to highly, that an information was filed against him. The "North Briton, No. 45," was voted by the house of commons to be a seditious libel, and ordered to be burnt by the common hangman. Mr. Wilkes was expelled the house:

and though he retired to France, his trial was brought on in his absence, when he was found guilty of republishing the libel, and was consequently outlawed. Four years afterwards he returned to England, his outlawry was reversed, and he was sentenced to two years in prison; during which he was elected an alderman of London, and knight of the shire for Middlesex.

In the year 1780, from a cause apparently harmless, a petition to parliament from the Protestant Association, arose an insurrection, composed chiefly of the lowest of the people, which for a week bore the most alarming appearance; the prisons of Newgate, the King's Bench, and the Fleet were burnt and the prisoners set at liberty, and most of them joined the insurgents. The Popish chapels, and a great number of private houses of Catholics, were set on fire; and thirty six fires were seen blazing at one time in various parts of the metropolis. Military interference became absolutely necessary, when many of the rioters were killed; 135 were brought to trial, of whom 59 were convicted, and upwards of 20 of the most active were executed in various parts of the town, but immediately contiguous to the scenes of their respective depredations.

During the year 1792, and the two following years, the metropolis was greatly agitated by political contention; many associations were formed for the purpose of obtaining a more pure and equal representation of the people. The two principal of these associations, *viz.* the Friends of the People, and the Corresponding Society, held their meetings in London. Their avowed object was parliamentary reform; but they were stigmatized by their enemies with the appellations of Republicans and Levellers. Some of the most active and powerful leaders of these associations were at length arrested, and tried for high treason, but after a long investigation all were acquitted. Other persons, among whom was Thomas Paine, were prosecuted for sedition, and some were imprisoned. Paine was pronounced guilty of writing and publishing the second part of the Rights of Man, which was declared seditious, and the author having left the kingdom, was outlawed. The numerous clubs, debating societies, and political associations formed in the metropolis soon after the revolution in France, and during the early stages of the war against that country, constitute a prominent epoch in the history of the metropolis. The country was hurried on to the very brink of revolution; but this great crisis was prevented by the vigilant, powerful, and determined conduct of the Pitt administration. An Alien act was passed in 1793; the Habeas Corpus act was suspended in the next year; and various arbitrary and oppressive measures were adopted by the ministry to preserve public tranquillity, but at the same time abridge the rights of the British subjects.

The year 1797 was distinguished by the stoppage of bank payments in specie, as the government had employed nearly all the current coin in remittances to the emperor of Germany and to other foreign powers. An act of parliament was now passed to allow the bank to issue notes under five pounds. At the commencement of 1798 a numerous meeting of the bankers, merchants, and traders of London, was held in the Royal Exchange for the purpose of raising a voluntary subscription for the public service. In the course of four days the common council alone subscribed 10,000*l.*, 200,000*l.* was subscribed by the bank, considerable sums were given by other public companies, and 20,000*l.* was advanced by his majesty. The minister estimated this subscription at one million and a half, but the total amount was more than two millions of money. Continued threats of invasion from France induced the minister to adopt some new mode of defence; and several armed associations were

formed by different parishes and companies in the metropolis. On the 4th of June, 1799, all these volunteers were assembled in Hyde Park, and reviewed by his majesty, the princes, &c. The total number under arms was 8989, of which 1008 were cavalry. On the 21st of the same month, a still greater number of volunteers was dispersed through the streets, squares, and suburbs of the metropolis, to be inspected again by the king, and a numerous retinue of princes, dukes, &c. It is stated, that 12,208 volunteers were then drawn out under arms. A similar review of the volunteers to the former, took place on the 4th of June 1800. On the ratification of preliminaries of peace in October, 1801, the metropolis was brilliantly illuminated, and all classes of people testified great joy at the event. The definitive treaty was signed on the 27th of the following month, and the illuminations throughout London were now singularly splendid and general. A war again broke out, and an act of parliament was passed to enable his majesty to arm the people *en masse*. Other acts for increasing the military force of the country were also passed. The cities of London and Westminster, and parishes immediately adjacent, raised a volunteer force amounting to 27,077 men. A patriotic fund was established in London in July 1803, and before the end of August more than 152,000*l.* were subscribed; towards which the city, in its corporate capacity, gave 2500*l.* The successive deaths of lord Nelson, Mr. Pitt, and Mr. Fox, produced great sensation in the metropolis, and many changes in the legislative officers. Covent Garden theatre and several contiguous houses were consumed by fire in September 1808; another fire in January 1809, destroyed part of the king's palace at St. James's, and a third fire, in February of the same year, consumed the whole of Drury-lane theatre. The October of 1809 is memorable in the annals of London, for the circumstance of his majesty's entrance into the fiftieth year of his reign, and the loyal rejoicings, or public manifestations of loyalty that were displayed on the occasion. The memorable and unpropitious expedition to Walcheren, the theatrical riots at Covent Garden theatre, the investigation, before the house of commons, relating to the duke of York and a noted prostitute of the name of Clarke, the arrest and imprisonment of sir Francis Burdett, a member of the house of commons, are all memorable events in the local history of London, and are entitled to particular narration and exposition in a publication devoted to the topography of the metropolis. In Brayley's Survey, already referred to, these subjects are particularized and elucidated. It is conjectured that within the last forty years, 40,000 new houses at least have been erected in London and its connected environs, and that these afford habitation for nearly 200,000 new inhabitants. In July, 1794, a fire broke out in Radcliffe highway, and consumed 630 houses, with much other property. Many of the inhabitants fixed tents in the open fields, where they lived for several weeks till new houses were erected.

History of the Commerce of London.—

“Then COMMERCE brought into the public walk
The busy Merchant; the big Warehouse built;
Rais'd the strong Crane; choak'd up the loaded Street
With foreign Plenty; and thy Stream, O Thames,
Large, gentle, deep, majestic king of floods!
Chose for his grand resort.” Thomson.

London is universally acknowledged to be the first commercial, as well as the first manufacturing city in the world. Considering, therefore, the intimate connection that subsists between its trading prosperity and the general interests of the empire; the subject of this section cannot fail to be highly

highly interesting and important. To trace the steps by which London has risen to its present opulence and grandeur, is in fact to develop the sources of that distinguished rank which England now holds among the nations of the earth.

London was, doubtless, a place of considerable trade at a very early period. Tacitus speaks of it as the *nobile imperium* of his time; the great resort of merchants, and though not a colony, famous for its commercial intercourse. After this, little is known of it, in respect to trade, until the close of the second century of the Christian era, when it is again mentioned as having become "a great and wealthy city." In the year 359, it is said of England, that its "commerce was so extended, that 800 vessels were employed in the port of London for exportation of corn only." Three centuries afterwards Bede styles it "an emporium for many nations repairing to it by land and sea." Fitz-Stephen, who lived in the reign of Henry II. says, that "no city in the world exports its merchandize to such a distance as London;" but does not inform us what goods were exported, or to what countries they were carried. Among the imports, however, he enumerates gold, spices, and frankincense from Arabia; precious stones from India; and palm-oil from Bagdad. But it seems more reasonable to suppose these were obtained through the medium of the trading cities of Italy, than by direct commerce to the respective places. William of Malmbury, who likewise lived about this period, calls "London a noble city, renowned for the opulence of its citizens," and "filled with merchandize brought by the merchants of all countries." The same author adds, "that in case of scarcity of corn in other parts of England, it is a granary, where it may be bought cheaper than any where else." Thus it will be perceived, that even in the infancy of European commerce, and at a time when ignorance and barbarism clouded almost every portion of the world, this city had made no inconsiderable progress towards its present celebrity and importance.

In the year 1220, the merchants of Cologne, in Germany, probably in consequence of an invitation from king John in 1203, established a hall or factory in London, which shortly after became the general factory of all the German merchants resident in the city. Not long subsequent to this period, viz. in 1245, sea coal "*carbone maris*," is mentioned among the articles of inquisition into trespasses committed in the king's forests. Hence it may reasonably be inferred, that coal was not only known and wrought before this time, but actually formed a part of the imports of London. Sea-coal lane, in this city, was certainly so named as early as the year 1253, and according to Stow, received this appellation from lime being burnt there with sea-coal.

The close of the thirteenth century appears to have been a remarkable era in the commercial history of London. In 1296, the company of merchant-adventurers was first incorporated by Edward I. The Hanseards, or Hanse merchants, also received considerable privileges about the same time. In the year 1498, when all direct commerce with the Netherlands was suspended, this body obtained very great advantages over the merchant-adventurers by importation of vast quantities of those articles, through the medium of the Hanse towns, which before had come directly from the Netherlands, where the trade of the latter company had been chiefly established. In consequence of these circumstances, the warehouses of the merchants were attacked and rifled by the mob; but the offenders were soon suppressed, and many of them punished.

In the year 1504, all the ancient privileges of the Hanse, or as they were likewise called, Steel-yard merchants, were

confirmed to them by statute, and all the previous acts which had been made in derogation of them were annulled. A similar charter was also obtained by the English merchants "trading in woollen cloths of all kinds to the Netherland," in which they are for the first time styled the "Fellowship of merchant-adventurers of England." This act strictly prohibited the Steel-yard association from interfering with their trade, by carrying cloths to any of their settlements in the Low Countries. Notwithstanding these unfavourable clauses, however, the Hanse-merchants seem to have engrossed the chief trade of the city. Grievous accusations were consequently made against them, for their proceedings were considered as tending to ruin the commerce of the native English. The city of London at length instituted an action, in the Star-chamber, against them, the object of which was to deprive them of their privileges as a body. Accordingly, in the year 1597, a decree was obtained, annulling their association, and ordering them, under severe penalties, to quit the kingdom. See *HANSE TOWNS*.

But to return: it may be proper to remark, that during the contentions between the houses of York and Lancaster, the commerce of London was very considerably retarded. In the reign of Henry VII. it again began to make rapid progress. Still, however, if credit is to be given to Wheeler's "*Treatise on Commerce*," published in 1601, the trade of this city must have been very low indeed, even as late as the year 1539; for that author expressly avers, that sixty years before he wrote, there were not above four merchant vessels exceeding 120 tons burthen in the river Thames. Nor would it appear that they had increased much in the next reign, if we are to believe the report of a London merchant, who, in a letter to sir William Cecil says, that there is not a city in Europe "having the occupying that London hath, so slenderly provided with ships."

Notwithstanding these complaints, however, it is undoubtedly a fact, that a spirit of enterprise was very general among the merchants about this period. For, in 1553, we find a great geographical and mercantile discovery made by a company, consisting of 240 shareholders, instituted for the purpose of prosecuting discoveries under the direction of Sebastian Cabot, a merchant of Bristol. (See *CABOT, SEBASTIAN*.) This association having fitted out three ships, one of them accidentally fell into the bay of St. Nicholas, in the White seas, and landing at Archangel, obtained from the czar of Russia peculiar privileges of trade with the subjects of his dominions. Within a few years after, the London merchants had also factors settled at the Canaries. The Russia or Muscovy merchants were incorporated in the reign of Philip and Mary, and had their charter subsequently confirmed by Elizabeth, in her eighth year. This princess, likewise, obtained an exclusive grant to the English of the whole foreign commerce of that extensive empire, which they continued to enjoy for a considerable period. About this time the civil dissensions in Flanders began, upon which a vast number of families from the Netherlands flocked to London, and brought over with them their trade and riches. This great addition to the population of the city, and the consequent increase of its commerce soon after, led to the erection of the Royal Exchange, by the celebrated sir Thomas Gresham, in the years 1566 and 1567. (See *ROYAL EXCHANGE*.) Previous to this the merchants were accustomed to meet twice every day in Lombard-street, without any other refuge from the severities of the weather but what the neighbouring shops might occasionally afford. In 1579, the Levant, or Turkey Company, was established, as was also the Eastland Company; both of which still exist, but the former only retains any degree of importance. On the

L O N D O N.

31st of December, 1600, the queen granted the first patent to the East India Company. Their stock then amounted to 72,000*l.* and with this sum the company was enabled to fit out four ships under the command of James Lancaster. The adventure proving successful, the company continued its exertions, and hence has arisen the most splendid and powerful mercantile association that probably ever existed in the world. (See COMPANY, *East India*.) Assurance and insurance companies were now established in London. An act was passed in 1601 for regulating the business of assurance, and a standing commission of merchants appointed to meet weekly "at the office of insurance on the west side of the Royal Exchange." (See INSURANCE COMPANIES.) The company of Spanish merchants were likewise among the number of those incorporated by Elizabeth, so that the reign of that princess may be justly said to form a grand era in the commercial history of this metropolis.

In the reign of James I. the progress of the foreign trade was rapidly increased. Tobacco, which had first been introduced in 1565, now became a considerable article of import. (See TOBACCO.) The tonnage and number of the shipping in the port of London were greatly augmented about this time. Many of the patents granted by Elizabeth were annulled, and the trade thrown open. Howe, speaking of the foreign commerce of this city in the year 1614, says, "London, at this day, is one of the best governed, most richest, and flourishing cities in Europe; plentifully abounding in free trade and commerce with all nations; richly stored with gold, silver, pearl, spice, pepper, and many other *strange* commodities from both Indies; oyles from Candy, Cyprus, and other places under the Turk's dominion; strong wines, sweet fruits, sugar, and spice, from Grecia, Venice, Spayne, Barbaria, the islands and other places lately discovered and known; drugs from Egypt, Arabia, India, and divers other places; silks from Persia, Spayne, China, Italy, &c.; fine linen from Germany, Flanders, Holland, Artois, and Hanault; wax, flax, pitch, tarr, malkes, cables, and honey, from Denmark, Poland, Swethland, Russia, and other northern countries; and the superfluity in abundance of French and Rhenish wines, the immeasurable and incomparable increase of all which coming into this city, and the encrease of houses and inhabitants within the terme and compasse of fifty years, is such and so great, as were there not now two-thirds of the people yet living, having been eye-witnesses of the premises and bookes of the custom-house, which remain extant, the truth and difference of all things afore-mentioned were not to be justified and believed." Howe's edition of Stow's Annals of England, p. 868.

Among the circumstances which occasioned the vast increase of trade during this reign, may be reckoned the colonization of America and the West India islands. The new discoveries, likewise, which were every day made in different quarters of the world, no doubt had a powerful effect in stimulating numbers of speculating persons to commercial exertion and adventure.

During the peaceful years of Charles I. the commerce of this metropolis still continued to make rapid progress; and though the civil wars, for a time, had a very contrary operation, yet in the end they certainly proved beneficial. The energies of the mind were more awakened; the habits of thinking and modes of action, which then became general, taught man to feel his dignity as an individual; the different ranks of society were more closely drawn together; the exertions of industry were better directed; and the means of acquiring wealth greatly augmented. The injurious tendency of monopolies was eminently counteracted; for,

though never abolished by any direct statute, men, regardless of the prerogative whence they were derived, gradually invaded the privileges they conferred, and commerce was increased by the increase of liberty.

The augmented commerce of the port of London, in this reign, may in some measure be estimated by the quota of ship-money, which Charles I. imposed on the city in 1634. By one writ, the citizens were ordered to fit out and equip, at their own charge, for 26 weeks, one ship of 920 tons and 930 men, one of 800 tons and 260 men, four of 500 tons each and 200 men, and one of 300 tons and 150 men. Next year they were commanded to provide two ships of 800 tons and 320 men each. About this time, or at least very shortly before, prices-current were first printed. In 1635, an order was issued by the king in council to the "post-master of England for foreign parts," requiring him to open a regular communication, by running post between the metropolis and Edinburgh, Ireland, and a variety of other places.

Previous to the year 1640, it was usual for the merchants to deposit their cash in the Tower mint; but this deposit now lost all its credit by the ill-advised measure of a forced loan, which the king thought proper to make. The merchants, in consequence, found themselves obliged to trust their money to their apprentices and clerks. The circumstances of the times and opportunity holding forth great inducements to frauds, many masters lost at once both their servants and their money. Some remedy became necessary; and the merchants now began to lodge cash in the hands of the goldsmiths, whom they also commissioned to receive and to pay for them. Thus originated the practice of banking: for the goldsmiths, soon perceiving the advantages that might be derived from disposable capital, began to allow a regular interest for all sums committed to their care; and, at the same time, they commenced the discounting of merchants' bills at a yet superior interest than what they paid. (See BANK and BANKING.) In 1651 the celebrated navigation act was passed, the wise provisions of which have no doubt contributed much to promote our naval and commercial greatness. This same year, coffee was introduced into London by a Turkey merchant named Edwards. (See COFFEE.) The sugar trade was now likewise established; and upwards of 20,000 cloths were sent annually to Turkey, in return for the commodities of that country.

The plague, which made such dreadful havoc among the citizens in 1665, almost wholly suspended the commerce of London; inasmuch that scarcely a single foreign vessel entered the port for the space of three years. The great fire, which happened in 1666, likewise occasioned incalculable loss to numbers of the most opulent merchants in the city. Notwithstanding these disastrous events, however, the spirit of the survivors, so far from sinking, was roused to uncommon exertions. In the course of a few years, the city rose from its ashes with greater magnificence and splendour. India muslins were first worn in 1670, and soon became prevalent. In this year also was the Hudson's Bay Company established, with very extensive powers. The Greenland Fishing Company was incorporated in the year 1693; and the institution of the Bank of England rendered the succeeding one justly memorable in the commercial annals of London. See COMPANY.

The commerce to the East Indies having become vastly enlarged, and many disputes arising relative to exclusive trade, a new joint stock company was incorporated in London, in the year 1698, by the name of "The English Company trading to the East Indies." The existence of two rival companies having the same privileges, however,

fool gave birth to numerous absurdities and contradictory questions of right. These circumstances, and some others which it is unnecessary to detail in this place, eventually produced the consolidation of both into one, in the first and seventh years of queen Anne, by the title of "The United Company of Merchants trading to the East Indies." See COMPANIES, *English, the East India*, vol. ix. for a full account of this establishment.

The number of vessels belonging to the port of London, as appears from returns made to circular letters from the commissioners of the customs, amounted, in 1701, to 560; carrying 84,882 tons and 10,065 men. In 1710 the customs of this city are stated at 1,268,005*l.*, and those of all the out-ports only at 346,081*l.*, which is more than three and a half to one. The following year beheld the incorporation of the South Sea Company, afterwards to baneful in its effects to numerous individuals, and so generally hurtful to the commercial enterprise of the country at large. The Royal Exchange Assurance and the London Assurance Companies were chartered about the same time.

During the reign of George I. the trade of London made very little, if any, progress. The failure of the South Sea scheme, the rebellion in Scotland, and the Spanish war, were the combined causes which operated to produce its retardation. In the year 1732, however, commerce began again to revive; but its advances continued comparatively slow, till the peace of Aix-la-Chapelle in 1748, after which it extended with uncommon rapidity. The next considerable check it sustained was the result of the American war. No sooner, however, was peace signed than it proceeded with renewed vigour. The grievous consequences which many persons apprehended to our trade, from the declaration of the independence of the United States, were only imaginary. For, even so soon after that event as the year 1784, the value of exports to America only had increased to 3,397,500*l.*, somewhat more than 332,000*l.* above the greatest amount in any one year before the war. The net sum of duties levied in the port of London, and paid into the exchequer this year, arose to the vast sum of 4,472,001*l.* 13*s.* 3*d.* From this period to 1793, when the French revolution began, the commerce of London continued uniformly increasing. In that year, however, the value of exports was upwards of two millions less than in the preceding year; though the imports scarcely suffered any diminution. Numerous bankruptcies consequently took place; but the timely interference of the legislature, and the voting of exchequer bills to the amount of 5,000,000*l.* for the use of such persons as could give sufficient security, soon checked the growing distress.

In the course of the three succeeding years, the appearance of things was entirely altered. In 1796 the exports of London amounted in value to 18,410,499*l.* 17*s.* 9*d.*, and the imports to 14,719,460*l.* 15*s.* 7*d.* The number of British ships that entered the port amounted to 2007, carrying 436,343 tons; and 2169 foreign vessels, carrying 287,142 tons. The total entering coastwise was 11,176, including repeated voyages, which made a tonnage of 1,059,915. The following year, some alarm was spread among the merchants by the stoppage of the bank payments *in specie*; but, through the intervention of parliament, confidence was soon restored. The net amount of the customs was 3,950,608*l.* In 1798 the importations of sugars and rum far exceeded those of any preceding year, as did likewise the revenue of the customs, which amounted to the sum of 5,321,187*l.* 7*s.* 3*d.* In 1799 it had increased to 7,226,353*l.* 0*s.* 1*d.*, West India 4*l.* per cent. duty included; but next year fell to 6,468,655*l.* 13*s.* 7*d.* The official

value of the imports, in 1800, was 18,543,172*l.* 2*s.* 10*d.*; and of the exports, 25,428,922*l.* 16*s.* 7*d.* Their real value amounted in all to 68,000,000*l.*, nearly two-thirds of the value of the whole trade of the kingdom. The number of vessels belonging to the port in that year appeared, from official documents laid before parliament, to be 2666, carrying 568,202 tons, and 47,402 men. Comparing this number with the number returned in the beginning of the last century, the increase will be seen to be astonishing. On the quantity of tonnage, it is nearly in the proportion of six to one; and on the amount of men and ships, as upwards of four to one. The East India Company's ships alone carry more burthen, by 21,166 tons, than all the vessels of London did a hundred year ago. The average number of ships in the Thames and docks is 1100, together with 3000 barges employed in lading and unlading them, 2288 small craft engaged in the inland trade, and 3000 wherries for the accommodation of passengers; 12,000 revenue officers are constantly on duty in different parts of the river; 4000 labourers are employed in lading and unlading, and 8000 watermen navigate the wherries and craft. See DOCKS and COMPANIES.

The Port of London, as actually occupied by shipping, extends from London bridge to Deptford, being a distance of nearly four miles, and from four to five hundred yards in average breadth. It may be described as consisting of four divisions, called the Upper, Middle, and Lower Pools, and the space between Limehouse and Deptford: the Upper Pool extends from London bridge to Union Hole, about 1600 yards; the Middle Pool, from thence to Wapping New Stairs, 700 yards; the Lower Pool from the latter place to Horse-ferry Tier, near Limehouse, 1800 yards; and the space below to Deptford about 2700 yards. When the house of commons commenced an investigation respecting the port of London, the land accommodations were found to consist of only the legal quays and the sufferance wharfs. The former were appointed in the year 1558, under a commission from the court of exchequer, authorized by an act of the first year of Elizabeth, for the exclusive landing of goods, subject to duty: they occupy the north bank of the river Thames, with some interruptions, from London bridge to the western extremity of Tower ditch; the whole frontage measuring about 1464 feet. Till of late years these quays constituted the whole legal accommodation for the prodigious shipping trade of London; though from the increased size and tonnage of merchant vessels, &c. the depth of the river in this part was found too shallow to admit of that speedy clearance which the trading and mercantile interests require. The commissioners of the customs, therefore, occasionally permitted the use of other landing places, which were thence called sufferance wharfs, and of which five were situated on the north side of the river, between the Tower and Hermitage Dock, and eighteen on the opposite side: the whole having a frontage of 3576 feet. Notwithstanding these additional conveniences, the whole number of quays was still very far from possessing sufficient accommodation for the increased trade; and more especially in times of war, when large fleets of merchantmen arrive at once. The numerous evils arising from this want of a sufficient space for shipping and landing goods, and among which, the monopoly thrown into the hands of the few legal quays was not the least, were for many years subjects of vexation and complaint. So long ago as 1674, the merchants of London petitioned the house of commons for redress against a combination, which the whole body of wharfingers had entered into; and in the year 1711, when the tonnage of the vessels belonging to London did not amount to one-third

part of what it does now, the commissioners of the customs recommended to government to make a legal quay at Bridge yard, on the south side of the river; but it was never executed. About the year 1762, the court of exchequer directed a part of the Tower wharf to be converted into a legal quay; but this plan was relinquished. The construction of Wet docks had been recommended as the best expedient for obviating the vast loss and embarrassment arising from the encumbered state of the quays and wharfs, and from the immense crowding of the vessels on the river; and through the various schemes which were about this time offered for the purpose, &c. the house of commons was induced to appoint a committee; the business of which has been to inquire into the best mode of improving the port, and render it completely adequate to the present and probable commerce of London. The most skilful engineers and surveyors have been employed; whose reports, plans, &c. with the opinions and statements of various merchants and other persons, have been printed by order of the house of commons. These reports constitute several volumes in folio; and are peculiarly interesting and curious. Sir Frederic Eden published a pamphlet on the same subject, entitled "*Porto-Bello, or a plan for the improvement of the port and city of London; illustrated by plates.*" 8vo. 1798. For a particular account of the various branches of commerce, commercial companies, and other objects connected with the same, the reader is referred to the words *DOCKS, COMPANIES, EAST INDIA Trade, WEST INDIA Trade.*

Custom House.—On the north bank of the Thames, west of the Tower, is a large building, appropriated to such officers, clerks, tide-waiters, &c. as are immediately concerned in receiving the king's duties on the exports and imports of commerce. The present building was erected in 1718, on the site of another which had been destroyed by fire. It is 260 feet in front; and when erected was deemed amply sufficient for its destination. It has proved, however, very inadequate to the increased customs and business of the port; and to the vast commerce of London. After various surveys and reports made on the subject, it has been recently determined by the commissioners of the customs, that a new custom-house shall be erected, upon such a scale, and provided with such numerous and various accommodations, as to meet the exigencies and demands of government. Mr. David Laing, architect to the customs, having furnished designs for a new edifice, and the same being approved, it is intended to proceed with the building immediately. The site is from the western side of the present edifice to Billingsgate quay; and its whole extent will constitute a range of 480 by 96 feet. In the centre is to be the long room, of 190 feet by 67. The whole building will accommodate 650 officers and clerks, the number employed here; also 1050 tide-waiters, and other inferior servants. The lower floor is to consist of bondage vaults, over which are to be numerous apartments for officers and offices; and above these are to be several others, with the long room already noticed. The water front is to be of stone, with Ionic columns at each wing, and the centre will be crowned with a large dome over the long room, with sky-lights and ventilators. It is but justice to say that the designs are creditable to the taste and science of the architect. The quay in front of the building is to be enlarged by filling up a part of the river. A new wall and quay are to be formed from the Tower to Billingsgate wharf, and numerous improvements will be made in the contiguous streets and lanes. The river, at this place, is about 20 feet deep at high water mark. The business of the customs is managed by nine commissioners, whose jurisdiction extends over all the ports of England.

Manufactures of London.—London has long been celebrated for its manufactures as well as for its commerce. In the year 1327 the Skinners were a very numerous and rich class of citizens, manufacturing "fables, lucerns, and other rich furs." Cloth-workers of different kinds were also noted for the excellence of their goods. In 1556 a manufactory for the finer sort of glasses was established in Crutched Friars, and flint glass, not exceeded by that of Venice, was at the same time made at the Savoy. About five years subsequent the manufacture of knit stockings was introduced by one William Rider, an apprentice in London, who happening to see a pair from Mantua at the house of an Italian, made another exactly similar to them, which he presented to William earl of Pembroke. (See *HOSE and STOCKINGS.*) A manufacture of knives was shortly after begun by Thomas Matthews of Fleet-street, and this has ever since been a flourishing trade. Silk stockings were first made in England in the reign of queen Elizabeth. In the fourth year of that princess, "John Rose, dwelling in Bridewell, devised and made an instrument with wyer stringes, called the Bandora, and he left a son far excelling him in making bandoras, viol de gambles, and other instruments." Coaches were introduced in 1564, and in less than 20 years became an article of great manufacture. The following year the manufacture of pins was established, and shortly after that of needles. The making of "earthen furnaces, earthen fire-pots, and earthen ovens, transportable," began about the tenth year of Elizabeth, one Richard Dyer, an Englishman, having brought the art from Spain. Women's masks, busks, musins, fans, bodkins, and periwigs were introduced and made in London shortly after the massacre at Paris in the year 1572, and in 1577 pocket watches were brought from Nuremberg in Germany, and the manufacture of them almost immediately commenced. In the reign of Charles I. saltpetre was made in such quantity, as not only to supply all England, but the greater part of the continent. The manufactures of silk had likewise become extremely prevalent, as well as the manufacture of various silver articles. The printing of calicoes commenced here in 1676, and about the same time the weavers' loom was introduced from Holland. The revocation of the edict of Nantes in 1685, having driven many industrious Frenchmen from their native land, a considerable number came over to England and settled in Spitalfields. By them several of our manufactures, but particularly that of silk, were greatly improved, and many others introduced. Since then the productions of London have greatly increased both in extent and value. They now consist chiefly of fine goods, and articles of elegant use, brought to the greatest perfection, such as cutlery, jewellery, articles of gold and silver, japan ware, cut glass, books, cabinet work, and gentlemen's carriages; together with such particular articles as require a metropolis, or a port, or great mart for their consumption, export, or sale; viz. porter, English wines, vinegar, refined sugar, soap, &c. The silk manufactories of Spitalfields, Shoreditch, and Bethnal-green parishes alone employ upwards of 7000 persons. In Clerkenwell a like number are engaged in the different branches of watch-making. Coach builders and harness makers are very numerous, and have brought their respective works to a higher degree of perfection and elegance than any in the world. Intimately connected with this subject is the

Trade of London. which is vast, various, and of extensive effect. It may be divided into the wholesale and retail business; for these are different, and under different systems of management. The great number and variety of shops that are dispersed over the metropolis, the diversity, richness, and multitude of articles displayed for sale, and the great concourse

course of persons immediately and collaterally dependent on, and intimately connected with the same, are calculated to excite the astonishment of foreigners, and of persons who have not made inquiries into the subject. The whole-sale trade is mostly carried on in the city, and in the vicinity of the river, where large warehouses and counting-houses are established. The retail trade is dispersed through all the public streets: where spacious and handsome shops are opened for the display of all the necessities, as well as all the luxuries of life. The shop-keepers of London are mostly an active, industrious and respectable class of society: many of them are wealthy, and frequently retire from business in advanced age, with competence, or fortunes. Among the most modern shop establishments upon a large scale, are those appropriated to books and prints. Within the last 50 years, these have been prodigiously increased: and it would greatly astonish Addison, Johnson, or Sir Joshua Reynolds, could they revisit London in 1812, and take a review of the change that has been produced since the time they lived, in the quantity and quality of literary productions, and in works of art. The regular, continued and perpetual intercourse that subsists between London and all parts of the kingdom, by coaches, waggons, barges, &c. constitutes another and strongly marked feature.

Provisions, &c. used in London.—An immense population will require a large and systematic supply of provisions; and in this respect, no city in the world can be better accommodated; laws, custom, and open competition are all conducive to public advantage.

Animal Food.—The number of oxen annually consumed in London is estimated at 110,000; of sheep, 770,000; of lambs, 250,000; of calves, 250,000; of hogs and pigs, 200,000; besides animals of other kinds. In speaking of the consumption of animal food in London, it is not sufficient to notice merely the number of animals brought to market; for their size and fine condition should also be considered in forming a proper criterion. The increased consumption of the metropolis, from its accumulating population, may be estimated from the following average of the number sold annually in Smithfield.

	Oxen.	Sheep.
From 1750 to 1758	75,331	623,501
1759 — 1767	83,432	615,328
1768 — 1776	86,362	627,805
1777 — 1785	99,285	687,588
1786 — 1794	108,075	707,456

It is not only in number but in weight that there has been an astonishing increase; this has arisen from the improvements in breeding that have taken place in the course of the last century. About the year 1700, the average weight of an ox, killed for the London market, was 370lbs.; of a calf, 50lbs.; of a sheep, 28lbs.; of a lamb, 18lbs.; whereas the average weight at present is, of oxen, 800lbs. each; of calves, 140lbs. each; of sheep, 80lbs. each; and of lambs, 50lbs. each. The total value of butchers' meat sold in Smithfield is calculated to amount to 7,000,000*l.* *per annum.*

Milk.—The quantity of this article consumed in London surprises foreigners; and yet few persons have even a suspicion of the amount, which is not less than 6,080,000 gallons annually. The number of cows kept for this supply is said to be 8500; the sum paid by the retailers of milk to the cow-keepers is valued at 317,400*l.* annually, on which the retailers lay an advance of *cent. per cent.*, making the cost to the inhabitants 634,000*l.* Not content with

this profit, the retailers add water to the milk, to the extent, on an average, of a sixth part. Though the cow-keepers do not themselves adulterate the milk, (it being the custom for the retailer to contract for the milk of a certain number of cows, to be milked by his own people,) yet they are not wholly to be acquitted of the guilt; for in many of the milk-rooms where the milk is measured to the retailer, pumps are erected for the express purpose of furnishing water for headulteration, which is openly performed in the presence of any person who happens to be on the spot. See MILK.

Vegetables and Fruit.—There are at least 10,000 acres of ground near the metropolis, cultivated wholly for vegetables, and about 3000 acres for fruit. The sum paid at market annually is about 645,000*l.* for vegetables, and about 400,000*l.* for fruit; independently of the advance of the retailers, which, on an average, is more than 20*l. per cent.*, making the entire cost for the London supply upwards of 3,000,000*l.*

Wheat, coals, &c.—The annual consumption of wheat in London is, at least, 900,000 quarters, each containing eight Winchester bushels; of coals 800,000 chaldron, 36 bushels, or a ton and half to each chaldron; of ale and porter 2,000,000 barrels, of 36 gallons each; spirituous liquors and compounds 11,146,782 gallons; wine 65,000 pipes; butter about 21,265,000lbs.; and cheese, 25,500,000. The quantity of porter brewed from July 5, 1809, to July 5, 1810, by two of the principal brewers, was, by Barclay, Perkins, and Co. 235,053 barrels, and by Menx, Reid, and Co. 211,009. (See PORTER.) The quantity of fish consumed in the metropolis comparatively small, on account of the high price which it generally bears; and this appears to be the most striking defect in the supply of the capital, when it is considered that the rivers of the kingdom, and the seas which surround it, must afford such an amazing quantity. There are, on an average, annually brought to Billingsgate market 2500 cargoes of fish, of 40 tons each, and about 20,000 tons by land-carriage, in the whole 120,000 tons. The supply of poultry being inadequate to a general consumption, and the price consequently exorbitant, this article is confined to the tables of the wealthy, and the annual value does not exceed 60,000*l.* Game is not publicly sold, yet a considerable quantity, by presents, and even by clandestine sale, is consumed by the middling classes. Venison is sold, chiefly by pastry-cooks, at a moderate rate; but the chief consumption, which is considerable, is amongst the proprietors of deer parks.

Markets, &c.—London contains 15 flesh markets, one for live cattle, sheep, horses, &c. and 25 for corn, coals, hay, vegetables, &c. Of these the principal are, at Smithfield, for bullocks, sheep, horses, swine, hay, straw, &c.; Leaden-hall, for butchers' meat, wool, hides, &c.; Billingsgate, for fish; Covent garden and Fleet, for fruit and vegetables; Newgate, Newport, Carnaby, and Clare markets, for butchers' meat, &c.; the corn market in Mark-lane: in Thames street is a coal exchange. London has only one annual fair, which is held in Smithfield, and continues for three days. It is mostly devoted to objects of amusement, such as shows, exhibitions of beasts, birds, flights of hand, and the very lowest species of diversion. Hence it is mostly frequented by the lowest and most depraved classes of society. It is become more a place of riot and debauchery, than of public utility.

From what has been stated respecting the provisions annually consumed in London, we are naturally led to inquire into its population; an accurate knowledge of which forms

a foundation for much curious speculation. In the following table we are enabled to give the total number of persons at four different periods; but it may be necessary to premise, that the last is presumed to be the most correct census ever taken in London.

Population.—London is less populous, for its extent, than many other great cities. The streets are wider, and the inhabitants of every class, below the highest rank, enjoy more room for themselves and families than is usual for the same classes in foreign countries. Hence a given number of people is spread over a larger space in London than in foreign

cities. From the report on the population of Great Britain, published on the authority of an act passed 43 G. III. London, including the suburbs, appears to contain 837,906 settled inhabitants; but the great number of soldiers, mariners, provincial visitors, colonists, and foreigners, who are constantly in London, for purposes of pleasure and business, and the new inhabitants of 10,000 houses built within the last seven years, extends the total population to more than a million. As the increase or diminution of the population claims a distinct notice, the following table will shew its five divisions, at four different periods.

	In 1700	1750.	1801.	1811.
1. City of London, within the walls - - - - -	159,300	87,000	78,000	80,000
2. City of London, without the walls, including the Inns of Court - -	169,000	156,000	155,000	168,000
3. City and Liberties of Westminster - - - - -	130,000	152,000	165,000	180,000
4. Out-parishes within the Bills of Mortality - - - - -	226,900	258,900	379,000	460,000
5. Parishes not within the Bills - - - - -	9,150	22,350	12,300	135,000
Total population of the Metropolis - - - - -	674,350	675,250	900,000	1,023,000

Government of London.—In tracing the outline of the present government of this metropolis, it will be proper to divide it into three principal parts; viz. the city of London, with its dependencies; the city and Liberties of Westminster; and the suburbs connected with the two, but out of the jurisdiction of both the cities.

The civil government of the city of London is vested, by charters and grants from the kings of England, in its own corporation or body of citizens. The city is divided into 26 principal districts, called wards; and the corporation consists of, 1, the lord mayor; 2, the aldermen; and 3, the common council. The lord mayor is chosen annually in the following manner: on the 29th of September, the livery, in Guildhall or common assembly, choose two aldermen, who are presented to the court of lord mayor and aldermen, by whom one of the aldermen is chosen, (generally the senior,) is declared lord mayor elect; and on the 9th of November he enters on his office. The aldermen are chosen for life by the free householders of the several wards, one for each ward; except Bridge-ward without, where the election is by the court of aldermen from among those who have passed the chair, commonly the senior: he is styled father of the city. The common council are chosen annually by the free householders in their several wards, the number for each ward being regulated by ancient custom; the body corporate having a power to extend the number. The common council are the representatives of the commons, and compose one of the parts of the city legislature, which nearly resembles that of the kingdom; for as the latter consists of king, lords, and commons, so this is composed of lord mayor, aldermen, and common councilmen: the principal difference is, that in the three estates of the kingdom each enjoys a separate negative, while in the city this right is denied to the lord mayor, and confined to the aldermen and common council. Before the year 1547, there were only two common-councilmen returned for each ward, which being thought insufficient to represent such a numerous body, it was at that time settled that each ward should choose a number, not more than twelve, or less than six, according to its dimensions; which has since been increased to the present number. The 26 wards are subdivided into 236 precincts, for each of which a representative is elected in the same manner as the aldermen; with this difference,

that as the lord mayor presides in the wardmote, and is judge of the poll at the election of an alderman, so each alderman, in his respective ward, presides at the election of common council men. The civil powers exercised by the corporation are very complete: the laws for the internal government of the city are wholly framed by its own legislature, called the court of common council, which consists of the lord mayor, aldermen, and representatives of the several wards, who assemble in Guildhall as often as the lord mayor thinks proper to convene them. They annually select six aldermen and twelve commoners for letting the city lands, and this committee generally meet at Guildhall on Wednesdays. They also appoint another committee of four aldermen and eight commoners for transacting the affairs of Gresham-college, who usually meet at Mercer's-hall, at the appointment of the lord mayor, who is always one of the number. The court of common council also, by virtue of a royal grant, annually choose a governor, deputy, and assistants, for the management of the city lands in Ireland. This court also dispose of the offices of town-clerk, common serjeant, judges of the sheriffs'-court, common crier, coroner, bailiff of the borough of Southwark, and city garbler. The election of the recorder is vested in the court of aldermen only. The lord mayor is the chief magistrate of the city: and the aldermen are the principal magistrates in their several wards. The lord mayor, the recorder, the common serjeant, and the aldermen, are judges of oyer and terminer (that is, the king's judges to try capital offences and misdemeanors) for the city of London and county of Middlesex; and the aldermen are perpetual justices of the peace for the city. The two sheriffs, (who are strictly officers of the king, for many important purposes of his executive government,) are chosen annually by the livery of London, not only for the city, but for the county of Middlesex, the same persons being sheriffs for London, and jointly forming one sheriff for the county. (See Philips's Letter on the Office of Sheriff, 8vo. and SHERIFF.) The administration, in all its branches, within the jurisdiction of the corporation, in all cases embracing the city and the borough of Southwark, and in some cases extending beyond, is exercised by members of the corporation or its officers. The borough of Southwark was formerly independent of the city of London, and appears to have been governed by

a bailiff till the reign of Edward III., who granted the government of it for ever to the city. A part has been since incorporated with the city, under the appellation of Bridge Ward Without, and has its officers appointed by the court of common-council. The livery is a numerous, respectable, and important elective body; in which is vested the election of the lord mayor, sheriffs, chamberlain, members of parliament, bridge-matters, ale-conners, and auditors of the chamberlain's accounts. The lord mayor, aldermen, common-council, and livery of London, form together the most important popular assembly, the commons house of parliament excepted, in the kingdom. On occasions of the greatest moment, their decisions have inspired general fortitude; and the whole legislature, when under evil influence, has been struck with awe by the remonstrance of the city, and prudently listened to a warning so solemnly pronounced.

The military government of the city of London was considerably changed by an act of parliament passed in the year 1794; under which two regiments of militia are raised in the city, by ballot, amounting together to 2200 men. The officers are appointed by the commissioners of the king's lieutenancy for the city of London; and one regiment may, in certain cases, be placed by the king under any of his general officers, and marched to any place not exceeding twelve miles from the capital, or to the nearest encampment; the other, at all such times, to remain in the city. Regiments of affiliated volunteers are formed in the respective wards and parishes, for the internal defence and peace of the metropolis. A considerable force is also maintained by the Bank, India-house, Custom-house, and other public bodies, for their more immediate security. The Artillery company, which is principally composed of a voluntary enrolment of the younger citizens, affords an additional force of about six hundred men. (See ARTILLERY.) See also Highmore's History of the Artillery Company, 8vo.

The civil government of the suburbs is vested in the justices of the peace for the county. The county-hall for Middlesex is on Clerkenwell-green, where the quarter-sessions are held; and a great part of the civil government is exercised. In Bow-street, Covent-garden, is an office of police, under the direction of certain justices of Middlesex, who dedicate their time chiefly to that office, where are first examined the most serious cases of misdemeanor. The other public offices of police, where magistrates sit daily, are—the Mansion-house and Guildhall, within the city. In the suburbs—Bow-street; Queen-square, Westminster; Marlborough-street; Hatton-garden; Worship-street; Lambeth-street. Whitechapel; High-street. Shadwell; and Union-street, Southwark; at Wapping New-Itairs is an office for enquiry into offences connected with the shipping and port of London.

The police of London is under the controul of the magistrates belonging to these offices; who are appointed and paid by the government. They are required to attend on duty every day, and their province is to hear and determine petty offences, and subjects of dispute between individuals. On many occasions they investigate felonies, and the higher classes of crimes, and commit the offenders to the proper prisons. Different acts of parliament have been passed on this subject, by which the duty and powers of the magistrates and subordinate officers are particularly defined. The police of the city of London is regulated by acts passed in 10 Geo. II. 11, 14, 33, and 34 Geo. III.: of Westminster and its liberties, by acts of 27 Eliz., 16 Cha. I., 29 and 31 Geo. II. 2, 3, 5, 11, and 19 Geo. III.: municipal regulations are also established in the borough of Southwark, by acts 28 Geo. II. and 6 and 14 Geo. III.

Under the foregoing acts, a nightly watch is appointed for the prevention of robbery, and the apprehension of offenders. To the city of London are attached 765 watchmen, and 38 patrols. The whole number of headles, patrols, and watchmen, who are every night on duty in and around the metropolis, is estimated at 2041. Watch-houses are placed at convenient distances in all parts, where parochial constables attend in rotation to keep order, receive offenders, and deliver them the next morning to the sitting magistrate. In the winter season, the roads adjacent to London are additionally guarded by horse-patrols; and on extraordinary occasions, the officers of the police are ordered out, or kept in readiness, to assist in the preservation of the public peace. The nightly watch is of peculiar utility in case of fire, as in every watch-house the names of the turncocks, and the places where engines are kept, are to be found. Besides parochial engines, many public bells are provided with them, and the principal fire-offices have engines stationed in various districts, with active men and horses. By means of the fire-plugs, water is immediately supplied, and the general security is guaranteed by every effort of vigilance and activity.

Acts of Parliament relative to London and its Inhabitants.—

The internal economy, government, police, and civil regulations of London, are entitled to particular and commendable notice; because these have tended to attract foreigners to settle here, and induced numerous families, both tradesmen and persons of fortune, to fix on this city as a desirable place of permanent residence. It will be found that many legislative acts have been passed, and are in force, to secure the safety and comfort, and administer to the luxuries of the inhabitants of this metropolis. Besides numerous local acts of parliament that apply to particular parishes and districts, the following have been passed expressly for the above purposes. It is thought advisable to specify these acts, and point out some of their items; because many local advantages and conveniences of London are to be referred to these legislative provisions.

By 3 Hen. VII. c. 9, citizens and freemen of London are authorized to carry their wares to any fair or market in the kingdom, in spite of any bye-law to the contrary. By 6 Geo. II. c. 22, the lord mayor and citizens were empowered to fill up part of Fleet Ditch, and the inheritance of the ground was vested in them. By 29 Geo. II. c. 20, the lord mayor and common-council were empowered to purchase and remove buildings, to improve, widen, and enlarge the passage over and through London-bridge.

Buildings.—In the year 1764, a very important act of parliament was passed, respecting all buildings which are hereafter to be erected within London, Westminster, the bills of mortality, and the parishes of Mary-le-bone, Paddington, Pancras, and Chelsea, whereby it is provided, that they shall be divided into seven rates, of which the external walls shall be of a thickness proportionate to their rates or sizes; those of first-rate buildings to be at the foundation $2\frac{1}{2}$ bricks, or 1 foot $9\frac{1}{2}$ inches thick, and decreasing upwards in a degree therein specified. Another act, of a more ample nature, was passed in 1774, respecting the buildings of London and its vicinage. By this it is required, that houses contiguous to other buildings shall have party-walls between them, which walls and all chimnies and chimney-shafts shall be of brick or stone, or both together. (See CHIMNEY.) Party-walls shall be 18 inches above the buildings adjoining, and those of first-rate buildings shall be at the foundation $3\frac{1}{2}$ bricks, or 2 feet 6 inches in thickness, decreasing upwards in a given proportion. No recesses to be made in party-walls (except for chimnies, fires, girders,

&c.) so as to reduce such wall under the thickness required. No timber to be in the party-walls (except bonds, templets, and chains, and the ends of girders, beams, &c.) and 8½ inches of solid brick-work to be between the ends and sides of every piece of timber, except opposite to other timbers, and then no part of such timber to approach nearer than four inches to the centre of the wall. Surveyors are to give information of irregular buildings, and the lord mayor and justices are to order the same to be demolished or amended, and 50s. penalty is chargeable on the workman. Fire-engines and ladders to be kept in known places in every parish; and parish officers shall place on the mains of water-works, stop-blocks, and fire cocks, and shall mark the house near. In case of fire, the turncock whose water comes first shall be paid 10s. First engine 1*l.* 10s., the second 1*l.*, the third 10s. Where officers pay rewards for fires in chimneys only, or beginning there, they are to be reimbursed by the occupier. Servants who through negligence set fire to any house, shall forfeit 100*l.* or be committed to hard labour for 18 months.

Butchers.—It is provided by an act of Hen. VII. c. 3, that butchers shall not kill beasts within the walls of London; but this act is either superseded or not put in force.

Cattle.—By 14 Geo. III. c. 87. and 21 Geo. III. c. 67. any peace officer may arrest persons who drive cattle through the streets of London in an improper or cruel manner. The party, if convicted, shall forfeit from 5s. to 20s. or be committed for one month. Persons not being drivers of cattle, who shall throw stones or set dogs at them, shall be subject to the same penalties.

Carts.—By 1 Geo. I. stat. 2. c. 57, no carman, drayman, waggoner, or other person shall, within the bills of mortality, ride on a cart, dray, or waggon, not having some person on foot to guide the same, on forfeiture of 10s. This penalty is extended to within ten miles of London, by 24 Geo. II. c. 43.

Coals.—By 27 Geo. III. sess. 2. c. 68, the coal exchange shall be a free open market on Monday, Wednesday, and Friday, from twelve o'clock till two, and coals are only to be sold in market hours, under a penalty of 100*l.*

Hackney Coaches.—The commissioners may licence 800 by act 9 Anne, 200 more by 11 Geo. III., and 100 more by 42 Geo. III.; total 1100. The rates of fares are fixed, and an office is appointed to determine on complaints, which are also cognizable by magistrates.

Paving, lighting, and cleansing.—Several acts were passed in the reign of Hen. VIII. for paving parts of the metropolis. The eastern suburbs were paved by act 13 Eliz. Various other acts were passed in subsequent reigns for paving the several parts which were added to the metropolis. The *new paving*, according to the present mode, commenced in 1763, under an act passed in the preceding year. Before this period the streets were extremely inconvenient to passengers, the stones (mostly Guernsey pebbles) being round, the kernels in the middle, and no level footway, as at present, for the pedestrians. The alterations first took place in Westminster, and the improvements progressively extended through most parts of the metropolis. The act also took place the removal of the enormous dunghills lying across the streets or over the footways, and the raising of the pavements and manure works, improving the circulation of the air as the progress of the paving.

Lighting.—As early as the year 1416, the inhabitants of London were obliged to hang out lanterns on winter evenings. Among other improvements in the reign of Queen Anne, was the introduction of globular glass lamps

with oil burners, instead of the lanterns with candles, and common lamps that had previously been in use. In 1736, an act of parliament was procured to regulate "the better enlightening the streets, &c." within the city. A committee appointed to carry this act into execution, reported that "the number of houses then inhabited and chargeable (*i.e.* such as were subject to poor-rates) was in all 14, 14, of which 1287 were under the rent of 1*l.* per annum: 4741 of 1*l.* and under 20*l.*; 3045 between 20 and 30*l.*; 1839 between 30 and 40*l.*; and 3092 of 40*l.* and upwards. The number of lamps required was 4200, exclusive of such as were attached to public buildings. They were to be placed at the distance of 25 yards from each other in the principal streets, and 35 yards in the smaller streets and lanes. This was the commencement of the system of defraying the charges of lighting the metropolis by parochial assessments. Since this time various other acts of parliament have been obtained for different districts in the suburbs, and it is conjectured that more than 30,000 lamps are lit every night within the bills of mortality. From Lady-day to Michaelmas, a less number is used than during the other half of the year. In 1737, an act of parliament was passed for regulating and increasing the city watch, &c. Various acts have been passed for cleaning the streets, and preserving them from obstructions and nuisances of every description.

Sewers.—One of the most essential objects in a large city is good drainage; and in this respect London is well provided. Into the deep channel of the Thames, numerous large sewers communicate, and convey all the superfluous water, and vast quantities of filth from the houses. By acts of the legislature, a number of persons, styled commissioners of sewers, are empowered to make and repair sewers, and levy a tax on every housekeeper towards defraying the expences incurred by the same. An act of parliament was obtained as early as the reign of Henry VI. on this subject; and this has been amended and enlarged by subsequent acts, 6th Henry VIII. cap. 10; 23d Henry VIII. cap. 5; and 25th of same reign; afterwards in the 3d and 4th of Edward VI.; 1st of Mary; 13th of Elizabeth; 3d of James, and 7th of Anne. See SEWERS.

By an act of parliament passed in 1737, the number of playhouses was limited to three, and all dramatic pieces intended for the stage, were first to be subjected to the perusal and approbation of the lord chamberlain. See PLAYHOUSE.

The *Charitable Institutions* of London are numerous, of various descriptions, and of incalculable advantage. Whilst they administer comfort, health, education, and protection to the necessitous, they reflect much honour on the affluent, and on all the patrons. These consist of hospitals, dispensaries, almshouses, charity schools, benevolent societies, and other establishments. In a former part of this work, under the word HOSPITAL, will be found accounts of several, to which we shall add a few particulars. In the metropolis are 22 hospitals for sick, lame, and for pregnant women; 107 almshouses for the maintenance of aged persons of both sexes; 18 institutions for the support of the indigent of various other descriptions; above 20 dispensaries for the gratuitous supply of medicine and medical aid to the poor; 45 free-schools with perpetual endowments, for educating and maintaining 3500 children; 17 other public schools for educating poor children; 237 parish schools, supported by voluntary contribution, in which about 9000 boys and girls are constantly clothed and educated: each parish has also a workhouse for the maintenance of its own helpless poor. Exclusive of this ample list, the several livery companies of

the city of London distribute above 75,000*l.* annually in charities; and there is a multitude of institutions, of a less prominent nature than the foregoing, which make the total of charitable donations immense. The sums annually expended in the metropolis for charitable purposes, independently of the private relief given to individuals, have been estimated at 850,000*l.* The hospitals were chiefly founded by private munificence: some are endowed with perpetual revenues, and others supported by annual or occasional voluntary subscriptions. The almshouses were built and endowed either by private persons or corporate bodies of tradesmen. Many of the free-schools owe their origin to the same sources. The magnitude of the buildings dedicated to public charities, and the large revenues attached to them, are highly deserving of commendation; and the general administration of these establishments confers a peculiar honour on the capital. The interior regulations of the hospitals well accord with the exterior magnitude: the medical assistance is the best the profession can supply; the attendance is ample; the rooms are generally very clean and wholesome; and the food is proper for the condition of the patients. The almshouses, and other institutions for the support of the aged and indigent, exhibit not merely an appearance, but a real possession of competence and ease. From some of the free-schools, pupils have been sent to the universities as learned as from any of the most expensive seminaries: and all the scholars receive an education completely adapted to the stations for which they are designed. Among the free-schools may be particularly noted those of Westminster, Blue-coat or Christ's-hospital, St. Paul's, Merchant-tailors', Charter-house, and St. Martin's. For a very ample history and description of all the charitable institutions of London, the reader is referred to a volume published in 1810, entitled, "*Pietas Londinensis; the History, Origin, and present State of the various public Charities in and near London,*" by A. Highmore, 12mo.

Institutions.—For the accommodation and convenience of the immense population of the metropolis, the following institutions have been formed for education, for promoting good morals, for advancing the useful and fine arts, and for charitable and humane purposes. For education (besides the various schools already mentioned) there are 16 inns of court and chancery for students in the law, &c. (see COURT, *Inns of*), and five colleges, *viz.* Sion-college, at London-wall, for the improvement of the clergy; Gresham-college, for divinity, astronomy, and other sciences; the college of physicians, Warwick-lane, for professors in medicine; one for the study of civil law, Doctor's Commons; and the Herald's-college. (See COLLEGE.) The number of private schools, for all the various branches of male and female education, is estimated at 3730; including some for children who are deaf and dumb.

For promoting religion and good morals London contains the following societies: 1. For giving effect to the king's proclamation against vice and immorality, established in the year 1707, and for the suppression of vice in 1803: 2. For promoting Christian knowledge, founded in 1699: 3. For the propagation of the gospel in foreign parts, incorporated in 1701: 4. For promoting religious knowledge, by distributing books to the poor, instituted in 1750: 5. For promoting charity schools in Ireland: 6. For religious instruction to the negroes in the West Indies, incorporated in 1795; and African education society, instituted in 1800: 7. For preventing crimes, by prosecuting swindlers and cheats, 1767: 8. For the encouragement of servants, 1792: 9. For the relief of poor pious clergymen, 1788: 10. For giving bibles to soldiers and sailors, 1780: 11. For giving bibles, and otherwise furthering the purposes of Sunday schools,

1785: British and foreign bible society, 1804. To these may be added, Dr. Bray's charity for providing parochial libraries; and queen Anne's bounty for the augmentation of small livings of clergymen.

For the promotion of learning, and advancement of the useful and fine arts, are the following institutions: 1. The Royal society, incorporated for promoting useful knowledge, was instituted 1663: 2. Antiquarian society, Somerset-place, 1751: 3. Society, or trustees of the British Museum, 1753: 4. Royal Academy of Arts, Somerset-place, 1768: 5. Society for encouragement of learning, Crane-court, Fleet-street: 6. Society for encouragement of arts, manufactures, and commerce, in the Adelphi-buildings: 7. Medical society of London, Bolt-court, Fleet-street, 1773: 8. Society for the improvement of naval architecture: 9. Veterinary college, St. Pancras: 10. Royal institution for applying the arts to the common purposes of life, 1799: 11. The London institution, in the city, 1805: 12. The Surrey institution near Blackfriars-bridge, 1808: 13. The Ruffel institution, Cornhill-street, Ruffel-square, 1808: 14. The Literary fund, established in 1707, &c.

Among the institutions for charitable and humane purposes, the following may be enumerated: 1. The humane society for the recovery of drowned and suffocated persons: 2. Society for the relief of merchants' seamen: 3. Several societies for support of widows in general: and others respectively for the widows and orphans of clergymen, medical men, officers, artists, and musicians; and for decayed musicians, artists, authors, actors, and schoolmasters: 4. Society for relief of persons confined for small debts: 5. Society for ameliorating the condition of the poor. With these benevolent establishments may be classed the friendly or benefit societies, of which there are in the metropolis and its vicinity about 1600, consisting, in general, of from fifty to one hundred members each. The members consist of mechanic and labouring people, who, by small monthly contributions, raise a fund for their support in sickness, and for their funerals, &c. An act of parliament was passed 33 Geo. III. for the special "*Encouragement and Relief*" of these societies.

Places of Public Amusement.—Considering the vast extent, population, and wealth of London, it certainly contains fewer places of public amusement than any metropolis in Europe. Whether this be the result of accidental causes, or is to be referred to the genius and habits of the people, may, perhaps, be a matter of some doubt. But whatever deficiency exists with respect to number, it yields to no city in the world in the splendour and excellence of those it possesses. Our dramatic authors are not less conspicuous for the brilliancy of their compositions, than our actors are for the judgment and effect which they display in their representation. Mrs. Siddons is, perhaps, the most effective and powerful actresses of the present, or of any former age; while her brother, Mr. John Kemble, must be allowed to possess talents of the first-rate description. In the walk of tragedy many other players have evinced very considerable abilities: among the deceased may be named Garrick, Barry, Betterton, Henderson, Booth, Quin, Ryan, and J. Palmer: and those of the present age, most entitled to historic record, are Cooke, Young, and C. Kemble. It may be safely asserted that the comedians of the London theatres have advanced the mimetic art nearly to the height of perfection. The names of the late Messrs. Lewis, King, Parsons, Woodward, Shuter, and Edwin are justly honoured in the annals of the drama; and those of the following actors are entitled to the unqualified commendation of the theatrical critic: Dowton, Munden, Bannister, Fawcett, Emery, Knight, Matthews, Johnson, Lovegrove, Linton, Simmons, and Blanchard. Many

actresses of the present age possess very considerable dramatic powers; particularly mesdames Jordan, Edwin, Duncan, C. Kemble, Gibbs, S. Booth, Davenport, Liston, and Storace. The English stage has many other performers of merit; but their talents are of a more limited nature than the preceding. In the operatic department, or singing, it has long been the fashion to introduce Italian, or foreign singers to the London boards; although many of our native performers unite to fine and powerful voices much science. Mrs. Billington, Mr. Braham, Madame Storace, Mrs. Mount, Miss Bolton, Mrs. Martyr, Mrs. Bland, Mrs. Dickons, Miss Kelly, Mr. Ingleton, Mr. Phillips, and Mr. Bellamy, are justly admired, and have acquired much professional fame. In action or pantomimic representations, many eminent performers are to be found on the London boards. Besides these there are many others very little inferior. Indeed it may be justly observed, that the companies at the principal theatres consist in general of highly respectable performers. The musical votary never had the means of gratifying his taste with a higher relish than at the present period. New compositions of considerable merit daily issue from the press. The list of our vocal performers comprises the names of some of the first singers in Europe. Our instrumental performers are no less celebrated; and our bands in general exhibit specimens of the highest taste and manual skill.

Appropriated chiefly to dramatic performances are the theatres of Drury-lane, Covent-garden, the Lyceum, and the Haymarket. Of these, the two first are upon a style of magnificence and grandeur, scarcely to be surpassed by any theatre in Europe. The last is on a small scale, and opens in summer, when the others close. The King's theatre, or Opera-house, situated in the Haymarket, was originally intended solely for the representation of Italian operas. Of late years, however, dancing has constituted a prominent part of its amusements, to the great injury of the operas, which are generally curtailed of an act to allow time for the ballets. The decorations of this theatre are splendid, and its band is considered as inferior only to that of the Opera-house at Paris. The concert of ancient music, generally called the King's concert, is held in the great room Hanover-square, every week from the beginning of February to the end of May. It owes its origin to a freedom from the Academy of Music, another celebrated musical institution. The following is a list of the theatres, and other places of public amusement, now occupied in London, and open to the public: a more particular description of some of these will be given in subsequent parts of this work. *See the heads THEATRE and WESTMINSTER.*

Covent-garden Theatre is the most eminent for size and dramatic exhibitions. The present building was erected in the year 1809, from designs by Mr. Smirke, jun. architect. It occupies the site of a former theatre, with connecting houses, which were consumed by fire in September 1808; and it is worthy of remark, that the whole of the present edifice was raised and finished within one year. It is on a large scale, and the whole stage management is vested in Mr. John Kemble, who has certainly made many improvements, and interesting reformations in the internal economy, science, and scenic representation of dramas.

Drury-lane Theatre is now in the progress of building from designs by Mr. B. Wyatt, architect; whose model evinces much skill and judgment. Though not on so large a scale as the theatre of Covent-garden, it combines many conveniences and advantages not to be found in that building; and for seeing and hearing it promises to be very satisfactory to the audience. Mr. Whitbread has taken a very active part in causing this theatre to be rebuilt. A former theatre, built by Mr. Holland, was burnt in 1809.

Theatre Royal Haymarket is a small, inconvenient house, and is allowed to be opened to the public from the 15th of May to the 15th of September.

The Lyceum Theatre, called the *English Opera house*, is at present occupied by the Drury-lane company of performers, under the management of Mr. Arnold and Mr. Raymond. Operas and comedies are chiefly represented here; and some of these are acted in the best style. Many new dramas have been produced at this house.

The Opera-house, in the Haymarket, is appropriated to Italian operas, spectacles, and dances. The management of this house has occasioned several legal litigations, and is still involved in dispute. Its principle is uncongenial to the English character, and it would be a memorable and laudable act to abolish it. Another similar establishment, arising out of the cabals of the former, and originating with some speculating adventurers, has lately been opened at

The Pantheon in Oxford-road; but after a few nights representation, and after debts of some thousands of pounds had been contracted in fitting up, and adapting the house to the purpose, the theatre is again closed.

Sadler's Wells is a theatre appropriated to pantomimes, burlettas, spectacles, dancing, &c. and commences its season on Easter Monday. The stage performances are invented and written by Mr. C. Dibdin, jun., who has displayed a peculiar and original talent in this species of composition. The musical department is conducted by Mr. Reeve, and the scenery painted by Mr. Andrews. A novelty has been introduced at this theatre, *i. e.* of filling the whole space beneath the stage with water, by which means some splendid and curious aquatic exhibitions have been displayed. It partly resembles the naumachia of the Romans.

Astley's Amphitheatre, near Westminster-bridge, is also a summer theatre, where pantomimes, burlettas, and various fetes of horsemanship are displayed. This house also commences its season on Easter Monday, and generally closes in October, when the company remove to another theatre, called

Astley's Olympic Pavilion, in Newcastle-street, where the same species of entertainments are exhibited.

The Surrey Theatre, in St. George's-fields, is devoted to a similar class of dramatic representations; but since Mr. Elliston has been proprietor and manager of this house, he has adopted a novelty, in abridging and versifying many celebrated dramas, and playing the same with the accompaniment of music.

Another theatre in Wells-street, called the *Royal Theatre*, is occasionally opened; and others are situated in Tottenham-street, in the Strand, and in Bridges-street, Covent-garden.

Flower-hill Gardens are opened twice a week in the summer months, when they are ornamented with an immense number of lamps, and a large concourse of visitors are entertained by vocal and instrumental music. Besides the foregoing, London abounds with many other places of amusement; such as tea-gardens, exhibitions for ingenious inventions, and display of works of fancy, &c.

Among the places of public amusement or exhibitions, may be specified—

The London Museum, in Piccadilly, the property of Mr. W. Bullock, who has devoted many years, much exertion, and a great expence, in collecting and arranging the most comprehensive and interesting assemblage of natural and artificial curiosities that was ever before amassed in England, or perhaps in Europe. His museum was originally commenced at Liverpool; but it has been progressively enlarged and improved. Its preserved specimens in natural history are select, in the highest preservation, and arranged according

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ing to the Linnæan system. They consist of about 15,000 quadrupeds, birds, reptiles, fishes, insects, corals, &c. One department of the museum is peculiarly curious and interesting. It is called the Pantheon, in which most of the known animals, in a preserved state, and in natural attitudes, are exhibited as ranging in their native, or appropriate haunts; and at intervals of exotic plants, rocks, and trees, are distributed over the apartment: the whole interior of the same is painted in a picturesque manner, representing the oriental forests. For a particular account of the truly interesting collection, the reader is referred to a printed "Compendium to the Museum and Pantheon," 12mo. 2s. 6d. or a similar work, with etchings, by Howitt, price 1s. A new building, in the Egyptian style, has been erected for this museum from designs by Mr. Robinson, architect.

Public Museum, at Exeter Change in the Strand, contains a collection of living birds and beasts; and to the students and lovers of natural history is very interesting. Here are Lions, Leopards, tigers, ottriches, baboons, and monkeys of different kind, Kangaroos, beavers, and various other foreign animals and birds. Other museums and exhibitions of natural and artificial curiosities are—

Doll's shop, in Grosvenor-street, for cork models of several temples, and ancient buildings in Rome:—*Mallard's* automatical exhibitions in Spring-gardens, for fine singular works of mechanism:—*Black's Museum*, Haymarket, is also for mechanical works. At *Barber's Panorama*, in Leicester-square, are exhibited circular views, on a large scale, of several foreign and English cities, towns, and other particular scenes. Mr. Barber has evinced very considerable taste and talents in this branch of art, and to him the public are indebted for the first invention of panoramic views. Since he commenced, several other artists have exhibited similar pictures: Mr. Giren, a view of London; Mr. Pirie, several paintings of battles; and a *New Panorama* is now opened by Reinagle and Barber, in the Strand. See PANORAMA.

The Fine Arts, and Exhibitions of Works of Art, in London, are entitled to distinct and particular notice; for their present state is calculated to shew the extraordinary progress they have made during the last century, and to display the highly cultivated cultivation of the present age. London is the focus of the fine arts of England, and fountain-head of excellence. Here all the eminent spirits of the country either originate, are developed, or terminate their career; because all the great masters collect here; the best instruction is to be obtained; the most celebrated productions to be seen and studied; and annual exhibitions displayed to the public. In the rooms of the Royal Academy at Somerset-house, in those of the British Institution, Pall-Mall, at Spring-gardens, and in Bond-street, are exhibited all sorts of paintings, drawings, sculptural and architectural designs; and a careful examination of the works here exhibited will furnish a foreigner with an opportunity to appreciate the individual and aggregate merits of English artists. Besides these public exhibitions, it will be expedient to visit the galleries of Mr. West, Mr. Turner, Mr. Wilkie, Mr. Lawrence, and some other painters; for in these will be seen some of the most meritorious works of the age. The best collections of our modern sculptors will be found in the church of St. Paul's and in Westminster Abbey; whilst the true talents of the architects can only be appreciated by a personal examination of the buildings they have erected. The public institutions devoted to the fine arts are the following:

At the *Royal Academy*, in Somerset-house, is the annual exhibition for the period of about six weeks, of paintings, drawings, sketches, and proofs-prints. The society was established by charter in the year 1768, and Sir Joshua

Reynolds appointed its first president. To this great artist, as a painter, collection of a man, and lover of art, the Royal Academy is indebted for its present prosperity and reputation. His fascinating productions, combining manner and luminous colouring, attracted the attention and patronage of the most distinguished, and at the same time, raised the public mind to a noble and judicious estimate. Since the death of Sir Joshua, the academy has opened its doors, with its usual splendour, to the public exhibition of new pictures in the fine arts of painting. A series of lectures has been annually given at the academy by different professors; all calculated to advance art, and to elucidate proper principles of taste and criticism. Some of the present lecturers are deservedly famed for professional science, as well as for general knowledge. In the years 1811 and 1812, the following professors delivered lectures on their respective provinces of art: Henry Fuseli, on painting; John Soane, on architecture; Anthony Carlisle, on anatomy (it is necessary to state that this gentleman is not a member of the academy); J. M. W. Turner, on perspective; and John Flaxman, on sculpture. The Royal Academy consists of forty members, called royal academicians, twenty associates, and six associate engravers. Further particulars of this institution will be given under ROYAL ACADEMY.

The British Institution, in Pall-Mall, was established by the liberal contributions of several noblemen and gentlemen in the year 1805, for the express encouragement of British artists: and it must afford much gratification to the founders to contemplate its great utility and successful effects. This institution is devoted to the exhibition and sale of pictures; and to the use of young students for copying from and studying old paintings. Another plan has been recently adopted, which is calculated to enhance its utility and reputation. This is the purchase of possession pictures, which are to be preserved as the property of the institution, and from which engravings are to be made on a large scale. The first of this series is a large painting by Mr. West, of "Christ healing the Sick in the Temple;" and Charles Heath is engraving a plate from it.

The Society of Painters in Water Colours was established in November 1804, since which time they have annually exhibited a large and interesting collection of drawings. This branch of art may be said to have attained to a high degree of excellence; and many of its protectors have manifested distinguished talents. In colouring, effect, and appropriate character, several young artists of the present age have surpassed any of the old masters in this branch of art. Another society of artists have made an annual exhibition of drawings in Bond-street. The collections of pictures in private houses in London are numerous, and many of them very valuable. The most celebrated of these are the marquis of Stafford's at Cleveland House; (for an account of these pictures, see Britton's "Cavalry of Rivers;" and Tresham's "Gallery of Pictures;") the collection at Buckingham-house; the earl of Grosvenor's, in Grosvenor-street; Mr. Thomas Hope's, in Duchels-street; Mr. H. W. Hope's, in Grosvenor-square; Mr. Anderdon's, Spring Garden; Mr. West's, in Newman-street; earl of Suffolk's, in Harley-street; the duke of Devonshire's, in Devonshire-house; Mr. Angerstein's, Pall-Mall; Sir Abraham Hume's, Sir George Yonge's, in Stratford-place; Lord North's, in Grosvenor-square; Mr. Weddell's, in Upper Brook-street; Lord Athburham's, in Devonshire-street; Lord's Lucas's, in St. James's-square; Sir George Beaumont's, in Grosvenor-square; Mr. William Sturt's, in Park-street; Mr. Knigh's, of Portland-place; Mr. Jeremiah Harman, of Finsbury-square; Mr. R. P. Knigh's,

Knight, of Soho-square; lord Radstock, in Portland-place. Besides these, there are many other collections of fine pictures in various parts of the metropolis. For much useful information respecting the fine arts in London, &c. see Hoare's "Inquiry into the present State of the Arts of Design in England," 8vo. 1806; also two other volumes in 4to. edited by the same intelligent and liberal writer, entitled "The Artist in a Series of Essays;" also, "The fine Arts of the English School," 4to. 1812; Britton's Preface to an Account of the Corham-House Collection; and Edwards's Anecdotes of Painters in England, 4to. 1808.

Courts.—For an account of the various courts of London, the reader is referred to a former volume, under the head *COURT of Common Pleas, of Chancery, of Exchequer, of Hustings, of King's Bench, of Marshfield, Mayor's, of Parliament,* (see PARLIAMENT,) *of the House of Peers, of Star Chamber;* also, *1808 of Court.*

Literature and literary Publications.—To give a view of the literature of this metropolis, and to point out its present state, compared with that of any former period, would be to develop one of the most interesting traits, not only of London, but of the present age. The number and variety of works which annually issue from the metropolitan press are truly astonishing; while in point of ability and usefulness they were probably never exceeded. There is not indeed a department, either in science or general literature, which has not made considerable progress within these few years. The publishing and book-selling businesses are at present conducted upon very large scales; and, in spite of a long and devastating war, a succession of new and interesting volumes is continually issuing from the press. It is conjectured that nearly 800 new books and pamphlets have been annually published in London, during the last ten years: the gross annual returns arising from the printing and selling of which cannot be much short of one million sterling. It is also estimated that 2000 persons at least are directly and collaterally employed in the various branches of the book business. The character and extent of periodical literature form a prominent feature of the present age: for the number of reviews, magazines, newspapers, and other periodical journals, far exceed those of any former period. Hence much political and general knowledge has been disseminated through the country: a spirit of inquiry and investigation has been excited; and a literary turn has been given to the higher and middle classes of society. Even the lower classes of mechanics and servants are now much accustomed to reading: one of the consequences arising from which is that we frequently hear of men of genius and talents starting up from humble stations, and displaying to the astonished world much originality of thinking. Many instances of this might be adduced; but it will be sufficient to name two or three, to prove the assertion: Burns, Dermoddy, and Bloomfield, the poets; and Drewe, the metaphysician of Cornwall. Nothing can more plainly shew the reading character of the present times, than a knowledge of the number of newspapers printed and circulated; and which number is thus stated in "The Picture of London for 1812:" "Of the morning papers, there are sold about 17,000 of these publications; of the daily evening papers, about 12,000; and of those published every other day, about 10,000. There are also about 26,000 fold of the various Sunday papers; and about 20,000 of the other weekly papers; in all, the enormous number of 232,000 copies *per week*; yielding to their proprietors from the sale 5800*l.*, and from advertisements 2000*l.* more; of which the revenue to government is full 4000*l.* and the net proceeds to the proprietors about 1000*l.*: the remaining 2800*l.* affords employment and sub-

sistence to about 50 writers and reporters, 300 printers, 100 vendors, and 100 clerks and assistants; besides paper-makers, stationers, type-founders, &c. full 200 more. If to these be added the weekly calculation of 250,000 copies of provincial papers, yielding 10,000*l.* *per week*, and supporting the industry of 1500 persons;—what a wonderful idea is afforded of the agency and influence of the press in this empire; and how easily is it accounted for, that we are the most free and most intelligent people on the face of the earth." Under the words MAGAZINE, NEWSPAPER, and REVIEW, we shall have opportunities of detailing many facts and peculiarities respecting these different publications. See also JOURNAL, *Literary.* London abounds with book-sellers' shops and circulating libraries. It is asserted that the first circulating library established in this town was by a Mr. Batts, about the year 1740; but Alan Ramsay had founded one at Edinburgh as early as the year 1725. In London there are published fifteen newspapers daily, and eighteen or nineteen every Sunday, besides eighteen once or twice a week. The number of monthly magazines and reviews amounts to fifty; in addition to which, there are several works published quarterly, or at irregular periods.

Societies for the Encouragement of the Arts, &c.—London possesses a variety of institutions formed with a view to the advancement of the different branches of art and science; among these the Royal Society undoubtedly takes the lead, being composed of the most distinguished literary and scientific characters of the present age. It was first instituted at the close of Cromwell's rebellion, at which time its meetings were held at Oxford. In 1659 they were adjourned to Gresham college, London; but of late years have been held at an apartment in Somerset house. This society was incorporated in 1663, when the celebrated sir Isaac Newton was president, and has, through the medium of its Transactions, and by its patronage, probably contributed, more than any similar body in the world, to promote useful and practical knowledge. (See ROYAL SOCIETY.) The society of Antiquaries, which holds its meetings in the same place with the Royal Society, was incorporated by Geo. II. in the year 1751. The object of this society is to encourage research in the elucidation, not only of our national antiquities, but of the antiquities of other countries. It has published sixteen volumes, called the Archaeologia, containing many curious and interesting essays and prints, also a large work illustrative of our ecclesiastical architecture. (See SOCIETY of Antiquaries, and ANTIQUARY.) The society for the encouragement of arts, manufactures, and commerce, instituted in 1753, and holding its meetings in the Adelphi, proposes the attainment of its object by giving premiums for all inventions and discoveries which may prove, and are calculated to be, beneficial to the arts, commerce, or manufactures of the kingdom, the British colonies, or the East India settlements. A volume of the Society's transactions is published occasionally. The walls of the great room, in which its meetings take place, are adorned with a variety of paintings from the pencil of Mr. Barry, the style and execution of which have indeed him deserved immortality, and are really an honour to the country. The Linnean society was founded in 1788, and incorporated in 1802. (See LINNEAN SOCIETY.) The Royal Institution, situated in Albemarle street, owes its foundation chiefly to the schemes and exertions of count Rumford. Its charter of incorporation is dated in 1800. The original object of this institution was to facilitate the introduction of useful discoveries and improvements in practical mechanics, and to point out, by philosophical lectures and experiments, the application of science to the common purposes of life. The investigations and important discoveries of Dr. Davy, the lecturer

lecturer on chemistry, have conferred no small degree of celebrity on this establishment, while they will not improbably be the means of effecting a complete change in our views of chemical analysis. (See *ROYAL INSTITUTION*.) The London Institution, as well as the Surrey Institution, embrace similar objects to the one preceding. The former was founded in 1805, and the latter in 1808. Both have extensive libraries and reading rooms, furnished with many of the foreign and domestic journals and other periodical works, together with the best pamphlets and new publications. The views of the Russell Institution are the formation of an extensive library, consisting of the most valuable books in ancient and modern literature, to be circulated among the proprietors, the delivery of lectures on literary and scientific subjects, and the establishment of a reading room. In Gresham college, founded by sir Thomas Gresham, lectures are delivered gratis twice a day during the terms, on divinity, law, physics, astronomy, geometry, music, and rhetoric. As it happens in all institutions on a similar plan, the lecturers, having no stimulus to exertion, consider their duty as a mere matter of routine, and are consequently ill attended. Some idea is entertained of transferring them and the funds to the London Institution, where it is hoped they may be more efficient, and answer better the design of the benevolent founder. The British Mineralogical Society was established in 1799, for the express purpose of examining gratuitously the composition of all specimens of minerals and soils, sent for that purpose by the owners of mines, agriculturalists, or others interested in the enquiry. The science of entomology will probably be much forwarded by the institution of the Entomological Society, which took place in 1806, and which chiefly directs its attention to the investigation of the properties of such insects as are natives of the united kingdoms. The London Architectural Society has published a volume of Essays, 8vo. 1808: also an Essay on the Doric order. The Horticultural society was founded in 1804. A Geological Society is established by some scientific gentlemen in Lincoln's-inn-Fields; they have recently published an interesting volume of their transactions. Before we quit these institutions it may be proper to remark, that the number and variety of lectures that have been read in them must have proved beneficial to science; by exciting inquiry, and investigating facts by experiment. Till these institutions were established, there were but few public lectures given in London; such, however, have been the influence and effect of them, that during the winter of 1811-12, it may be asserted that no less than fourteen courses have been given at the Royal, Russell, and Surrey Institutions. We subjoin the names of the principal professors: Dr. Davy, Dr. Roget, Dr. Crotch, J. M. Good, esq., Geo. John Singer, esq., Dr. Shaw, F. Accum, esq., Sam. Wesley, esq., Mr. Hardie, Robert Bakewell, esq., Dr. Brande, James Qum, esq., John Pond, esq., and Wm. H. W. esq.

The British Museum, situated in Great Russell-street, is a grand national depository of antiquities, MSS. and books, with various natural and artificial curiosities. It was established by act of parliament in 1753, in consequence of sir Hans Sloane having left, by will, his museum to the nation, on condition that parliament paid 20,000 *l.* to his executors, and purchased a house sufficiently commodious for its reception. Since that period many valuable collections of manuscripts, books, &c. have, at different times, been added to the Sloanean, besides innumerable presents from our own monarchs, foreign princes, the boards of Admiralty and Longitude, the East India Company, the various literary societies of London, Edinburgh, Oxford, Cambridge, and Leyden, the Royal

and Imperial academies of Brussels, Lisbon, &c. and a long list of private individuals, too numerous to be particularized. The vast variety of articles which this museum contains, its extent and value, entitle it to be considered equal to any in the world. Under the word *MUSEUM* will be given further particulars of this national repository; in the mean time the reader is referred to a "Synopsis of the Contents of the British Museum," 8vo. 1808; and to a quarto work of "Engravings from the Gallery of Antiquities in the British Museum," by Mr. Taylor, Combe, and Mr. Alexander. This very handsome and interesting work is now in the progress of publication, and is very creditable to the trustees who have commenced it, and to the draftsman and author by whom it is chiefly executed.

Public Vices and Prisons.—The general tendency of the preceding statements only shew the best and most interesting features of the metropolis. It is our duty also to depict its vices; and to shew the numerous places that are set apart for the punishment of crimes. In Colquhoun's work on "the police of the metropolis," is such a deplorable display of profligacy and criminality, that an inexperienced reader, who knew London only through the medium of this publication, would conclude that its inhabitants were mostly composed of vagabonds, sharpers, pickpockets, and prostitutes. It should be remembered, however, that the work is chiefly devoted to this subject: and that, amidst so vast a population, and where there are so many opportunities for rogues to practise their depredations, and screen themselves from detection, it is not surprising that so many are collected together, and that out of a great number so few are brought to condign punishment. To this great hive of human society, the most vicious, and also the most learned resort, as the best place for action and exertion. The worthy magistrate already named, has enumerated and described eighteen different classes of cheats and swindlers who infest the metropolis, and prey upon the honest and unwary: besides persons who live by gambling, coining, housebreaking, robbery, and those who plunder on the river. He deduces the origin of most of the crimes from alehouses, bad education of apprentices, servants out of place, Jews, receivers of stolen goods, pawnbrokers, low gaming-houses, smuggling, associations in prisons, and prevalence of prostitution. No less than 50,000 prostitutes are supposed to live in the metropolis. An amazing number, and a distressing circumstance to contemplate: for it is presumed that eight-tenths of these die prematurely of disease and in wretchedness, having previously corrupted and contaminated twice their own number of young girls and young men. The following is a list of the public prisons.

1. Newgate, being the city and county goal for debtors, felons, libellers, and other offenders against government. See *NEWGATE*

2. Giltspur-street Compter was erected in 1791, for debtors, felons, and persons committed for misdemeanors. It is situated near Newgate, and is a large, commodious building.

3. Ludgate, adjoining to the last mentioned, is appropriated only to debtors who are freemen of the city of London, clergymen, preceptors, or attorneys.

4. The Poultry Compter is chiefly for debtors. It is situated near the Mansion-house, and has one ward set apart for Jews: the only prison in England that has such a provision.

5. The Fleet Prison is for debtors, and for such persons as are committed for contempt of the courts of chancery.

6. The Savoy Prison, in the Strand, is exclusively devoted to deserters and military delinquents.

7. The New Prison, Clerkenwell, is the goal for the county of Middlesex, for felons, and for persons committed.

8. The Prison for the 'Liberty of the Tower of London,' is at Bethnal-green, and is used only for soldiers belonging to the Tower.

9. Whitechapel Prison, for debtors in the 5th court.

The houses of correction are

10. The City Bridewell, Bridge-street, Blackfriars.

11. Tothill-fields, Clerkenwell.

12. Cold Bath Fields, Penitentiary House.

13. New Bridewell, in the borough of Southwark.

14. County gaol, Surrey, in the borough of Southwark, for felons and debtors.

15. New goal, Southwark, or Borough Compter, for felons and debtors.

16. Clink goal, for the district of that name, in Southwark.

17. The Marshalsea goal, Southwark, for pirates, and for persons arrested for small debts in the Marshalsea court.

18. King's Bench prison, St. George's Fields, for debtors, and for persons committed for contempt of the court of King's Bench, of which this is the peculiar prison.

Public Buildings.—It will surprise a foreign architect to look through the wealthy city of London, and perceive so few public edifices that display architectural beauty, or grandeur. Various circumstances have conspired to occasion this; and not want of abilities in our artists: for many names can be mentioned, both of deceased and living architects, whose designs would honour and ornament any city. Those whose works are most conspicuous in London, are Inigo Jones, Sir Christopher Wren, Gibbs, Hawksmoor, Dance, Soane, Samuel Wyatt, Jupp, Sir Robert Taylor, Smirke, Milne, Holland, and Adams. The public edifices of London, are bridges, (for an account of which see BRIDGES,) churches, public offices, hospitals, and private mansions. Squares and regular streets constitute a distinguishing feature of town architecture. Some of the public buildings are spacious, commodious, judiciously adapted to their respective purposes, and display beautiful, fine, and even grand parts. The English architect is justly noted for the skill and judgment he often evinces in designing and adapting the interior of his buildings; and this is certainly the most essential part of the profession. The principal public edifices within the precincts of the city, and in the eastern part of the town, are the Tower; the New Mint; the Trinity House; the Bank; the Mansion House; the Royal Exchange; the East India House; the Auction Mart; the Common Law Court; the Custom House; the Excise Office; Guildhall; the bridges of London and Blackfriars; the Post-office; Newgate; Giltspur-street Compter; St. Luke's Hospital; the churches of St. Paul, Bow, St. Stephen's Walbrook, St. Bride's Fleet-street.

Tower of London.—This celebrated building stands on the north bank of the river Thames, at the eastern extremity, and just without the limits of the city. If credit is to be given to the statement of Fitz-Stephen, it owes its original foundation to Julius Cæsar, but this assertion is supported by no evidence. The first authentic notice of it is, that William the Conqueror erected a fortress here immediately upon his obtaining possession of London in the year 1066, with the view of intimidating the citizens from any opposition to his usurpation. This monarch seems, about twelve years afterwards, either to have much enlarged the previous edifice, or to have built another on its site or near it. This building forms, what is now called, the White Tower, from its having been repaired and white-washed by Henry III. in the

year 1240. It is a large square structure, situated near the centre of the present fortress, and surmounted by four watch towers, one of which is used as an observatory. It consists of three lofty stories, in the first of which are two grand rooms, one of which is a small armory for the naval service. The other buildings and fortifications have been erected at different periods. The principal of the former are, the church dedicated to St. Peter *ad vincula*; the ordnance office; the mint; the record office; the jewel office; the horse armory; the grand store-house; the new or small armory house belonging to the officers of the Tower, and barracks for the garrison. The whole comprises, within the walls, an extent of twelve acres and five roods. The exterior circumference of the ditch, which entirely furrounds it, measures 3176 feet. This ditch, on the side of Tower-hill, is broad and deep, but becomes much narrower on that nearest the river, from which it is divided by a handsome wharf, having a platform upon it, mounted with sixty-one pieces of cannon. Besides these, there are a number of great guns, arranged as small batteries, on different parts of the walls. The chief entrance is by a stone bridge thrown over the ditch on the west-side of the Tower. At the outer extremity of this bridge are two gates, and within the ditch another, all which are shut every night, and opened in the morning with particular formality. The wharf is connected with the Tower by a drawbridge, near which is a cut leading from the ditch to the river, secured by a gate called Traitor's Gate, from the circumstance of state prisoners having been formerly conveyed by this passage to Westminster for trial.

This fortress was a palace, inhabited by various sovereigns of England till the reign of queen Elizabeth. Since that period it has been chiefly used as a state prison, and as a place of security for arms and property belonging to the crown. In one of the rooms of the White tower, called Cæsar's chapel, a variety of ancient records of the court of chancery are deposited. All the models of new invented engines of destruction, which have been presented to government, are preserved in another room adjoining. The old mint, and the houses belonging to the officers employed in the coinage, occupied nearly a third of the whole fortress. A yard, to the right of the western entrance, contains the royal menagerie. In the Spanish Armory are kept the trophies of the celebrated victory over the Spanish armada; the axe with which the unfortunate Anne Bullen was beheaded; and a representation of queen Elizabeth, dressed in the armour she wore when she addressed her army at Tilbury, in the year 1588. The Small Armory, one of the finest rooms of its kind in Europe, contains complete stands of arms for upwards of 100,000 men, arranged in a most elegant manner, besides other curiosities. Under this armory is another very noble room belonging to the royal train of artillery, where many beautiful and uncommon pieces of cannon may be seen. The Horse Armory is filled with curiosities of different kinds. Among these are the figures of the kings of England on horseback, chiefly dressed in the ancient armour. In the Jewel Office are preserved the imperial regalia, and all the crown jewels worn by princes and princesses at coronations. Independently of several, which are inestimable, the value of the precious stones and plate in this office considerably exceeds two millions sterling. These, as well as the government of the whole Tower, are entrusted to the care of an officer, called the constable of the Tower, who has under him a lieutenant, deputy-lieutenant, tower-major, gentleman porter, and a number of inferior officers. The garrison is composed of a detachment from the guards. The rising ground adjacent to the Tower

Tower is called Tower-hill. The right of the city to this spot was long disputed by the crown, but in the reign of Edward III., some of the king's officers having erected a gallows here, the citizens remonstrated, whereupon that monarch issued a proclamation, which he disavowed in the act, and virtually acknowledged the city's jurisdiction, by delivering over the persons about to be executed to the sheriffs; and desiring that they should preside at their execution. On the site of the old victualling office, to the east of the Tower, an extensive building has been lately erected from designs by Mr. Smirke, jun. for the Mint. It is composed of a long front of stone, consisting of a ground-floor, with two stories above; the whole surmounted by a handsome balustrade. The wings are ornamented with pilasters, and in the centre are several demi-columns, over which is a pediment, decorated with the arms of England. The porch is covered with a gallery, balustrades, &c. all of the Doric order. Adjoining are houses for the principal officers.

Mansion-house.—This building, the residence of the lord mayor of London, is situated to the west of Lombard-street and Cornhill. It is of an oblong form, and constructed of Portland stone. From its massive style and vast extent, it is calculated to make a magnificent appearance, but the effect is destroyed by its confined situation. A wide and lofty portico, composed of six fluted pillars of the Corinthian order, with two pilasters at each side of their pediment, of the same order, form the chief ornament of the front. Under this portico is a low basement story, in the centre of which is the gate-way leading to the kitchen and offices. A flight of steps ascends to the principal entrance door-way beneath the portico. These stairs are inclosed by a stone balustrade, continued along the whole length of the front. The pediment of the portico is adorned with a piece of sculpture emblematical of the wealth and grandeur of the city. In the centre is a female figure representing the city, having a wand in her right hand, and her left resting on the city arms. On her head is a mural crown, and under her left foot a figure of Envy. Near her on the right is a cupid, with the cap of liberty affixed to a short staff, leaning on his shoulder, and beyond him reclines a sea god, to represent the Thames, having at his side an anchor fastened to a cable. To the left of London is Plenty, with a cornucopia, and behind her two naked boys, with bales of goods to denote Commerce. The west side of this edifice presents a range of very noble windows, placed between coupled Corinthian pilasters. Its interior exhibits a sufficient degree of splendour, but is far from being comfortable, as many of the rooms are dark. Some of the apartments are very large, and fitted up in a sumptuous style; particularly the Egyptian hall, the ball-room, &c.

Commercial Hall.—It has long been a complaint in the city that some respectable place of general accommodation was wanted for the disposal of imported merchandize, but principally for that of colonial produce. Several attempts have been made to remedy this defect, but without success. About a year ago, Messrs Smith, Marten, and St. Barbe called a meeting of merchants and brokers, in order to establish an institution for this purpose. A large subscription was raised almost instantly, and as soon as a plot of ground, sufficiently large, and in a suitable situation, could be procured, a number of plans were submitted by different architects, from an examination and comparison of which, a new design was formed and carried into execution under the direction of J. Woods, jun. whom the committee chose for their architect. The original intention of the establishment was

principally for the accommodation of public sales, but it has been extended to provide equal conveniences for sale by private contract; and thus to form a complete market for sugar, cotton, coffee, tobacco, indigo, and other imported goods.

The building is composed of two principal parts. The front consists of an entirely new edifice 64 feet long, and 39 feet broad, with a stone front, ornamented with six columns of the Ionic order, adopted, with little variation, from the temple of Minerva Polias, at Priene. These columns are supported on pedestals, which rest on the cornice of an inferior order, composed not of columns but of piers, whose squareness and solidity form a contrast with the lighter and more varied proportions of the columns above. This order of piers forms the ground story of the building. The spaces between the pedestals are filled up with balusters, and above the windows, which are large and suited to the scale of the building, are five bas-reliefs, executed in artificial stone by Bubb: the middle compartment representing the city of London, the four others, Navigation, Commerce, Agriculture, and the Arts. The whole of the ground floor of this edifice is occupied by a magnificent coffee-room, at one end of which, between two columns, appear the stairs leading to two public sale-rooms, one of which is about 35 feet by 30, and again on the upper floor to three more sale-rooms, each about 25 by 20 feet.

The second building formerly consisted of three houses, which are now thrown into one: the lower floors are divided into a number of counting-houses, the upper into five show-rooms, the largest of which, sixty feet long, is appropriated for the exhibition of goods intended for sale.

Particular attention has been paid to the lights in these rooms, and by a succession of sky-lights sloping to the north the perfect light of day is admitted, and the sun effectually excluded. The space between these buildings, and that behind the latter on the ground-floor, is occupied by a number of rooms lighted in the same way, all of which are intended for the sale of sugars.

The object of this building is the attainment of public convenience; by bringing into one point what before had been scattered among several coffee-houses, and the rooms of individuals.

East India House.—This edifice is situated on the south side of Leadenhall-street, and comprises the principal offices of the East India Company. It was originally founded in the year 1726, but has recently been so much altered and enlarged, under the superintendence of Mr. Jupp, architect to the company, as to appear like an entire new building. The front, composed of stone, is very extensive, and displays a general air of grandeur and simplicity. In the centre rises a noble portico, supported by six Ionic fluted columns. The frieze is sculptured with a variety of antique ornaments, and the pediment exhibits several figures emblematical of the commerce of the company, protected by his majesty, who is represented in the act of extending a shield over them. On the apex of the pediment is placed a statue of Britannia, to the east of which is a figure of Asia, and on the west another of Europe. The interior can boast of several very noble apartments, particularly the sale-room, which may be justly reckoned among the curiosities of the metropolis. In this house the courts of the East India Company are held, and all its official and general business transacted. Several large and commodious ware-houses are distributed in different parts of the town, where teas and other imported goods are deposited. See COMPANY, *East India*.

LONDON.

The London Monument.—This noble pillar, perhaps the finest in the world, stands on the east side of Fish-street-hill, about two hundred yards from the north end of London-bridge. It was erected by the celebrated Sir Christopher Wren, to commemorate the dreadful fire of 1666, which destroyed a great part of the city, and commenced near this spot. This monument is a fluted column of the Doric order, with a base and capital, surmounted by a ball. Its diameter at the base is fifteen feet. The mally pedestal measures 40 feet, the column 120, the cone above it, with its urn, 42, so that the entire height of the pillar is 202 feet. The interior contains a flight of 345 steps, ascending to a balcony, from which the visitor has a very extensive prospect of the metropolis and the adjacent country. The obscure situation of this beautiful and majestic pillar is much to be lamented, for were it placed in a conspicuous position, it would form a great and striking ornament to the metropolis.

The Post-Office is situated in an area on the south side of Lombard-street. As a building, it is not only unworthy of notice, but when the importance and magnitude of its concerns are considered, is really a disgrace to the country and the metropolis. Such an important establishment should be well and properly accommodated. As a national institution, however, it deserves particular attention, being perhaps the most perfect system of internal economy, of its kind, in the world: it keeps up a constant communication, directly or indirectly, with every town in the united kingdom, as well as with every foreign port in the most remote degree connected with the British empire. It possesses likewise the double advantage of being incalculably useful to individuals, and affording a large revenue to the government. Indeed, of all the means of finance any minister ever employed, it is beyond comparison the best; while at the same time it may justly be regarded as the soul of commerce. The present post-office was built in 1760, but since that time great additions have been made to the building. At the commencement of the post-office system, the whole was vested in private persons, and was irregular, defective, and insecure. A few years back a very important plan was suggested by Mr. Palmer, of conveying letters to all parts of the kingdom by means of mail coaches; whereby a speedy communication, and security from robbery were effected. See MAIL COACHES, and POST-OFFICE.

The Trinity House—On the north side of Tower-hill is a large, handsome, regular building, which was erected from designs by Samuel Wyatt, architect. The chief business of the Trinity-house corporation, which was founded in 1512, is conducted here, though the old established house is at Deptford. The corporation consists of one master, four wardens, eight assistants, and twenty-eight elder brethren, who are styled "the guild, or fraternity of the most glorious and undivided Trinity, and of St. Clement, in the parish of Deptford-Strond, in the county of Kent." The object of this corporation is to superintend and guard the interests of the British shipping, both military and commercial. Their powers are extensive; and their objects important. They have to examine the children who are instructed in mathematics in Christ's hospital; examine the masters of the King's ships; appoint pilots for the Thames; erect light-houses and sea-marks in the British coast; grant licences to poor fishermen who are not free of the city, to ply for fares on the Thames; superintend the deepening and cleansing of the river, &c. The Trinity-house contains some handsome apartment, particularly the hall, the stair-case, and the court-room; in one of which is a fine model of the ship

called the Royal William; also portraits of twenty-four of the elder brethren, and of other eminent persons.

The Lunatic Hospital, called St. Luke's, in Old-street, a large pile of building, was erected from designs by George Dance, who also built the prisons of Newgate and the city Compter. In all these he manifested much skill and judgment; but there is a great want of both in the new front.

The Guildhall of the city is a piece of architectural absurdity.—It is appropriated to the chief public offices of the corporation of London. the principal of these is the great hall, 153 feet long, by 48 broad and 55 high, in which the large city feasts are held, where public meetings are assembled, and the lord-mayor and members of parliament elected. Here are several portraits of sovereigns, judges, lord-mayors, &c.; also large marble monuments to the justly esteemed lord-mayor, Blackford, the great lord Chatham, &c. Besides the hall, the following offices are included in the present building; chamberlain's-office, the court of king's bench, in which the lord-mayor's court and sessions of the peace for the city are held; a court of common pleas, and court of exchequer; a court, called common council chamber, for the lord-mayor, aldermen, and common council. Attached to the Guildhall is an old chapel, which formerly belonged to a religious establishment, but is now used as a justice-room for the aldermen.

The Bank of England, an immense pile of building, is more extensive in its range of offices, and more eminent for its architectural adornment and interior arrangement, than any single public edifice in the metropolis: for Somerset-house, or place, consists of various offices, dwelling-houses, &c. It presents an irregular and incongruous medley of styles and forms; having been built at various periods by three different architects. The eldest part, i. e. the centre of the principal, or south front, with some apartments on the same side, was designed and erected by George Sampson, in the year 1733: and the lateral wings of this facade, and the returns on the east and west sides, with several offices immediately attached, were built by Sir Robert Taylor, between 1770 and 1786: but the great alterations and additions that have been made since the year 1788 by Mr. Soane, constitute the prominent features of this noble edifice. It would occupy a volume to describe the whole arrangement and extent of the bank: it must suffice on the present occasion to mention a few of its leading characteristics. The whole buildings are included in an area of an irregular form, the exterior wall of which measures 365 feet in front, or on the south side; 440 feet on the west side; 410 feet on the north side, and 245 feet on the east side. This area comprises eight open courts, one rotunda, or circular room, several large public offices, committee rooms, and private apartments for the residence of officers and servants. The principal suite of rooms is on the ground-floor, and there is no floor over the chief offices; but it is necessary to state, that beneath this floor, and even below the surface of the ground, there is more building, and more rooms than above-ground. Part of the edifice is raised on a masonry, soft soil, for the stream called Wallbrooke run here, and it has been necessary to pile the foundation, and construct counter arches beneath the walls. The following is a list of the principal public rooms, with their dimensions; on the southern side, dividend-pay office, 44 by 40 feet; the three per cent. reduced office, 50 by 40 feet; pay-hall, 40 by 70 feet; stock office, 60 by 45 feet: three others of nearly the same dimensions; the rotunda, 55 feet in diameter; the consol office, 80 feet by 48, is a noble room; court-room, 60 by 30 feet, ad-

joining which is the great committee room; office for notes under 5*l*, 6*s* by 4*s* feet; and the chief cashier's office, 45 by 30 feet. Besides these, the Bank contains many other offices and apartments: among which may be named the secretary's office, bullion office, deputy governor's rooms, general cash-book office, out-teller's office, land-tax redemption office, loan, or property office, drawing office, accountant's office for the new specie, cheque office, reduced annuity office, dividend pay-office, armoury, bank-note printing-office, engraver's rooms, the library, &c. Such is the extensive business of the bank, that above 1000 persons are employed in its various offices. Of the architectural characteristics of this edifice, its extent, arrangement, and adaptation to the accumulated and increasing business of the British bank, it will be impossible to convey satisfactory information, in a limited space, and without illustrative prints. We can only briefly describe a few of the principal features. The oldest part by Sampson, combines a degree of simplicity united with grandeur; and was admirably adapted to its original purpose. It bespoke the character of a public edifice, with a rich and appropriate style of design. The whole assumed an air of dignity and importance, with a sufficiency of ornament and dress. On a rusticated basement are two stories with Ionic columns, and a bold entablature. An uniformity of character pervades the whole. With such a model before him, it is astonishing that Sir Robert Taylor did not design his additions in the same style, or in one that harmonized with it: but it seems evident that he did not feel or appreciate the charms of simplicity. He preferred prettiness to propriety, and gaiety to grandeur, and therefore designed the wings, with the offices immediately attached, in the most gorgeous style of Roman architecture. Corinthian fluted columns, arranged in pairs, are placed along the whole front, supporting pediments at both extremities, and a balustraded entablature between.

In this façade, the architect has copied a building of Bramante in the Belvidere gardens at Rome; but this very circumstance impeaches his taste and judgment. For though the style and design might have been appropriate and judicious in a small ornamental building, it is very absurd in a great national structure, where solidity, security, and simple grandeur were required. The four and five *per cent.* stock offices are truly disgusting, as works of art; and also very defective as rooms for business. They are both exact imitations of the interior of the church of St. Martin-in-the-Fields. The forms and proportions of the exterior columns much excite our admiration. In the additions and improvements made to the bank by Mr. Soane, since his appointment in 1788, we find many novelties in design, and skilful appropriations. The rotunda is a spacious circular room, with a lofty dome; where a large and heterogeneous mass of persons of all nations and classes assemble on public days to buy and sell stock. The design and construction of the dome, by the last named architect, are entitled to the particular notice and admiration of strangers. In the three *per cents.* warrant office, the same profound artist has displayed much taste and skill. It is an oblong room, with a vaulted ceiling springing from ornamented piers; and in the centre is a handsome dome, or lantern light, supported by caryatides. The soffits of the arches are decorated with panels, roses, and other objects in strict conformity to the practice of the ancient architects. It is worthy of remark, that the whole is constructed without timber. Branching from this apartment is another, called the interior office, adapted to clerks whose business is to guard against forgery.

It opens to Lothbury court, which is a grand display of architectural design, two sides of it being formed by open screens, with handsome fluted columns of the Corinthian order. These are copied from the little temple at Tivoli. On the southern side of this court is a noble arch of entrance to the bullion court, and to other offices. This arch and façade are designed after the model of the celebrated triumphant arch of Constantine at Rome. On the sides of the great archway, are four handsome fluted columns, supporting an entablature, and four statues emblematic of the four quarters of the globe. In panels are basso-reliefs, executed by that great master of sculpture, Banks, allegorically representing the Thames and Ganges. The chief cashier's office is a noble apartment, in the design of which the architect has again shown his enthusiastic attachment to classical antiquity. It is in imitation of the temple of the sun and moon at Rome, and is spacious, simple in decoration, and cheerfully lighted by large and lofty windows. In the accountant's office, governor's court, vestibule and passage from Prince's-street, and recessed portico at the north-western angle, are some specimens of architectural design, which must excite the admiration of every accomplished connoisseur. In all these parts we recognize the forms, style, and detail of the best antique specimens, carefully adapted to their respective situations, and calculated to gratify the eye and satisfy the judgment. Stability is certainly the most essential object in such a building; but beauty and grandeur are equally deserving of attention; for the British bank is rich, its proprietors are presumed to be men of learning and science, and under their auspices we are entitled to look for such actions and such works as shall be ornamental and honourable to the character and taste of the kingdom. In the great enlargements that have been recently made in the present building, it is evident, that the architect has been particularly attentive to the immediate business of the company, the security of their property from fire and depredation, and a chaste, classical style of embellishment. These remarks and descriptions are the result of a recent examination of the building.

Places of Worship.—London is distinguished by the number and variety of its places of worship. It contains 116 churches of the established religion; above 80 chapels of ease on the establishment, in parishes where the population is too great for their respective churches; 11 Roman Catholic chapels; 17 churches and chapels belonging to foreign Protestants; six synagogues of the Jews; and 132 meeting-houses of the different denominations of English Protestant dissenters.

Of the 116 churches above-mentioned, 74 are within the walls of the city, 10 in London, without the walls, nine in the city and liberties of Westminster, five in the borough of Southwark, and 18 in the suburbs, not included in these classes. Of these we can only particularise a few; for descriptions of the whole would require a large volume. Pre-eminent above all the buildings of the metropolis, is the

Cathedral Church of St. Paul, which holds the most distinguished rank among the modern works of architecture in the British empire. The original cathedral was commenced in the year 610, by Ethelbert, king of Kent, and the building, with its revenues and privileges, were greatly increased by succeeding sovereigns. This structure was destroyed by a conflagration in 1564; after which, Maurice, then bishop, commenced the magnificent edifice which immediately preceded the present cathedral. So great was

the magnitude of the building, that neither Maurice, nor his successor De Belmeis, were able to complete the undertaking, though each of them presided twenty years, and expended great sums in the prosecution of it; the latter prelate appropriated the whole revenue of his bishopric to carrying on the work, and supported himself and family by other means. After his death the building was for some time suspended, and the eastern part, or choir, was burnt in the year 1135. At what period it was restored is uncertain; the grand ceremony of consecration was performed in 1240; large additions were afterwards made to the structure, and it was not till the year 1315 that the church was entirely completed; being 225 years from the time of its foundation by Maurice. This ancient cathedral must always be regarded as one of the great works of architecture of the middle ages; in dimensions it far exceeded every other religious edifice in this country; and it is represented by historians as equally pre-eminent in magnificence and splendour of ornament. (For an account of this edifice, see Dugdale's History of St. Paul's.) In the reign of James I., the cathedral having fallen to decay, a royal commission was issued for its repair; but nothing of consequence was done till the advancement of Laud to the see of London, in the succeeding reign. This prelate exerted himself zealously in favour of the neglected building; a subscription was collected to the amount of 101,330*l.* 4*s.* 8*d.*; and Inigo Jones was appointed to superintend the undertaking. He commenced his operations in 1633; and the work went rapidly on till the breaking out of the civil war threw all things into confusion, and the parliament confiscated the unexpended money and materials. After the restoration, the repairs were again commenced; but after much labour and expence, the great conflagration in 1666, destroyed the chief part of the building, and irreparably damaged the remainder. Still, however, the magnitude of the work, and the contemplation of the vast expence of building a new cathedral, occasioned a lapse of several years before it was finally determined that all attempts at reparation were hopeless. The impracticability of restoring the ancient church being now apparent, Dr. (afterwards Sir) Christopher Wren, was ordered to prepare plans for a new cathedral. The pulling down the remaining walls of the old structure, and the removal of the rubbish to the amount of 47,000 loads, proved excessively laborious as well as dangerous, and several men were killed in the progress of the work. This being completed, the first stone of the new edifice was laid June 21, 1675; and the design was prosecuted with such diligence and success, that within ten years the walls of the choir and side aisles were finished, together with the circular porticoes on the north and south sides. The last or highest stone of the building was laid at the top of the lantern in the year 1711; and shortly afterwards the queen and both houses of parliament attended divine service in the new cathedral. The whole structure was thus completed in thirty-five years, by one architect, Sir Christopher Wren, and one master mason, Mr. Thomas Strong, and while one prelate, Dr. Henry Compton, filled the see of London.

The general form or ground plan of St. Paul's cathedral is that of a Latin cross, with an additional arm or transept at the west end, to give breadth to the principal front, and a semicircular projection at the east end for the altar. At the extremities of the principal transept are also semicircular projections for porticoes; and at the angles of the cross are square projections, which, besides containing staircases, vestries, &c. serve as immense buttresses to the dome, which

rises from the intersection of the nave and transept, and is terminated by a lantern, surmounted by a ball and cross of copper gilt. The west front of this fabric consists of a noble portico of two orders, the Corinthian and the Composite, resting on a basement formed by a double flight of steps, of black marble, and surmounted by a spacious pediment. On each side is a tower, with columns, &c.; one serving as a belfrey, the other as the clock-tower. In the tympanum of the pediment is a very large piece of sculpture, in basso-relievo, of the conversion of St. Paul; and on the apex a gigantic statue of the same apostle; whilst on either hand, along the summit of the front, are other colossal statues of St. Peter, St. James, and the four evangelists. Large statues of the other apostles are placed upon pediments on the side walls of the fabric. The dome is the most remarkable and magnificent feature of the building. It rises from a circular basement, which, at the height of about twenty feet above the roof of the church, gives place to a Corinthian colonnade, formed by a circular range of thirty columns. Above the colonnade, but not resting upon it, rises an attic story with pilasters and windows, from the entablature of which springs the exterior dome, which is covered with lead, and ribbed at regular intervals. Round the aperture, at its summit, is another gallery; and from the centre rises the stone lantern, which is surrounded with Corinthian columns, and crowned by the ball and cross.

In its interior form, this edifice is entirely constructed on the plan of the ancient cathedrals, *viz.* that of a long cross, having a nave, choir, transepts, and side aisles; but, in place of the lofty tower, the dome in this building rises in elevated grandeur from the central intersection. The architectural detail is in the Roman style, simple and regular. The piers and arches, which divide the nave from the side aisles, are ornamented with columns and pilasters of the Corinthian and Composite orders, and are further adorned with shields, festoons, chaplets, cherubim, &c. The vaulting of this part of the church merits great praise for its light and elegant construction: in this, each story forms a low dome, supported by four spandrels; the base of the dome being encircled by a rich wreath of artificial foliage. The central area below the dome deserves particular attention: this is an octagon, formed by eight massive piers, with their correlative apertures, four of which, being those that terminate the middle aisles, are forty feet wide, while the others are only twenty-eight; but this disparity only exists as high as the first order of pilasters, at which level the small openings are expanded in a peculiar manner, so that the main arches are all equal. The spandrels between the arches above form the area into a circle, which is crowned by a large cantilever cornice, partly supporting by its projection the "whispering gallery." At this level commences the interior tambour of the dome, which consists of a high pedestal and cornice, forming the basement to a range of apparently fluted pilasters of the Composite order, the intervals between which are occupied by twenty-four windows and eight niches: all this part is inclined forward, so as to form the frustum of a cone. Above, from a double plinth, or the cornice of the pilasters, springs the internal dome; the contour being composed of two segments of a circle, which, if not interrupted by the opening beneath the lantern, would have intersected at the apex. The dome, the idea of which was confessedly taken from the pantheon at Rome, is of brick, two bricks thick; but, as it rises, at every five feet has a course of brick, of eighteen inches long, bending through the whole thickness: for greater security

curity also, in the girdle of Portland stone which encircles the low part, an enormous double chain of iron, strongly linked together, and weighing nearly 96 *cwt.*, was inserted in a channel, which was afterwards filled up with lead. Over this cupola is a cone of brick, so built as to support a stone lantern of an elegant figure. The choir is of the same form and architectural style as the body of the church.

The dimensions of this vast fabric are, height from the ground without to the top of the cross 347 feet, extreme length within 500 feet, greatest breadth 223 feet. The entire ascent to the ball includes 616 steps. The weight of the ball, which is capacious enough to contain eight persons, is 5600 lbs.; and that of the cross, 3360 lbs. For a more particular description of this edifice, with plan of the substructure, elevation of the west front, section of the dome, and north-east view of the exterior, see "*Fine Arts of the English School.*" 4to. 1812.

The particular objects of curiosity which are comprised in this church, and generally shewn to strangers, are the whispering gallery, which encircles the interior of the lower part of the dome, and is so constructed, that a low whisper breathed against the wall, in any part of the circle, may be heard on the opposite side: the library, chiefly remarkable for the floor, which is constructed with small pieces of oak, disposed in geometrical figures: the beautiful model, constructed by sir Christopher Wren; the geometrical staircase, the finest specimen of the kind in Great Britain; the clock, and great bell on which it strikes. The clock is of great magnitude: the length of the minute-hand is eight feet, and its weight 75 lbs.; the hour-hand five feet four inches, and its weight 44 lbs.; the diameter of the dial is eighteen feet ten inches: the length of the hour-figures two feet two inches and a half; the bell is about ten feet in diameter, and its weight nearly four tons and a quarter.

About the year 1790 a scheme was suggested, and has been happily carried into effect, for breaking the monotonous uniformity of the architectural masses in the interior of the cathedral. This was done by admitting large and noble monuments for eminent public persons deceased. These may with strict propriety be termed *national*, as commemorative of British virtues, talents, or heroism. Statues are already erected for Mr. Howard the philanthropist, Dr. Johnson, and sir William Jones. Here are also monuments for generals Abercromby and Dundas, and for captains Mordaunt, Riou, Westcott, Burgess, and Faulkner. Others are now erecting for marquis Cornwallis, lord Howe, and lord Nelson. The latter is interred in the vault under the centre of the building; and near him, his friend lord Collingwood. Among other eminent characters who have been deposited in these vaults, are sir Christopher Wren; Dr. Newton, late bishop of Bristol; Alexander Wedderburn, earl of Rosslyn; sir John Braithwaite; sir Joshua Reynolds, president of the Royal Academy; and two other eminent artists, James Barry and John Opie, *esqrs.*

Although the churches in London are mostly plain, ordinary in architecture, and in obscure situations, yet a few of them are entitled to the notice and admiration of a stranger. That of St. Stephen Walbrooke, built by sir Christopher Wren, is very small, but is justly esteemed for its novelty of design and architectural adornment. "The plan is original, yet simple; the elevation surprising, yet chaste and beautiful; the dome, supported by eight arches, springing from eight single columns, is wonderfully light and scenic in its effect." (*Malton's Picturesque Tour*, p. 76.) Over the altar is a fine picture representing the interment

of St. Stephen, by West. The following churches and towers have claims to architectural beauty, or scientific merit. The tower and spire of Bow-church, in Cheap-side, by sir Christopher Wren; the tower of St. Michael's, in Cornhill; the tower and spire of St. Bride's, in Fleet-street; the church of St. Mary, called the New church, in the Strand, by James Gibbs; the church of St. George, in Bloomsbury, by N. Hawksmoor, built in 1731; the tower and spire of St. Dunstan in the East, by sir Christopher Wren; and the church of St. Paul, Covent Garden, by Inigo Jones.

Members of Parliament.—The city of London has no more weight in the legislative representation of the kingdom, than two small boroughs which are the property of an individual. It sends four representatives to parliament, who are chosen, not by the inhabitant householders at large, but by the livery of the several companies. The right of election was anciently vested in the freemen of the city, which gave rise to many contests between the freemen and livery: till an act of parliament, passed in the eleventh year of George I., settled the question, and gave a peremptory right to the livery only. To be possessed of this elective franchise, a man must have previously obtained his freedom of the city, and also of one of the trading companies, either by patrimony, servitude, or purchase; and must afterwards be admitted to the livery of his company. The present number of electors is about eight thousand, which is not above a third part of the number of inhabitant householders. The elections are held in Guild-hall, and the sheriffs are the returning officers. The city sent two members to parliament as early as 49 Henry III. The number was increased to four, 6 Edward II.: in that and the succeeding reign, four were frequently sent; but since 43 Edward III., this number has been uniformly returned.

Inns of Court and Chancery.—The design of these establishments having been curiously noticed under INNS, it may be proper here to set forth some further particulars relative to each. The inns of court in London are the Inner Temple, the Middle Temple, Lincoln's Inn, and Gray's Inn; but there are several other places called inns, which are appendages to the former. The Temple, belonging to the two societies of the Inner and Middle Temple, is an immense assemblage of buildings, extending from Fleet-street to the Thames; and from Lombard-street, White-friars, to Essex-street in the Strand. It derives its name from a religious house, which was founded by the Knights Templars, who were crusaders; and, in the beginning of the twelfth century, formed themselves into a military body at Jerusalem, for the protection of the pilgrims who visited the holy sepulchre. On the dissolution of the order, the Temple was granted to the Knights Hospitallers of St. John of Jerusalem; and by them it was let for 10*l.* *per annum* to the students of the law, whose successors still possess it. (See HOSPITALERS and TEMPLARS.) The Temple is an irregular building: in Fleet-street are two entrances, one to the Inner and one to the Middle Temple: the latter has a front, in the style of Inigo Jones, of Ionic, ornamented with four large stone pilasters, of the Ionic order, with a pediment. There are four other entrances; but the gates of all are shut at night. The garden of the Inner Temple is of great extent, and is laid out on the banks of the Thames, with spacious walks, &c. The Middle Temple has also a garden, but small: both are open to the public in summer. The hall of the Middle Temple is a spacious and curious room: the Inner Temple hall, which is smaller, is orna-

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mented with the portraits of several of the judges. Each society has a good library for the use of its students. In the treasury chamber of the Middle Temple is preserved a great quantity of ancient armour, which belonged to the Knights Templars. The Temple church belongs in common to both societies, and is open for divine service twice every day. The Knights Templars built a church on this site, which being destroyed, the present edifice was erected by the Knights Hospitallers. It is in the early pointed and late circular styles of architecture, and consists of two distinct parts: at the west end is a spacious round tower or vestibule, forming a grand and singular entrance to the church. In this are the statues of eleven Knights Templars. The organ is esteemed one of the finest in the world. Since the time of Henry VIII. the superior clergyman of this church is called the master of the Temple, and is so constituted by the king's letters patent. For an account of this church, with ground plan and prints, see Britton's *Architectural Antiquities of Great Britain*, vol. i.—Lincoln's Inn is situated on the west side of Chancery-lane. On its site anciently stood a house of the Black friars, and the palace of the bishops of Chichester. The ground was afterwards granted to Henry Lacy, earl of Lincoln, from whom it derives its name. It appears to have reverted to the bishops; for the present possessors hold it as a grant from a prelate of that see. Lincoln's Inn occupies a very extensive space: the buildings are mostly old and irregular. An attempt has been made, but never completed, to rebuild the Inn on a regular plan. A considerable range, called the Stone Buildings, faces the west. This plan, the work of sir Robert Taylor, is simple and elegant in its exterior architecture; and the chambers are on a grand and commodious scale. In the old part of the building are the hall and chapel; the first of which is a spacious room, in which the lord chancellor holds seals and sittings out of term. At the upper end is a painting by Hogarth, of St. Paul before Felix. The chapel, designed by Inigo Jones, is spacious, and raised on large piers and arches, which form an open area beneath, used as a burial-place for benchers only. The chapel is open for public worship every morning and evening. The garden, which in summer is open to the public, is spacious, and forms one of the finest promenades within the city. Lincoln's Inn has a good library, which contains a great number of manuscripts; the greater part of which was bequeathed by lord Hale, with a singular injunction, that no part should ever be printed. Gray's Inn is situated on the north side of Holborn, and derives its name from a lord Gray, who resided here. In this Inn is a small neat chapel, a commodious hall, and an extensive garden, with a grove of large elm trees. The inns of chancery, which are dependent on the inns of court, are Furnival's Inn, an appendage to Lincoln's Inn: it is situated on the north side of Holborn-hill, and was the mansion of sir William le Furnival, in the time of Richard II.—Thavies Inn, also dependent on Lincoln's Inn: the old fabric having been recently burnt down, a neat range of buildings is erected on its site, which is near St. Andrew's church, Holborn.—Staple Inn, situated on the north side of Holborn, and an appendage to Gray's Inn: in the hall are casts of the twelve Caesars, and portraits of Charles II., queen Anne, lord Charles Field, and the lords chancellors Cowper and Campbell.—Barristers' Inn, situated near Fetter-lane, Holborn, and a large edifice on Gray's Inn.—Sergeants' Inn, in Chancery-lane, is built in a full neat chapel, with casts for the judges.—Clarendon's Inn, situated near St. Dunstons' church, Fleet-street, and an appendage to the Inner Temple: in the

hall is an oak case, of very great antiquity.—Clement's Inn, near St. Clement's church in the Strand, a dependent on the Inner Temple: it contains an elegant hall, and a garden kept with particular care, in which is a sundial, supported by a kneeling figure of considerable merit, brought from Italy by lord Clive.—New Inn, adjoining to the last mentioned, and an appendage to the Middle Temple.—Lyon's Inn, situated in Wych Street, and belonging to the Inner Temple. For historical and descriptive particulars of these establishments and buildings, the reader is referred to Dugdale's "*Origines Juridicales*," folio, 1680; Herbert's "*Antiquities of the Inns of Court and Chancery*," 8vo 1804; and Lane's "*Student's Guide to Lincoln's Inn*," 8vo.

General remarks.—Before closing this interesting and important article, it seems proper to offer a very few remarks on the characteristic features of the metropolis, the manners and condition of its inhabitants, and the local peculiarities by which it is distinguished. Such observations, however, the reader will readily perceive must be extremely general indeed. The subject is too various and comprehensive to admit of full developement in a section, such as the nature and limits of a work of this kind necessarily prescribe.

The vast extent of London, and its immense population, cannot fail to strike every visitor with wonder and astonishment. Even to those who have previously resided in Paris, or in any other large city, these circumstances alone must be matter of surprise; for not only is this city far more extensive than the imperial metropolis, but it contains at least 400,000 more persons. These, like the inhabitants of all great trading cities, are a heterogeneous mass, composed of foreigners from every town and province of the united kingdoms, with a large portion of Jews, both native and foreign, Indians, Germans, French, Italians, Spaniards, Swifs, and people of almost every nation in the world. From its immense trade, foreign and internal, a constant communication is kept up with every part of the globe, as well as with every part of our own dominions, both at home and abroad. The quantity of property of every description flowing into the metropolis, and distributed from it, is immense. The number of strangers constantly here, either on business or for pleasure, is supposed to be not less than 100,000. Hence the prodigious concourse of people in the streets, and the number of carriages, carts, and other vehicles, continually crowding through them, are unparalleled in any city in the world.

London, in its usual and more extensive application, contains two cities, London and Westminster, besides the borough of Southwark. The city of Westminster was formerly entirely detached from London, for the street now denominated the Strand was, at no very distant period, a sort of bog, or morass, by which they were separated. The nobles of England have, for several centuries, fixed upon this city as their court residence, and the seat of the legislative and judicial authorities. This portion of modern London, and its suburbs have extended with more rapidity than any other district of the town. Its buildings are in a much superior style of architecture, and more open and regular in their distribution and arrangement, than those in the city of London. They are chiefly inhabited by the nobility, gentry, and higher class of merchants, and though perhaps even inferior in external appearance to the residences of the nobles in some other countries, are no where finer and more splendid and magnificent. London, within the walls, is the great repository of the mercantile wealth,

wealth, not merely of the metropolis, but of the whole country. Hence the buildings themselves bear ample testimony to the object for which they were raised. Almost every house is a shop, or a counting-house, and so closely are they huddled together, that in many places room is scarcely left for the passage of a single cart. Ground is valuable, and is fully occupied. This renders it certainly a matter of regret, and the remark is applicable to every part of the town, that there exist no regulations, or general plan authorized by act of parliament, to which all builders should be obliged to conform. Such a plan, it is believed, was suggested by sir Christopher Wren after the great fire in 1666, and since by Gwynn, in a quarto volume, entitled "London and Westminster improved, &c."

In a political point of view, London bears a most important sway in deciding the opinions of the country at large. It is the centre from which all information, civil or military, emanates. The number of newspapers and other political vehicles distributed here, and hence over the united kingdom, is prodigiously great. The foreigner who peruses a few of these, cannot but be astonished at the opposite sentiments they contain, and the freedom with which they praise or censure the measures of government. This is the consequence of liberty, and is doubtless one of its chief supports. The ruling magistrate of the kingdom is not exempt from public censure and critical animadversion. At the commencement of the year 1812, this is more notorious than at any former period; and future historians will have occasion to explain the cause and lament the effect. Not only has London a powerful influence over the political sentiments of the country, but it has likewise no inconsiderable share in directing the conduct of the higher powers. This it effects in some degree by the members it returns to parliament, which are six in number, but much more by the influence and riches of some of its chartered companies, as well as individuals. The bank of England, mostly a body of merchants, is closely identified with government. The minister is compelled to have recourse to the citizens for supplying the deficiencies in the revenue, by loan, all which circumstances render it necessary for the government to pay peculiar attention to the interests of the city in general.

London may further be characterized as the grand theatre for the display of talents either in the arts or sciences. It is here alone, perhaps, of all the cities in the united kingdom, that literary ability will receive any adequate reward. The artist of genius will likewise in general meet here with support and encouragement. He will here find the finest productions of the most celebrated masters in every department of art, by the study of which alone it is possible for him to attain the praise of excellence. In London are to be seen the best actors, and the most splendid theatres, Great Britain can boast of. The talents of the vocal and instrumental performers at the opera and concerts are unrivalled, and probably no city in Europe possesses a place of public amusement more brilliant and magnificent than Vauxhall. London likewise abounds with museums, also various scientific, literary, and rational establishments.

The merchants, bankers, and higher classes of tradesmen, bear a strong resemblance in manners to the gentry with whom, from their immense wealth, they are generally accustomed to associate. The same wealth, and the greater security they possess for its enjoyment than the merchants of other countries, confer upon them a spirit of real indepen-

dence, to which the latter are totally strangers. From this spirit of independence many advantages have undoubtedly arisen both to the political condition and commercial prosperity of England. Reacting as it were upon the springs of our free constitution, from which it proceeds, it tends to render them vigorous and effective. Britons justly boast of their trial by jury as the bulwark of their freedom, but of what use would juries be, if the individuals who compose them were dependent and submissive. It is to the spirit of the people rather than to any particular forms of administration that a country is indebted for its freedom.

The nobility and gentry of London are of a very different complexion from the same classes in other countries. They possess the highest polish of manners, but unite with their accomplishments a degree of manliness and moderation, the result of the freedom of the English constitution and the general diffusion of riches. A foreign nobleman considers himself as a distinct species of being from those who are his inferior in rank and station, and consequently treats them with arrogance and contempt. An English nobleman, on the other hand, while sufficiently conscious of his own superiority, behaves towards those whom fortune has placed beneath him with real attention and civility; even in the article of dress he is scarcely to be distinguished from the ordinary tradesman or mechanic, while the higher class of merchants fully equals him in the splendour of his equipages and establishments. He is almost wholly a stranger to that indolence which usually results from excessive wealth and hereditary titles. Even the ladies of high rank are much less enervated and feeble than most of the same class abroad. They are accustomed to much exercise, and to mix in the public world.

The beneficial operation of this spirit on our commerce is the consequence of that honour and integrity, which are uniformly found to accompany elevation of mind. That honesty is the best policy, has long been an undisputed dogma in commercial transactions in London. Hence it is that an English merchant can often obtain credit even in foreign countries, where it is little practised, and bills of immense value are sometimes entrusted to him without receipt or acknowledgment. But these remarks ought not to be considered as applicable to the higher orders of traders only. The same freedom of conduct and sterling integrity are prominent features in the character of the generality of established shop-keepers, particularly those of the city.

With respect to physicians, surgeons, and barristers, they may be ranked with the gentry, though influenced by some little peculiarity of habits and manners. Apothecaries and attornies may be classed with the better sort of shop-keepers.

The labouring classes in London are usually of industrious and frugal habits. Their dress and appearance are far more decent and respectable than in any other city in the world, and this alone is a sufficient evidence of its great trade and wealth. The same thing may be said of the poorer sort of shop-keepers, who, from the rate of their earnings, may be placed in the rank of labouring people. Male and female servants, in plain and honest families, may likewise be thrown into this rank with a similar character.

Among many essential improvements recently made in London, the following are worthy of notice and commendation. In the city, and at the east end of the town, we find that new docks have been made on a vast scale, whereby
the

the property of merchants, companies, and the government is, and will be, materially benefited. Many commodious streets and new houses have also been made in the vicinity of those docks, so that from the Tower to Limehouse a new town has been formed. All the great roads leading to London have been much improved, and every approach to the metropolis, excepting that through the Borough, is broad, good, and flanked by handsome rows of houses, or detached villas. In the city, and immediately adjacent, a wide and handsome street, called Skinner-street, has been entirely new built; a handsome square formed in Moorfields, other streets made near Temple Bar, several new buildings erected around the Bank, and others on Tower-hill. In Mary-le-bone a new plan is executing of laying out a large park into various allotments of detached villas, with gardens and pleasure grounds, by John Nash, esq. architect. The destruction of the two great theatres by fire has afforded opportunities for much improvement, and much has been effected. North of Holborn many new squares and streets have been built, the greater part of which has been designed by James Burton, esq. In subsequent accounts of MARY-LE-BONE, PADDINGTON, and WESTMINSTER, many other subjects will be described.

Publications relating to London and Westminster.—Though many volumes have been expressly devoted to the history and topography of the metropolis, it is generally admitted, and much to be regretted, that not one work is satisfactory either as a comprehensive history, or popular and general description. The most elaborate, and the most complete at the time of publication, is Strype's edition of Stow's "Survey of London," 2 vols. folio, sixth edition, 1754: but this is merely a reprint of a former edition of 1720. As a sort of guide, or popular account of the present metropolis, "The Picture of London for 1812," called "the thirteenth edition," is best adapted to furnish a stranger with a view of London 'as it is': but this, though admirably planned, and well executed in parts, is replete with errors of names, dates, and events. Many of its strictures are objectionable on points of art, taste, and antiquities; and one section on reviews and literary criticism is unjust, and of injurious tendency. The most essential points of these two works, with much additional information, will be comprised in Brayley's "London and Middlesex; or, An historical, commercial, and descriptive Survey of the Metropolis of Great Britain," now in the progress of publication, and promised to be completed in two large octavo volumes. The following are the titles of the other principal works relating to the topography of the metropolis.

"The History of London, from its Foundation by the Romans, to the present Time," by William Maitland, F.R.S. and others, 2 vols. folio, 1765.

"A new and complete History and Survey of the Cities of London and Westminster, the Borough of Southwark, and Parts adjacent," to the year 1770, by Henry Chamberlain, esq. and a society of gentlemen.

"A new History of London, including Westminster and Southwark," by John Noorthouck, citizen and stationer, 4to. 1773.

"Repertorium Ecclesiasticum," by ——— Newcourt, 2 vols. folio. 1708.

"Londinopolis, or An historical Discourse of the City of London," by Howell, folio, 1657.

"A picturesque Tour through the Cities of London and Westminster," by Thomas Malton, folio, 1792.

"Londinium Redivivum, or An ancient History and modern Description of London," by James Peller Malcolm, F.S.A. 4 vols. 4to. 1807.

"Some Account of London," by Thomas Pennant, esq. 4th edition, 4to. 1805.

"The Customs of London, otherwise called Arnold's Chronicle," new edit. 4to. 1811.

"London; being an accurate History and Description of the British Metropolis, and its Neighbourhood," 6 vols. 8vo. said to be by David Hughson; but really compiled and written by David Pugh. This mode of giving fictitious names is very reprehensible.

"London and Westminster improved, with a Discourse on public Magnificence," by John Gwynn, 4to. 1766.

"A critical Review of the public Buildings, Statues, and Ornaments, in and about London and Westminster," by ——— Ralph, architect, a new edition, 12mo. 1783.

"A Treatise on the Police of the Metropolis; containing a Detail of the various Crimes and Misdemeanors by which public and private Property and Security are injured; and suggesting Remedies for their Prevention," by P. Colquhoun, L.L.D. 8vo. Several editions have been published.

"A Treatise on the Commerce and Police of the River Thames; containing an historical View of the Trade of the Port of London, and suggesting Means for preventing Depredations thereon, &c. With a Map of the River from London Bridge to Sheerness," by P. Colquhoun, L.L.D. 8vo.

"A Treatise on the Functions and Duties of a Constable; containing interesting Details and Observations, relative to the Corruptions of Morals, and the Protection of the peaceful Subjects against penal Offences," by P. Colquhoun, L.L.D. 8vo.

"The Thames; or, Graphic Illustrations of the Seats, Villas, &c. on the Banks of that River," 2 vols. 8vo. 1811. chiefly a book of prints.

"The History of London and its Environs," 2 vols. 4to. published by John Stockdale.

It appears from Mr. Kirwan's "Estimate of the Temperature of different Latitudes," that from a mean of the observations made at the house of the Royal Society, from the year 1772 to 1780, the annual temperature of London is 51.9, or in round numbers 52; the monthly temperature is stated in the following table:

January	-	35.9	July	-	66.3
February	-	42.3	August	-	65.85
March	-	46.4	September	-	59.63
April	-	49.9	October	-	52.81
May	-	56.61	November	-	44.44
June	-	63.22	December	-	41.04

The greatest usual cold is 20°, and happens in January; the greatest usual heat is 81°, and happens generally in July. The limits of the annual variation are 2.5; that is, 1° above and 1.5 below the mean.

The greatest variations of the mean temperature of the same month, in different years, are as follows:

January	-	6°	July	-	2°
February	-	5	August	-	2
March	-	4	September	-	3.5
April	-	3	October	-	4
May	-	2.5	November	-	4
June	-	2	December	-	3

Hence—

Hence it appears that the summers differ much less than the winters.

The most usual variations of temperature within the space of 24 hours in every month, are

January	- 6°	July	- 10°
February	- 8	August	- 15
March	- 20	September	- 18
April	- 18	October	- 14
May	- 14	November	- 9
June	- 12	December	- 6

Hence is seen the origin of vernal and autumnal colds.

Mr. Kirwan has shewn that, proportionably to its latitude, it is much colder in London than at Edinburgh; for the mean temperature of Edinburgh in January is $34^{\circ} 5$, and that of London is $35^{\circ} 9$; and this difference he ascribes to the following causes: 1st. That Edinburgh is not exposed to the Siberian winds as London is. 2dly. That Edinburgh is nearer to the sea. 3dly. The rigour of the northerly winds is very little moderated, if not increased, in passing from Scotland to us, particularly if the surface of the earth is covered with snow; and hence, if we believe Dr. Smollet (*Travels to Italy*), the winters are sometimes milder at Edinburgh than at London.

LONDON, a town of America, in Ann-Arundel county, Maryland; 5 miles S.W. of Annapolis.

LONDON, *The township of*, is situated in Upper Canada, on the main fork of the river Thames, in a central position from the lakes Erie, Huron, and Ontario, and offers many advantages for being the capital of the province. It communicates with lake St. Clair and the Detroit by the river Thames; with lake Huron by the northern branch of the Thames and a small portage, and with the Ouse and lake Ontario by the military way called Dundas-street. It abounds with black and white walnut, cherry, bass, elm, hickory, beech, ash, and many other kinds of timber. It is supplied with excellent water, and the situation is healthy.

LONDON *Cove*, a narrow water of Long island found, which sets N. into the township of New London; 4 miles W. of the mouth of Thames river.

LONDON *Harbour*, a bay and harbour on the N. coast of the island of St. John, in the gulf of St. Lawrence. N. lat. $46^{\circ} 26'$. W. long. $67^{\circ} 8'$.

LONDON, *New*. See *New London*.

LONDON *Pride*, in *Gardening*, the name of a well-known plant of the flower-kind. See *SANIERAGA*.

LONDONDERRY, in *Geography*, a county of Ireland, in the province of Ulster. It lies to the west of Antrim, from which it is in a great measure separated by the river Bann. Lough Neagh washes it on the south-east; on the south it has Tyrone, from which it is separated, in part, by the little river Bellinerry; on the west it has Donegal and Lough Foyle; and on the north, that part of the Atlantic ocean which is sometimes called the Deucalionian sea. A great part of it was given by James I. to the twelve London companies, on condition of their fortifying the towns of Derry and Coleraine. From this circumstance, both the county and town were called by the name of Londonderry. It extends 32 Irish miles from north to south, and about the same from east to west, where it is broadest. This length and breadth are equal to 441 English miles. It measures in area 318,500 Irish acres, and 479 square miles, which, in English measure, are 511,688 acres, and 792 square miles. It contains 31 parishes.

riches, which have 29 churches, mostly in the diocese of Derry; which see.

Londonderry is in general very mountainous, excepting the eastern part, adjoining Lough Neagh and the river Bann. The principal hills are Benyvenagh in the north; Slieve-Gallen in the south; Cairntogher, which sometimes gives name to the chain extending into the county of Tyrone, and Sawell on the borders of the same county. The highest of these, however, is not more than 1600 feet above the level of the sea. The face of the country, near the sea and the river Bann, bears a great resemblance to that of the adjoining county of Antrim. Basaltes, intermixed with zeolite, is found on a bed of white limestone, which is sometimes concealed by the basaltes, and sometimes shows itself in steep and elevated rocks, especially in Benyvenagh, and the adjacent forelands. The ground about Lough Foyle is, in general, a strong loam, which is well adapted for wheat, barley, flax, and potatoes, and which is principally manured by the shells procured from the lough. The land in the vallies does not considerably differ, except in nature, shells being at too great a distance; a circumstance which is, in some measure, recompensed by the deposits from the mountain torrents. The river Roe, which passes through the middle of the county to Lough Foyle, is thought to separate the basaltic region from the schistose or slate. There are in the latter various kinds of schist; and with them are found pudding stone, gneiss, and blue limestone. Schistose is found universally under the basaltes, and occasionally intermingled with schist. Iron is in great abundance throughout the county, either in an ochreous state, or mixed with manganese. It was formerly smelted by an agent of the Drapers' company, but the speculation was unsuccessful. Beate mentions gold found in Londonderry; and some specimens of quartz containing thin leaves of gold are said to have been lately met with (A. D. 1822); they were found on the surface, and supposed to be adventitious. The siliceous, or flinty matter, like the calcareous, has two distinct appearances, which denote the regions of which they are the natives. The silica in the schist country is in the character of quartz, and the lime of the same country is bluish and laminated. In the basaltic country the silica is in the character of flint, including chalcedony, &c.; and the lime white, and abounding in marine substances. Both the quartz and flint are of various tings. The former sometimes clear, yellow, brownish, reddish, &c.; the latter horn-coloured, purple, brownish black, &c. The flint has sometimes marine impressions; the quartz never. Rock crystals of great hardness, and weighing from one ounce to twelve, are found in the schistose region. The grass which is most prevalent in this county is the *Agrostis stolonifera*, called in Irish *florin*, and so strongly recommended for cultivation by Dr. Richardson. It is peculiarly luxuriant in low meadows. The soft meadow grass (*Holcus mollis*), is thought to be next in value and predominance, and is that generally sown. The variety, however, found in other counties, is not wanting in this. Of other vegetables, the most remarkable is the Lichen lomphaloides, which, when manufactured, is called litmus, turnsole, and archil. This is found on the rocks in great abundance, and is used both for dyeing purple, and in a simple watery decoction, for giving woollen goods, such as flannels, an orange-red colour. The flints near the river Bann have a greater extent of bog than is at present necessary for fuel, which bog is in general very reclaimable. Both this part of the county and the mountainous district require much improvement. Some young cattle are reared on the mountains, and some sheep fed.

The linen manufacture is carried on extensively through every part of the county. Londonderry is well watered by several streams. Of these the Bann flows from Lough Neagh, and forms the eastern boundary, till it approaches the town of Coleraine, when it ceases to be a boundary, flowing through the liberties of that town into the sea about three miles below it. About a mile above Coleraine is a ridge of rocks called the Salmon Leap, at which weirs are built for the salmon-fishery. Great quantities of this fish are caught in the Bann, and being salted at Coleraine form a valuable article of commerce. There is also an eel-fishery at Toome, between Lough Beg and Lough Neagh, which, as well as the other, is very valuable to the proprietor. The Foyle, a wide and deep river, having divided the counties of Tyrone and Donegal, and received several smaller, enters this county a little above the city of Londonderry, and passing by it expands into that large saltwater lake, known by the name of Lough Foyle. The rivers Fahan and Roe rising in the Cairntogher mountains also flow into this lough. Several other streams join the Bann in its course, or increase the waters of Lough Neagh; amongst the latter is the Moyowla. In tracing the coast from the little harbour of Portrush, in Antrim, we first meet with Bannhaven at the mouth of the Bann, about three miles from which is the town of Coleraine. (See COLERAINE.) Proceeding along the coast, Magilligan Point, at the extremity of a large sandy tract, presents itself, approaching the coast of Donegal, and thus forming the entrance of Lough Foyle. Between Benyevanagh mountain and this point is a warren, which yields, on an average, three thousand dozen of rabbits each year. The sale of the skins, which are sent to Dublin, produces a large revenue to the proprietor. Near this point is the Tons, a sand-bank not far from the entrance of the lough, on which the sea sometimes beats with a prodigious noise. The entrance of Lough Foyle is not above half a mile wide, so that it is land-locked on all sides. It is a large oval basin, twelve miles long, and near seven broad in the widest part, but it has only one deep channel in the middle between long shoals or banks of sand. It is, nevertheless, on the whole, a safe, large, and commodious harbour. Near the mouth of the river Roe, which runs into the lough, is a ridge of stones mixed with shells and sand, extending a mile and a half in length, which is called the Giant's Grave. There are other banks of the same kind at a greater distance from the lough, which renders it probable, that this part of the county was once overflowed by the sea. The county town, called also Londonderry, is on the Foyle. (See next article.) Other towns are, Newtown Limavaddy, Magherafelt, and Money more. Londonderry returns three members, two for the county and one for the city. Sampson's Statistical Survey, and Beaufort's Memoir.

LONDONDERRY, the capital of the county described in the preceding article: it is on the river Foyle, over which it has a wooden bridge, 1068 feet in length, and of singular and excellent construction. It is a well built and neat city, and has a general appearance of order, industry, and sobriety. It contains about 10,000 inhabitants. Its trade is considerable, especially with America; the exports are linen, linen-yarn, &c. In the time of queen Elizabeth, Derry was a considerable military station, being well fitted for keeping the adjoining country in subjection. In the reign of James I. it was rebuilt and strengthened by the citizens of London, to whom it was given by that monarch. In the rebellion of 1641, and the succeeding years, it was twice besieged, but without success; but it is most cele-

brated in history for the siege nobly sustained by the inhabitants in 1688 and 1689, for 105 days against the army of King James, although pressed by a very severe famine. It deserves to be recorded, that when the military governor was inclined to give up further resistance, the inhabitants, incited by the Rev. George Walker, whom they chose governor, took it upon themselves, and have thus gained immortal renown. Londonderry is still surrounded by walls and has a military governor, who is also commander of Culmore fort. (See CULMORE.) Londonderry is a post-town, and returns a member to parliament. It is 115 miles N. by W. from Dublin. N lat 55. W. long. 7° 13'. Sampson, &c.

LONDONDERRY, a post-town of America, in Rockingham county, New Hampshire, near the head of Beaver river, which discharges itself into Merrimack river, at Pawtucket Falls, settled in 1718, incorporated in 1722, and containing 2650 inhabitants. The inhabitants are mostly the descendants of emigrants from Ulster county, Ireland, and are employed in the manufacture of linen cloth and thread; 30 miles S.W. by S. from Portsmouth.—ALLO, a township in Halifax county, Nova Scotia, on the N. side of Cobequid or Colchester river, about 30 miles from its mouth, at the basin of Minas; settled by North Irish and Scotch.—ALLO, a township in the N.W. part of Windham city, Vermont, on the head waters of West river, about 33 miles N.E. of Bennington. In 1795 it was divided into two parts, the E. half being called *Windham*, and the W. part retaining its original name.—ALLO, two townships in Pennsylvania; one in Dauphin county, containing 1577 inhabitants, the other in Somerset county, having 709 inhabitants.

LONDONGROVE, a township in Chester county, Pennsylvania, containing 921 inhabitants.

LONDRES, or LONDON, a town of South America, in the province of Tucuman, built by Tarita, the governor, in 1555, in compliment to Mary, queen of England, then married to Philip, king of Spain. S. lat. 19 12'.

LONEE, a town of Hindoostan; 12 miles E.S.E. of Poonah.

LONEL, a town of the island of Sardinia; 22 miles S.E. of Bosa.

LONER, a town of Hindoostan, in Baglana; 16 miles N.W. of Chander.

LONERSTATT, a town of Bavaria; 14 miles S.S.W. of Bamberg.

LONG, JAMES LE, in *Biography*, a learned French priest, was born at Paris in 1665. In 1686 he entered into the congregation of the Oratory, and occupied the post of professor in several houses of that society, and finally was appointed their librarian at St. Honoré. He passed his life in learned labours, and died in 1721, with the character of a virtuous and estimable man. He was thoroughly conversant in the ancient and many of the modern languages, and had an extensive acquaintance with the history of literature, of bibliography, and printing. His chief work is entitled "*Bibliotheca Sacra*," containing a catalogue of all the editions and translations of the scriptures, in two volumes octavo, to which he subjoined, in a second part, a list of all the authors who had written upon the scriptures. He published, likewise, "*Bibliothèque Historique de la France*," being an account of all the historical works relative to that country, which is highly esteemed, and ranks among the great productions of the reign of Lewis XV.; also a "*Historical Discourse on Polyglott Bibles*," and their several editions.

LONG,

LONG, ROGER, an English divine, and astronomical professor, was born in 1679, received his college education at Cambridge, and became master of Pembroke-hall, and Lowndes's professor of astronomy. He is chiefly known as an author, by a *Treatise on Astronomy*, in two volumes; the first of which was published in 1742, and the second in 1764. He was the inventor of a curious astronomical machine, erected in a room at Pembroke-hall. This is a hollow sphere about eighteen feet in diameter, in which thirty persons may sit. The concave surface represents the heavens with the stars and constellations in their order; the axis is placed parallel to the axis of the world, upon which it is easily turned by a winch. (See *CONSTELLATION*.) He published a Commencement Sermon, and an Answer to Dr. Galley's pamphlet "On Greek Accents." He died in the year 1770, at the age of eighty-one.

LONG, THOMAS, a learned divine, was born at Exeter in 1621, and educated at the college of that name in Oxford. His highest preferment in the church was a prebend in Exeter cathedral, of which he was deprived at the Revolution for refusing the oaths. He died in 1700. He was author of many theological pieces; of a *Life of Julian*; *History of all the Popish and Fanatical Plots and Conspiracies*; and a *Vindication of the Claim of King Charles I. to the Authorship of the Eikon Basilike*.

LONG Accent. See *ACCENT*.

LONG Bay, in *Geography*, a bay on the E. coast of Jamaica. N. lat. $18^{\circ} 8'$. W. long. 76° .—Also, a bay on the W. coast of the island. N. lat. $18^{\circ} 20'$. W. long. $78^{\circ} 21'$.—Also, a bay on the S. coast of the same island; six miles E. of Calibash bay.—Also, a bay of America, extending along the shore of N. and S. Carolina, from Cape Fear to the mouth of Pedee river.—Also, a bay on the W. side of the island of Barbadoes.—Also, another on the S. side of the island.

LONG Boat, the largest and strongest boat belonging to a ship. See *BOAT*.

LONG Hand. See *LONG HAND*.

LONG-horned Cattle, in *Agriculture*, a breed of neat cattle, which is chiefly distinguished by the length of the horn, the thickness and firm texture of the hide, the length and closeness of the hair, the large size of the hoof, and the coarse leathery thickness of the neck. It is sometimes termed Lancashire breed from its being predominant there. See *CATTLE*.

LONG-jointed, in the *Manege*. A horse is said to be long-jointed, whose pattern is slender and pliant. Long-jointed horses are wont to have wind-galls.

LONG Island, in *Geography*, an island in Penobscot bay. (See *ISLEBOROUGH*.)—Also, an island of America, on the coast of Maine, 4 miles long and $1\frac{1}{2}$ wide. N. lat. $44^{\circ} 20'$. W. long. $68^{\circ} 20'$.—Also, an island near the S. coast of Jamaica. N. lat. $17^{\circ} 51'$. W. long. $76^{\circ} 58'$.—Also, an island near the N. coast of the island of Antigua. N. lat. $17^{\circ} 17'$. W. long. $61^{\circ} 28'$.—Also, an island in Hudson's Straits. N. lat. 61° . W. long. 75° .—Also, another in Hudson's bay. N. lat. $55^{\circ} 16'$. W. long. $78^{\circ} 30'$.—Also, a narrow island about two miles in length, on the S. coast of the county of Cork, Ireland, in Roaring-water bay. It contains 316 acres of land. N. lat. $51^{\circ} 26'$. W. long. $9^{\circ} 27'$.—Also, one of the smaller Bermuda islands.—Also, a small island in the gulf of Mexico, near the coast of East Florida. N. lat. $27^{\circ} 50'$. W. long. $82^{\circ} 55'$.—Also, a small island near the coast of S. Carolina. N. lat. $32^{\circ} 50'$. W. long. $79^{\circ} 45'$.—Also, a small island near the coast of Virginia, at the mouth of York river. N. lat. $37^{\circ} 16'$. W. long. $76^{\circ} 35'$.—Also, a small

island in the Atlantic, near the coast of Brasil. S. lat. $16^{\circ} 30'$.—Also, an island of America, formerly called "Manhattan," afterwards "Nassau island," discovered by Henry Hudson, an Englishman, in 1609, and belonging to the state of New York. It extends from Hudson river, opposite to Staten island, almost to the western boundaries of the coast of Rhode island, terminating with Montauk point. Its length is about 140 miles, and its medial breadth from 10 to 14 miles; and it is separated from Connecticut by "Long island Sound." It contains 1400 square miles, and is divided into three counties, viz. King's, Queen's, and Suffolk; and these are again subdivided into 19 townships. The N. side of the island is rough and hilly, but the soil is well adapted for raising grain, hay, and fruit. The S. side of the island lies low, and its soil is light and sandy. On the sea-coast are extensive tracts of salt-meadow, which extend from Southampton to the W. end of the island. Nevertheless, the soil is well adapted to the culture of grain, especially Indian corn. Near the middle of the island is Hempstead plain, in Queen's county, which is 16 miles long, and about eight broad. This plain, the soil of which is black, and apparently rich, yields naturally a particular kind of wild grass and a few shrubs; but it produces some rye, and furnishes, together with the salt marshes, food for large herds of cattle. On the E. part of the island, E. of Hempstead plain, is a large barren heath, called Bruthy plain, overgrown with shrub oak, intermixed with a few pine-trees, which afford harbour to wild deer and grouse. In a bay on the S. side of the island, vast quantities of oysters are taken, and also of baf. The largest river in the island is Peakonok, which is but an inconsiderable stream; it runs E. and discharges itself into a large bay that separates Southhold from Southampton. In this bay are Robin and Shelter islands. Rockonkama pond lies about the centre of the island, between Smith-town and Islip; it is about a mile in circumference, and has been found to rise gradually for several years, until it had arrived to a certain height, and then to fall more rapidly to its lowest bed; and thus it is continually ebbing and flowing. Two miles to the southward of the pond is a stream called Connecticut river, which runs into the bay. There are two whale-fisheries; one from Soggharbour, which produces about 1000 barrels of oil annually. The other is much smaller, and is carried on by the inhabitants in the winter season, from the S. side of the island. They commonly catch from three to seven whales in a season, which produce from 25 to 40 barrels of oil each. This fishery was formerly a source of considerable wealth to the inhabitants, but on account of a scarcity of whales, it has of late years much declined. From Soggharbour to the West Indies and other places, there is a considerable trade in whale oil, pitch, pine-boards, horses, cattle, flaxseed, beef, &c. The produce of the middle and western parts of the island is carried to New York. The island contains 42,097 inhabitants, of whom 3893 are slaves. (Morfe.)—Also, an island in Holston river, Tennessee, five miles long, and containing 2500 acres of rich land, subject to inundations. Many boats are built here annually, and loaded with the produce of the state for New Orleans; 100 miles above Knoxville, and 1000 from the mouth of the Tennessee.—Also, a small island in the East Indian sea, near the W. coast of Billiton. S. lat. $2^{\circ} 51'$. E. long. $107^{\circ} 30'$.—Also, a small island near the S.E. coast of the island of Madeira. S. lat. $7^{\circ} 16'$. E. long. $113^{\circ} 5'$.—Also, a small island near the N. coast of the island of Flores. S. lat. $8^{\circ} 6'$. E. long. $122^{\circ} 27'$.—Also, a small island in a bay on the N. coast of New Guinea. S. lat. 104° . E. long. 135° .

18'.—*Alfo*, an island in Queen Charlotte's sound, on the coast of New Zealand, called by the natives "Hamote," about four miles long; nine miles S. of Port Jackson.—*Alfo*, an island in the South Pacific ocean, at the entrance of Broad sound, on the N.N.E. coast of New Holland, about 30 miles in length. S. lat. 22° 24'. W. long. 210° 33'.—*Alfo*, an island discovered by captain Wallis in 1767, and so called by him. N. lat. 10° 20'. W. long. 247° 24'.—*Alfo*, a small island near the W. coast of Scotland. N. lat. 56° 15'. W. long. 5° 37'.—*Alfo*, a small island in the East Indian sea, near the coast of Africa. S. lat. 10° 25'.—*Alfo*, one of the islands in the Mergui Archipelago. N. lat. 12° 26'. E. long. 98° 12'.

Long Island Sound, a kind of inland sea, from three to 25 miles broad, and about 140 miles long, extending the whole length of Long island, in the state of New York, and dividing it from Connecticut. This sound communicates with the ocean at both ends of the island, and affords a very safe and convenient inland navigation.

Long Is., or *Le River*, *Indians*, are Indians who inhabit the territory, on the White river, which runs W. into the Wabash river. The mouth of White river is in N. lat. 38° 58'. W. long. 80° 7'.

Long Key, Middle, a small island in the bay of Honduras, near the coast of Mexico. N. lat. 17° 10'. W. long. 88° 48'.

Long Key, North, a small island in the same bay. N. lat. 17° 58'. W. long. 88° 40'.

Long Key, South, a small island in the same bay. N. lat. 16° 57'. W. long. 88° 50'.

Long Konang, a town of Corea; 125 miles S.S.E. of King-ki-tao. N. lat. 35° 55'. W. long. 79° 20'.

Long Lakes, The, a chain of small lakes in Upper Canada, extending westerly from the grand portage of Lake Superior toward Rain lake.

Long Legs, in *Natural History*. See *TIPULA*.

Long Meadows, in *Geography*, a town of America, in Hampshire county, Massachusetts, on the E. bank of Connecticut river, about four miles S. of Springfield, and 23 N. of Hartford; incorporated in 1783, and containing a congregational church, and about 70 houses, forming a street parallel with the river. The township contains 973 inhabitants.

Long Measure. See *MEASURE*.

Long Mountain, in *Geography*, a mountain of Virginia; 80 miles W.S.W. of Richmond. N. lat. 37° 15'. W. long. 79° 20'.

Long Nose, a cape on the E. coast of New Holland. S. lat. 35° 0'. E. long. 151° 15'.

Long Point, is a long beach or sand bank, on Lake Erie, in Upper Canada, now called the "North Foreland," stretching into Lake Erie from the township of Walsingham, and forming the deep bay of Long Point, upwards of 20 miles in length.

Long Pond. See *BRIDGE-TOWN*.

Long Reach, a narrow part of the straits of Magellan, between Cape Quod and Buckley Point.

Long Reef, a shoal in the Spanish Main, near the Mosquito shore. N. lat. 12° 22'. W. long. 82° 50'.

Long Saut, a small island of Upper Canada, in the river St. Lawrence, in front of the township of Osnabrock, containing from 1000 to 1500 acres, with good soil. N. lat. 55° 2'. W. long. 74° 55'.

Long Shoal, a river of America, in North Carolina, which runs into Pamlico sound, at the mouth of which is a cape called *Long Shoal Point*. N. lat. 35° 22'. W. long. 76° 2'.

Long Timbers, or *Double Futtocks*, in a *Ship*, those timbers afore and abaft the floors which extend from the deadwood to the run of the second futtock head.

LONGA, in *Geography*, one of the smaller Shetland isles. N. lat. 60° 12'. W. long. 1° 37'.—*Alfo*, a small island near the W. coast of Scotland. N. lat. 56° 12'. W. long. 50° 40'.

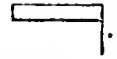
LONGA, Ital. *Longue*, Fr. *A long*, Engl. in *Music*, is a character for time in the first time-table, half the duration of the *maxima*, or *large*, and twice the length of the *breve*.

The long is formed thus:  or  John de Muris

and his contemporaries had longs of three several kinds; the

perfect, with a tail on the right side, thus  or 

equal to three pointed breves; it is called *perfect*, says de Muris, on account of its numerical ratio with the Trinity. The *imperfect* long is of the same figure as the *perfect*, and is only distinguished by the mood or character for time at the beginning of a movement. It was accounted *imperfect*, from its being incomplete without a breve to precede or follow it. The *double* long contains two imperfect breves:

it is like the long only of a much larger size 

John de Muris quotes Aristotle to prove that this note is not used in canto fermo. At present, the term long is only correlative with *short*, in scanning verses.

LONGABOO, in *Geography*, one of the smaller Friendly islands; 12 miles E.S.E. of Naenava.

LONGARA, a town of Naples, in Calabria Ultra; 20 miles W.N.W. of Severina.

LONGARES, a town of Spain, in Aragon; 20 miles S.S.W. of Aragossa.

LONGAY, a small island near the E. coast of Skye. N. lat. 57° 19'. W. long. 5° 53'.

LONGEAU, a town of France, in the department of the Upper Maine, and chief place of a canton, in the district of Langres; six miles S. of Langres. The place contains 428, and the canton 9485 inhabitants, on a territory of 295 kilometres, in 29 communes.

LONGEPIERRE, HUBAHE-BERNARD DE ROQUELEYNE, *Lord of*, in *Biography*, born of a noble family at Dijon, in 1659, was secretary of commands to the duke of Berry. He distinguished himself by an accurate knowledge of the Greek language, and published notes upon Anacreon, Sappho, Bion, Moschus, and the Idylls of Theocritus. In 1690 he gave the public a collection of "Idylls" of his own invention: he was author of the tragedies of "Medea," and "Electra," written after the manner of the Greek tragedians, which were brought on the stage, and gave him a reputation among dramatic poets. He wrote other tragedies of considerable merit, and died at Paris in 1721. Mereri.

LONGEPIERRE, in *Geography*, a town of France, in the department of the Saône and Loire, situated near the river Doubs; 16 miles N.E. of Chalons sur Saône.

LONGERI, a town of Africa, in the kingdom of Loango, where the kings are generally interred.

LONGEVITY, a term expressing length of life.

From the different longevities of men in the beginning of the world, after the flood, and in these ages, Dr. Derham deduces a good argument for the interpolation of a Divine Providence.

LONGEVITY.

Providence. Immediately after the creation, when the world was to be peopled by one man and woman, the ordinary age was nine hundred years and upwards. Immediately after the flood, when there were three persons to stock the world, their age was cut shorter; and none of those patriarchs, but Shem, arrived at five hundred. In the second century we find none that reached two hundred and forty; in the third, none, but Terah, that came to two hundred years; the world, at least a part of it, by that time being so well peopled, that they had built cities, and were cantoned out into distant nations. (See ANTEDILUVIAN.) By degrees, as the number of people increased, their longevity decreased, till it came down at length to seventy or eighty years; and

there it stood, and has continued to stand, ever since the time of Moses. This is found a good medium, and, by means hereof, the world is neither overstocked, nor kept too thin; but life and death keep a tolerably equal pace. So that from this period the common duration of man's life has been much the same in all ages, as we learn both from sacred and profane history. In consequence of the relation of the ingenious Mr. Whitchurch (see *Phil. Inquiry into the Origin of the Earth*), and of Dr. Barrow's *Remarks on Longevity in the Manchester Memoirs*, vol. ii. we are enabled to present our readers with tables of longevity, and appropriate reflections, which will be no less instructive than amusing.

TABLE I.

Names of the Persons.	Ages.	Places of Abode.	Living or Dead.
Thomas Parre - - -	152	Shropshire - - -	Died Nov. 16, 1625, <i>Phil. Trans.</i> N. 14.
Henry Jenkins - - -	160	Yorkshire - - -	— Dec. 8, 1708, <i>Phil. Trans.</i> N. 221.
Robert Montgomery - - -	126	Yorkshire - - -	— in 1670.
James Sands - - -	140	Staffordshire - - -	} Ditto Fuller's Worthies, p. 47.
His Wife - - -	125	Staffordshire - - -	
Countess of Desmond - - -	140	Ireland - - -	Rawleigh's History, p. 160.
Countess of Egleston - - -	143	Ireland - - -	Died - - - 1691 (a)
J. Sagar - - -	112	Lancashire - - -	— - - 1688 (b)
— Laurence - - -	140	Scotland - - -	Living - - - (c)
Simon Sack - - -	141	Trionia - - -	Died May 30. 1764
Colonel Thomas Winflow - - -	146	Ireland - - -	— August 26, 1766
Francis Confit - - -	150	Yorkshire - - -	— January 1768
Christ. J. Drakenberg - - -	146	Norway - - -	— June 24, 1770 (d)
Margaret Ferster - - -	136	Cumberland - - -	} Both Living 1771
Her Daughter - - -	104	Cumberland - - -	
Francis Boes - - -	121	France - - -	Died February 6, 1769
John Broekoy - - -	134	Devonshire - - -	Living - - - 1777 (e)
James Bowels - - -	152	Lillingworth - - -	Died August 15, 1656 (f)
John Tice - - -	125	Worcestershire - - -	— March - - - 1774 (g)
John Mount - - -	136	Scotland - - -	— February 27, 1776 (h)
A. Goldsmith - - -	140	France - - -	— June - - - 1776 (i)
Mary Yates - - -	128	Shropshire - - -	— - - - 1776 (k)
John Ba'es - - -	126	Northampton - - -	— April 5, - - - 1755 (l)
William Ellis - - -	130	Liverpool - - -	— August 16, 1780
Louisa Truxce, a Negress } in South America	175	Tucuman, South America - - -	Living October 5, 1780 (n)
Margaret Patten - - -	138	Lockneugh, near Paisley - - -	Lynche's Guide to Health.
Janet Taylor - - -	168	Fintray, Scotland - - -	Died October 10, 1780
Richard Lloyd - - -	133	Montgomery - - -	Lynche's Guide to Health.
Sufannah Hilliar - - -	100	Piddington, Northamptonshire - - -	Died February 19, 1781 (o)
James Hayley - - -	112	Middlewich, Cheshire - - -	— March 17, 1781 (p)
Ann Cockbolt - - -	105	Stoke-Bruerne, Northamptonshire - - -	— April 5, - - - 1775 (q)

William Walker, aged 112, not mentioned above, who was a foldier at the battle of Edge-Hill.

- (a) Fuller's Worthies, p. 140.
 (b) Philosophical Transactions, abridged by Lowthorp, vol. iii. p. 306.
 (c) Derham's Physico Theology, p. 273.
 (d) Annual Register.
 (e) Daily Advertiser, Nov. 18, 1777.
 (f) Warwickshire.
 (g) Daily Advertiser, March 1774.
 (h) Morning Post, Feb. 23, 1776.

- (i) Daily Advertiser, June 24, 1776.
 (k) Ibidem, August 22, 1776.
 (l) See Inscription in the portico of All-Saints church.
 (m) London Evening Post, August 22, 1780.
 (n) London Chronicle, October 5, 1780.
 (o) Northern Mercury, Feb. 19, 1781.
 (p) General Evening Post, March 24, 1781.
 (q) Well known to persons of credit at Northampton.

LONGEVITY.

If we look to an early period of the Christian era, we shall find that Italy has been, at least about that time, peculiarly propitious to longevity. Lord Bacon observes, that the year of our Lord 76, in the reign of Vespasian, was memorable; for in that year was a taxing, which afforded the most authentic method of knowing the ages of men. From it, there were found in that part of Italy, lying between the Apennine mountains and the river Po, one hundred and twenty-four persons who either equalled or exceeded one hundred years of age, namely:

TABLE II.

	54	Persons of	100	Years each.
	57	-	-	110
	2	-	-	125
	4	-	-	130
	4	-	-	136
	3	-	-	140
In Parma	3	-	-	120
	2	-	-	130

In Brussels	1	-	-	125	Years each.
In Placentia	1	-	-	131	
In Faventia	1	-	-	132	
	6	-	-	110	
	4	-	-	120	
In Rimino	1	-	-	150	<i>viz.</i> Marcus Aponius.

Mr. Carew, in his Survey of Cornwall, assures us, that it is no unusual thing, with the inhabitants of that county, to reach ninety years of age, and upwards, and even to retain their strength of body and perfect use of their senses. Besides Brown, the Cornish beggar, who lived to one hundred and twenty, and one Polezew to one hundred and thirty years of age; he remembered the decease of four persons in his own parish, the sum of whose years, taken collectively, amounted to three hundred and forty. Now, although longevity evidently prevails more in certain districts than in others, yet it is, by no means, confined to any particular nation or climate; nor are there wanting instances of it, in almost every quarter of the globe, as appears from the preceding, as well as the subsequent table.

TABLE III.

Names of the Persons.	Ages.	Places of Abode.	Where recorded.
Hippocrates, physician	104	Island of Cos	Lynche on Health, chap. 3.
Democritus, philosopher	109	Abdera	Bacon's History, 1095.
Galen, physician	140	Pergamus	Voss. Inst. or lib. i.
Albuna Marc	150	Ethiopia	Hakewell's Appendix, lib. i.
Dumitur Raduly	140	Haromfzeek Transilvania	Died January 18, 1782, General Gazetteer, April 18:h.
Titus Fullonius	150	Bononia	Fulgofus, lib. viii.
Abraham Paiba	142	Charles-Town, South Carolina	General Gazetteer
L. Tertulla	137	Arminium	Fulgofus, lib. viii.
Lewis Cornaro	100	Venice	Bacon's History of Life, &c. p. 134.
Robert Blakeney, Esq.	114	Armagh, Ireland	General Gazetteer.
Margaret Scott	125	Dalkeith, Scotland	See Inscription on her Tomb in Dalkeith Church-yard.
W. Gullstone	140	Ireland	Fuller's Worthies.
J. Bright	105	Ludlow	Lynche on Health.
William Postell	120	France	Bacon's History, p. 134.
Jane Reeves	103	Essex	St. James's Chronicle, June 14, 1781.
W. Paulet, marquis of Winchester	106	Hampshire	Baker's Chronicle, p. 502.
John Wilton	116	Suffolk	General Gazetteer, Oct. 29, 1722.
Patrick Wian	115	Leibury, Northumberland	Piempius Fundammed, sect. 4, chap. 8.
M. Laurence	140	Orcades	Buchanan's History of Scotland.
Evan Williams	135	Caermarthen Workhouse	General Gazetteer, October 12, 1782.

If we ascend to the first ages of the world, and endeavour to investigate the causes of the longevity of the antediluvians, we shall find that different writers have stated them very variously. Some have imputed it to the sobriety of the antediluvians, and the simplicity of their manners; alleging that they abstained from flesh, and had none of those excitements to gluttony, which have been devised in subsequent times. Others have ascribed their longevity to the excellency of their fruits, and some peculiar virtues in the herbs and plants of those days. Others again have thought that the long lives of the inhabitants of the old world proceeded from the strength of their stamina, or first principles of their bodily constitutions; and this might be a concurrent, though not the sole and adequate cause of their longevity: for

Shem, who was born before the deluge, and had all the virtue of the antediluvian constitution, fell 300 years short of the age of his forefathers, because the greatest part of his life was passed after the flood. It has therefore been more rationally supposed, that the chief cause of their longevity was the salubrity of the antediluvian air; which, after the deluge, became corrupted and unwholesome. But how the flood should occasion this change in the air, it is not easy to comprehend; and the difficulty must remain unsolved, and we must content ourselves with ascribing it to the constitution of Providence, operating by unknown causes. The examples which are exhibited in the above tables are abundantly sufficient to prove, that longevity, in more modern times, does not depend so much as some have supposed, on

any particular climate, situation, or occupation in life. For we see that it often prevails in places, where all these are extremely dissimilar; and it would, moreover, be very difficult, in the histories of the several persons above mentioned, to find any circumstance common to them all, except perhaps that of being born of healthy parents, and of being inured to daily labour, temperance, and simplicity of diet. Among the inferior ranks of mankind, therefore, rather than amongst the sons of ease and luxury, shall we find the most numerous instances of longevity; even frequently, when other external circumstances seem extremely unfavourable: as in the case of the poor sexton at Peterborough, who, notwithstanding his unpromising occupation among dead bodies, lived long enough to bury two crowned heads, and to survive two complete generations. The livelihood of Henry Jenkins and old Parr is said to have consisted chiefly of the coarsest fare, as they depended on precarious alms. To which may be added, the remarkable instance of Agnes Milburne, who, after bringing forth a numerous offspring, and being obliged, through extreme indigence, to pass the latter part of her life in St. Luke's work-house, yet reached her hundredth and sixth year, in that fordid, unfriendly situation. The plain diet, and invigorating employments of a country life, are acknowledged, on all hands, to be highly conducive to health and longevity; while the luxury and refinements of large cities are allowed to be equally destructive to the human species: and this consideration alone, perhaps, more than counterbalances all the boasted privileges of superior elegance and civilization resulting from a city life.

From country villages, and not from crowded cities, have the preceding instances of longevity been chiefly supplied. For an illustration of this fact we refer to the article *BILLS OF MORTALITY*.

Attached as we are to life by the constitution of our nature, and desirous of protracting the short span, it seems to be no less our duty than our interest to examine minutely into the various means that have been considered as conducive to health and long life; and to discriminate between those that are collateral and accidental and such as are essential to this great end. In order to obtain sufficient data for reasoning justly and satisfactorily on this subject, it would be desirable to improve the mode of framing our bills of mortality; and with this view, it would be proper to add a particular account of the diet and regimen of every person, who dies at 80 years of age, or upwards; and to mention, whether his parents were healthy, long-lived people, &c. &c. All the circumstances, that are most essentially necessary to life, may be comprised under the six following heads: 1, air and climate; 2, meat and drink; 3, motion and rest; 4, the secretions and excretions; 5, sleep and watching; 6, affections of the mind. With regard to the first head, it may be observed that the common atmosphere may be more or less healthy, in proportion as it abounds with pure dephlogisticated gas, or oxygen; and as this is copiously supplied by the green leaves of all kinds of vegetables, we may hence in some measure account why instances of longevity are so much more frequent in the country than in great cities, where the atmosphere is contaminated with noxious animal effluvia, and with mephitic air or carbonic acid. As to climate, various observations conspire to prove that those regions which lie within the temperate zones are best adapted to promote long life. Hence perhaps we may be enabled to explain, why Italy has produced so many persons whose lives have been prolonged, and why islands in general are more salutary than continents. However, the Author of nature has wisely enabled the inhabitants of hot and cold

countries to endure great and surprising changes of temperature with impunity. See an account of experiments in a heated room, under the article *HEAT*. For the effects of *food and drink*, see these articles. It needs no proof, that alternate motion and rest, sleep and watching, are necessary conditions of health and longevity, and that they ought to be adapted to age, temperament, constitution, temperature of the climate, &c. Moreover, when the animal functions are duly performed, the secretions go on regularly; and the different evacuations so exactly correspond to the quantity of aliment taken in, in a given time, that the body is found to return daily to nearly the same weight. Besides, the due regulation of the passions, perhaps, contributes more to health and longevity than that of any other: the non-naturals. We may further add, that longevity is, in a great measure, hereditary: and that healthy, long-lived parents would commonly transmit the same to their children, if it were not for the frequent errors in the non-naturals, which so evidently tend to the abbreviation of human life. Nevertheless the duties and occupations of life will not indeed permit the generality of mankind to live by rule, and subject themselves to a precise regimen. Fortunately, this is not necessary: for the divine Architect has, with infinite wisdom, rendered the human frame so ductile, as to admit of a very considerable latitude of health; yet this has its bounds, which none can long transgress with impunity. For if old Parr, notwithstanding some excesses and irregularities, arrived at so astonishing an age, yet we have reason to suppose that these were far from being habitual; and may also conclude, that had it not been for these abuses, his life might have been still considerably protracted.

On the whole, though some few exceptions may occur to what has been already advanced, yet it will be found, in general, that all extremes are unfriendly to health and longevity. Excessive heat enervates the body; extreme cold renders it torpid; sloth and inactivity clog the necessary movements of the machine; incessant labour soon wears it out. On the other hand, a temperate climate, moderate exercise, pure country air, and strict temperance, together with a prudent regulation of the passions, will prove the most efficacious means of protracting life to its utmost limits. Now, if any of these require more peculiar attention than the rest, it is undoubtedly the last: for the social passions, like gentle gales, fan the brittle vessel calmly along the ocean of life; while, on the other hand, rough, turbulent ones dash it upon rocks and quicksands. Hence, perhaps, it may be explained why the cultivation of philosophy, music, and the fine arts, all which manifestly tend to humanize the soul, and to calm the rougher passions, are so highly conducive to longevity. And, finally, why there is no sure method of securing that habitual calmness and serenity of mind, which constitute true happiness, and which are, at the same time, so essential to health and long life, without virtue.

“Æquanimis sola, atque unica felicitas.”

LONGFORD, in *Geography*, a county of Ireland, in the north-western extremity of the province of Leinster. It has Roscommon on the west, Leitrim and Cavan on the north, and Westmeath on the east and south. Its length from north to south is 20 Irish miles (25 English), and its breadth from east to west 19 Irish, or 24 English miles. It contains 134,152 Irish acres (215,522 English), which are divided into 23 parishes, all of which, except one, are in the bishopric of Ardagh, united to Tuam. Though the northern angle consists of rugged mountains, and the south-western part is chiefly bog to a great extent, yet Longford may

may be reckoned populous; and it supplies large quantities of oats for distant markets. About Grasard is a fine tract of dry gravelly land, which is much used for fattening cattle. Lime-stone is here abundant; and it is surprising that, with this advantage, so little has been done towards reclaiming the bogs. In other parts of the county, the soil is in general a vegetable mould on the surface for three or more inches deep; under that, two inches thick of blue clay, which retains water; below this is yellow clay for two or three feet; and then lime-stone gravel. Oats is the grain principally raised. The linen manufacture has spread much through Longford. Spinning is universal, and there are now many weavers. The increase of the latter has been attributed to the liberal conduct of a gentleman, in giving 50*s*. to be lent to poor weavers, in sums of 5*l*. each, which were to be repaid by quarterly payments of 2*s*. 6*d*. The benefits attending such loans to the poor have been experienced in many places; and if care be taken in the management, it is a mode of assisting them which encourages their industry, and can never be called a *premium for idleness and extravagance*. There are also some bleach greens; and great quantities of yarn are sent to distant markets.

In the northern part of the county, near Lough Gawnagh, is a very rich iron ore in great abundance, not in thin beds, as that in the mountains near Lough Allen, and at Arigna in the adjoining county of Leitrim, but in solid rocks. It is of a dark red colour, and breaks into small shelving pieces. There are also indications of coal in the same neighbourhood. Longford is well watered. The Shannon forms its western boundary, and the Inny crosses it in the south. Lough Gawnagh, which covers several acres, is in the north; and some small rivers flow into the Shannon, on one of which, called the Camlin, the town of Longford is situated. It is intended that the Royal Canal should cross this county, and join the Shannon at Tarmonbury; a measure which cannot fail of leading to much improvement, if it should be ever completed. The towns are small. For Longford, the county town, see the next article; and for Granard and Lanesborough, those names in this work. Edgeworthstown, which was by some accident omitted in the proper place, may be noticed here. It is not, indeed, remarkable for its size, but it is remarkable for the residence of a family, which is distinguished for literary and scientific attainments. The name of Maria Edgeworth is too well known, and her talents as a pleasing and useful author too generally acknowledged, to need the praise of the writer of this article. The same may be said of her lively, ingenious, and patriotic father, Richard Lovell Edgeworth; and there is reason to expect that some of the younger branches of this family will add to a celebrity already very great. The writer has before him the reports of the bog commissioners, the eighth of which contains many proofs of the ingenuity of Mr. William Edgeworth. Mr. Edgeworth's house and the adjoining church contain many proofs of his mechanical skill.

The whole of the county of Longford was formerly called Annaly, and was a principality so late as the fifteenth century. It is now only represented in parliament by two knights of the shire; though it had, before the union, no less than four boroughs, which sent two members each. Beaufort, &c.

LONGFORD, a post-town of the county of Longford, Ireland, of which it is the shire town. It is situated on the river Camlin, and is of tolerable size, and pretty well built. It has a charter school for 60 boys. Longford is 59 miles W.N.W. from Dublin. Beaufort and Carlisle.

LONG-CHUAN, a city of China, of the first rank, in

the province of Se-tchuen, which contains a city of the third class under its jurisdiction, and is a place of great trade. N. lat. 32° 22'. E. long. 104° 18'.

LONG-HOU-KOEN, a town of China, in the province of Hon-quang; 52 miles S.S.W. of Pao.

LONGIANO, a town of Italy, in the department of the Rubicon; 12 miles N.W. of Rimini.

LONGIMETRY, the art of measuring lengths, both accessible, as roads, &c. and inaccessible, as arms of the sea, &c.

Longimetry is a part of trigonometry, and a dependant on geometry, in the same manner as altimetry, planimetry, stereometry, &c.

The art of longimetry see under the names of the instruments used in it, particularly THEODOLITE, CHAIN, DISTANCE, &c. See also MEASUREMENT.

LONGING in pregnant women, an inordinate desire for some particular kind of food, which, if denied, or not procured for them, was supposed to occasion wasting, and sometimes hysteric affections, in the women, and on the child, besides impairing its health, to impress the figure of the object longed for. This affection, which heretofore occasioned in families much anxiety and uneasiness, seems wearing away, just in proportion as the belief in witches, ghosts, and hobgoblins vanishes, or as reason and common sense procure an ascendancy over superstition and imposture. See that part of the article CONCEPTION, which treats of pica.

LONGINUS, DIONYSIUS, in *Biography*, celebrated for his treatise on the sublime, flourished in the third century, and is supposed by some to have been a native of Athens, by others of Syria. In his youth he travelled for improvement: he was known at Rome, Alexandria, and other cities distinguished for literature; and attended upon the lectures of all the eminent masters in eloquence and philosophy. Such was the extent of his erudition, that he was styled by his contemporaries "the living library." He appears to have taught philosophy at Athens, where Porphyry was one of his disciples. He was invited to the court of Palmyra, by its illustrious queen Zenobia, who took his instructions in the Greek language, and made use of his counsels on political occasions. This distinction was fatal to him: he was executed by order of the emperor Aurelian, who proved victorious over the troops of Zenobia, and took her prisoner. The queen, to save herself, imputed the resistance which she made to her counsellors, of whom Longinus was suspected to be the principal. The philosophy of Longinus supported him in the hour of his trial, and he submitted to his fate with resignation and cheerfulness. This event took place in the year 273. Gibbon observes on this circumstance, that the fame of Longinus will survive that of the queen who betrayed, or the tyrant who condemned him. Genius and learning were incapable of moving a fierce unlettered soldier, but they had served to elevate and harmonise the soul of Longinus. Without uttering a complaint, he calmly followed the executioner, pitying his unhappy mistress, and bestowing comfort on his afflicted friends. He was author of numerous writings. Dr. Pearce has collected the titles of twenty-five; but his treatise on the sublime, already referred to, is the only one remaining; and thus, as is well known to scholars, is in a mutilated and imperfect state. The best editions of it are those of Hudson, Pearce, and Toup. It has been translated into the English; but it is one of those works which scarcely admits of a translation. Speaking of this treatise, Mr. Smith, the translator, says, "It is one of those valuable

able remnants of antiquity, of which enough remains to engage our admiration, and excite an earnest regret for every particle of it that has perished. It resembles those mutilated statues, which are sometimes dug out of ruins: limbs are broken off, which it is not in the power of any living artist to replace, because the fine proportion and delicate finishing of the trunk excludes all hope of equalling such masterly performances." Smith's translation of the treatise on the Sublime. Moreri. Gibbon. Harwood.

LONGISSIMUS DORSI, in *Anatomy*, a muscle of the back. See **DORSI**.

LONGITUDE of the Earth, is sometimes used to denote its extent from east to west, according to the direction of the equator.

By which it stands contradistinguished from the *latitude of the earth*, which denotes its extent from one pole to the other.

LONGITUDE, in *Astronomy and Geography*. The longitude of any point of the heavens is the distance of its place, reduced to the ecliptic, from the vernal equinoctial point; that is, if a great circle pass through a star perpendicular to the ecliptic, the arc of the ecliptic intercepted between the intersection of this circle and the equinoctial point will be the longitude of the star.

The longitude of a place on the surface of the earth, is a portion of the equator intercepted between a meridian passing through the place, and another meridian which passes through some principal city or observatory assumed as a point of departure, from which the longitudes of other places are taken. The reason why longitude is so differently defined on the celestial and terrestrial globe, has been already explained under **LATITUDE**, to which article the reader is referred.

The subjects of astronomical investigation, arising from different definitions, are so intimately connected, that much of the present has been already anticipated. Under **RIGHT ASCENSION** we have shewn how, having given the longitude and latitude of a heavenly body, we deduce its right ascension and declination: and under **LATITUDE**, a rule has been given for computing the longitude and latitude from the observed right ascension and declination. But though we have shewn how the quantities are derived reciprocally one from the other, we have reserved for this place to explain how they are originally derived from elementary observations. We are therefore to suppose the case of a practical astronomer who should be desirous of making a catalogue of stars, and of determining their longitudes and latitudes independent of previous observation, except only such as are absolutely necessary for determining the quantity of precession, aberration, nutation, &c.

The observer is to be even supposed unacquainted with the latitude of his observatory, with the situation of the equinoctial points, and with the obliquity of the ecliptic. The principles of the method which we mean to explain were familiar to Flamsteed and the astronomers of that period, and are demonstrated in De Lalande's and Vince's *Astronomy*. But the late Dr. Maskelyne was the astronomer who improved and practised it with the greatest success in forming his catalogue of the thirty-six principal stars, and which would have been much more accurate than any ever known, had the instrument with which his observations were made been as perfect as those of later construction.

As no instrument now in use can give directly the longitude or latitude of a star, it is necessary, first of all, to determine the right ascensions and declinations of those stars of

which we mean to form a catalogue. The method of determining the declination has been already explained at great length. (See **DECLINATION**.) It is quite independent of the solar theory, and is derived by direct measurement of the meridian distance between the object and the pole. A mural circle, such as that now erecting at Greenwich, determines this distance, without any reference to the zenith; but with a quadrant, and with astronomical circles of the usual construction, it is either absolutely necessary, or at least convenient, to employ the zenith. And in this case we determine by one series of observations the distance of the zenith from the pole, and by another series the meridional distance of the zenith from each particular star. The first quantity, called the co-latitude of the place, being applied to the second, or zenith distance of the star, the sum is the polar distance. It is evident, that all this may be performed without any knowledge of the solar theory, or even without a single solar observation.

To determine the right ascensions of the stars, we might have assumed (had right ascension been otherwise defined) any great circle perpendicular to the equator, and passing through any given star, as α Aquilæ, exactly in the same manner as we assume an arbitrary meridian for the determination of terrestrial longitudes. But as astronomers have agreed to assume, as their first celestial meridian, that which passes through the vernal equinoctial point, the solar theory necessarily becomes involved with the subject of our investigation: we are, therefore, under the necessity of combining two distinct objects of enquiry. In the first place, it is necessary to determine exactly the relative situation of the stars with respect to each other and to the equator; and next, to place the ecliptic in its true position both with respect to the equator and to the fixed stars, and thus determine the situation of the equinoctial point. To have a clear idea of the whole of this process, we should observe that the two preliminary investigations are perfectly independent of each other; for the constellations (as we remarked above) might be truly placed on the celestial globe without any knowledge of the ecliptic, and the ecliptic, in like manner, might be placed making its proper angle with the equator; and the declination of the sun and its distance from the equinoctial point determined at any moment, by a series of solar observations conducted without any reference to the fixed stars, and even without any knowledge of their existence. It is by the combination of the results of these separate investigations that the intended object is accomplished. The practical method of conducting the whole of this operation is as follows:

In the first place, we assume the right ascension of any given star, as for example α Aquilæ, as near the truth as possible from prior determination, or we may consider it as entirely unknown, and call it zero. This is quite immaterial, but the former method is the most usual. The stars of the intended catalogue are then observed at the transit instrument for a series of years, with a view to determine their difference of right ascension from α Aquilæ and from each other. This investigation would be much more simple than it is, if the fixed stars always preserved the same relative position to each other, as the differences of right ascension would then remain the same. But this is not the case; the apparent position of each particular star is altered by the effects of aberration, precession, solar and lunar nutation. The phenomenon of *Aberration* has been already explained. That of *Precession* and *Nutation* will likewise be minutely described under their respective titles. At present, it is only necessary to observe, that the action of the sun and moon

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(considered as constant forces) produce by their action on the protuberant regions of the equator a slow periodical revolution of the earth's axis about the pole of the ecliptic. By this motion the equinoctial points are carried backward, and the position of the equator among the fixed stars changes at every instant. If the effect of this phenomenon was simply to cause a change in the position of the equinoctial points, the difference of right ascension of stars would not be affected by it; but it must be remembered, that the right ascension of a star is determined by a perpendicular drawn from the star to the equator; now, the equator changing its place, this perpendicular will change its place also; that is, the star will be constantly referred to a new point on the equator, and hence the right ascension will vary from two causes; one, the motion of the equinoctial point, or point of departure, which will equally affect every star; and the other from the change in the point of reference, by which, according to the definition, right ascension is determined. It is the latter only of these two causes that affects the difference of right ascensions.

The solar and lunar nutations of the axis of the earth arise from the unequal action of the sun and moon, by which the precession of the equinoxes is not described in the uniform and simple manner above mentioned. The reader will see under NUTATION, that the axis of the earth never points to its *mean* place; hence the *apparent* equator never coincides with the *mean* equator, or that circle which would be the equator, if these periodical nutations did not exist. These derangements of the equator, and the corresponding oscillations of the equinoctial points, affect both the longitudes and right ascensions of the stars, and likewise their declinations: their latitudes alone remain unchanged, for an oscillation in the axis of the earth produces no change in the ecliptic, which depends only on the path which the centre of the earth describes in space, and which is not affected by the causes we have above mentioned; but the ecliptic itself is deranged by the action of the neighbouring planets, for these cause the centre of the earth to take actually a new path in the heavens, though they are too distant to derange the parallelism of the earth's axis by any unequal action on the equatorial regions. The ecliptic, in consequence of this disturbance, changes its point of intersection with the equator, which circle remains, from this cause at least, unmoved, and consequently the declinations of the stars remain unchanged; but their longitudes are affected, not only because the equinoctial point is disturbed, from which longitudes are reckoned, but likewise because each star is referred to a new point on the ecliptic; hence arises a secular variation in longitude, peculiar to each star. The right ascensions are altered by the change of position in the equinoctial point, but this affects every star alike, and therefore produces no change in the difference of right ascension; in fact, the effect of this latter derangement enters as an element in the constant part of the precession common to all stars. The nature of all these changes, or equations, as they are technically called, has been, or will be, described under their appropriate terms, as *Aberration*, *Nutation*, *Ecliptic*, *Secular Variation*, &c. &c. which see respectively.

Now the nicety and delicacy of the modern method of reducing observations, consist in the exact determination of all these equations, and the due application of them to

each separate observation; so that instead of the apparent place, we make use of that in which we presume the object would have appeared, had none of these periodical oscillations existed. Agreeable to this conception of the subject, we may define some of the terms we have used above with greater precision than we have yet done. For instance, *mean right ascension* of a star, is the distance of the star's place corrected for aberration, reduced to the mean equator, from the mean vernal equinoctial point. *Apparent right ascension*, is the distance of the star's place reduced upon the apparent equator from the apparent equinoctial point.

Mean declination, is the distance of a star corrected for aberration from the mean equator. *Apparent declination*, is the apparent distance of the star from the apparent equator. The *mean equator*, is an imaginary great circle of the heavens, about which the apparent equator revolves without ever coinciding with it, in the manner already described. The *apparent equator*, is that great circle of the heavens which actually corresponds with the equinoctial line on the earth, whatever the position of the earth may be at the moment of observation.

If, with the mean right ascension, the mean declination, and the mean obliquity of the ecliptic, we compute the longitude of a star, that longitude will be its mean longitude, that is, its place referred to the ecliptic will be reckoned from the mean equinox.

If, with the apparent right ascension, the apparent declination, and the apparent obliquity, we compute the longitude, this will be reckoned from the apparent equinox. Sidereal time, (as used in these computations,) is that which has elapsed since the passage of the apparent equinoctial point over the meridian; for astronomers have not yet adopted a *mean sidereal time*, which might be defined the interval which elapses from the passage of the *mean equinoctial point*. This latter method would be more scientific than that now in use, and would be a similar improvement to the substitution of *mean solar time* for apparent solar time. Were this latter mode adopted, an alteration must be made in our present tables of nutation, and the equation of the equinoxes in right ascension, which now enters as common to all stars, would be omitted, as the same quantity would previously be applied to the error of the clock which is now applied to the star.

We have been led into this digression, and induced to dwell rather at length upon these preliminary considerations, because we do not, at this moment, recollect any author that has entered much on the subject, to whom we can refer.

The right ascension of α Aquilæ then, being assumed as near the truth as possible, the right ascensions of the other stars are to be inferred from it, by applying all the above equations, and likewise a correction for the error of the clock.

We subjoin an example of one day's computation, taken from the Greenwich Observations, 1809. The requisite tables for these reductions, for aberration, precession, nutation, have been given under DECLINATION (Tables II. and III.), and for applying the error of the clock to each star, the following table will be found very useful.

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TABLE IV.

Names of Stars.			Decimal Multiplier.	Names of Stars.			Decimal Multiplier.
γ	Aquila	-	0.003	Castor	-	-	0.486
α		-	0.000	Procyon	-	-	0.490
β		-	0.002	Pollux	-	-	0.494
α	Capricorni	-	0.017	α Hydræ	-	-	0.433
α	Cygni	-	0.037	Regulus	-	-	0.405
α	Aquarii	-	0.093	β Leonis	-	-	0.335
	Fomalhaut	-	0.028	β Virginis	-	-	0.334
α	Pegasi	-	0.134	Polaris, S. P.	-	-	0.283
α	Andromedæ	-	0.179	Spica Virginis	-	-	0.269
γ	Pegasi	-	0.182	Arcturus	-	-	0.232
	Polaris	-	0.217	1α	Libræ	-	0.209
α	Arietis	-	0.260	2α		-	0.209
α	Ceti	-	0.298	α Cor. Bor.	-	-	0.177
	Aldebaran	-	0.363	α Serpentis	-	-	0.172
	Capella	-	0.389	Antares	-	-	0.142
	Rigel	-	0.391	α Herculis	-	-	0.108
β	Tauri	-	0.397	α Ophiuchi	-	-	0.094
α	Orionis	-	0.419	α Lyræ	-	-	0.049
	Sirius	-	0.455				

Example of one Day's Observations.

	Names of Stars, &c.	Transits of Stars.				Clock too slow, or Reduction to Sid. Time. +	Apparent Right Ascension of Stars.				Correction by Table II.	Correction by Table III.		Mean A.R. Jan. 0, 1807.			
		S.	D.	M.	S.		S.	D.	M.	S.		S.	S.	S.	D.	M.	S.
1807. Sept. 6. R - 0.28	☉ Centr.	-	10	56	33	28	0	29	8	10	57	2	96	-	14	6	51
	Arcturus	-	14	6	23	84	0	29	78	14	6	53	62	-	15	34	46
	α Serpentis	-	15	34	19	03	0	29	79	15	34	48	82	-	17	25	58
	α Ophiuchi	-	17	25	32	16	0	29	81	17	26	1	97	-	18	30	24
	α Lyræ	-	18	29	57	18	0	29	83	18	30	27	01	-	19	37	4
	γ	Aquila	19	36	38	90	0	29	84	19	37	8	54	-	19	37	4
	α		19	40	55	74	0	29	84	19	41	25	58	+	Stand.	Star	†
	β		10	45	23	80	0	29	84	19	45	53	64	-	19	45	49
	1α	Capric.	20	6	30	88	0	29	84	20	7	0	72	-	20	6	56
	2α		20	6	54	58	0	29	84	20	7	24	42	-	20	7	19
	Capella	-	5	2	1	47	0	29	95	5	2	31	42	-	5	2	26
	Rigel	-	5	4	48	95	0	29	95	5	5	18	90	-	5	5	16
	β Tauri	-	5	13	39	64	0	29	95	5	14	9	59	-	5	14	5
	Sirius	-	6	36	10	70	0	29	97	6	36	46	67	-	6	36	38
	Pollux	-	7	33	2	16	0	29	98	7	33	32	14	-	7	33	29

† The signs are reversed in the reduction, because apparent A.R. is deduced from the assumed mean A.R. In the other stars the mean A.R. is deduced from the apparent.

In the above example the mean right ascension of α Aquila is assumed $19^h 41' 21''.75$ for January 1, 1807, and its apparent right ascension is deduced $19^h 41' 25''.58$ by applying the corrections of Tables II. and III. The first of these include the effect of precession, aberration, solar nutation, and proper motion peculiar to the star; the second gives the nutation, including the equation of the equinoctial point, so that the whole correction, when applied, gives the interval of fidereal time that should elapse between the passage of the star and that of the apparent equinoctial point;

this interval is $19^h 41' 25''.58$; and if the A.R. of the star be rightly assumed, it is the time which the clock should mark at the interval of the transit; but the clock marked only $19^h 40' 55''.74$. The difference is $29''.84$, which we call the error of the clock, and since its rate is -0.28 , we can, by means of the above table, calculate the error of the clock for every other star. For instance Capella, the decimal multiplier of which is 0.39 , which is to be multiplied by the daily rate, $-0.28 \times 0.39 = .109$, which added to $29''.84 = 29.95$, the reduction corresponding to

X 2 Capella.

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Capella, or the quantity to be added to the observed transit to obtain the apparent right ascension. The apparent right ascensions are next reduced to mean right ascensions for the beginning of the year by Tables II. and III. observing to apply the contrary signs to those for α Aquilæ, because now the mean place is to be deduced from the apparent, whereas we deduced the apparent place of α Aquilæ from the mean.

A series of observations and calculations, similar to the above, being continued for a great length of time, a catalogue is to be formed, which, supposing the instrument to be perfect, will be subject to no other error than that of the assumed right ascension of α Aquilæ, and with this error every right ascension will be affected.

The sun is likewise to be observed during the whole of this process, and its right ascension deduced as in the above example, and which will be subject to the same common error as subsists in the right ascensions of the stars.

While this series of observations is going on at the transit instrument, both the sun and stars are to be observed assiduously with the mural quadrant, or any other instrument destined to the determination of polar distances. We need not enter into the details of this process, as it has already been minutely described under DECLINATION, but shall proceed to consider the use we are to make of the result.

With respect to the stars, it is evident that by this double investigation we have determined their places accurately, both with respect to each other and to the equator, so that we might place them in their true positions on the celestial globe, provided no attention was required to be given to the situation of the ecliptic; and this would be the case, if the intersection of a meridian passing through α Aquilæ with the equator, had been assumed as an arbitrary point of departure in the same manner, as we assume a meridian passing through Greenwich or Paris on the terrestrial globe, as a standard to which terrestrial longitudes are referred. But the great circle to which celestial longitudes are referred, is required to pass through the equinoctial point: it is the exact position, therefore, of this point which we are in search of, and which is to be determined by the data we are now supposed to have collected.

The continued series of solar observations gives us the obliquity of the ecliptic, and the declination of the sun at the moment of observation, from which its right ascension may be easily deduced by the solution of a right-angled spherical triangle; but in making these computations, attention must be paid to the periodical oscillations of the equator,

and to the secular variation of the ecliptic itself; that is, the right ascensions must be calculated with the apparent obliquity, that they may be reckoned from the apparent or variable equinoctial point, in the same manner as those determined by the transit instrument, and with which they are now to be compared.

We have thus obtained a solar theory independent of the fixed stars, and the position of the fixed stars independent of the position of the ecliptic. It now only remains to combine these operations, and to place the ecliptic in its due position with respect to the fixed stars; and this is done in the following manner.

We begin by comparing the right ascensions of the sun determined by the transit instrument, with the right ascensions determined on the same day with the quadrant; and if they agree, it is a proof that the right ascension of α Aquilæ was rightly assumed; if they differ, as will most probably be the case, we must proceed and endeavour to ascertain both the quantity and the cause of the discordance.

If we consider one single insulated observation, the discordance may arise either from an erroneous assumption in the right ascension of α Aquilæ, or from some defect in our solar theory, or from some error in the observation from which the declination of the sun has been inferred. Now, though it would be impossible to assign the true cause of the discordance from one single comparison, yet the whole series will lead us to the truth, from this fortunate circumstance, that whatever error any defect in the solar observations produces in any one observation, the same defect will produce an equal error, but with the contrary sign, in an observation in which the sun is 180 degrees from its first position.

In selecting observations thus circumstanced, it must however be remembered, that although in theory we may determine the right ascension of the sun by trigonometrical calculation from any given declination, yet practically, no exactness can be expected, except when the change of declination is considerable, which only happens near the equinoxes. The exact limits in which the comparison may without impropriety be made, must depend on the accuracy of the instruments, and on the confidence of the observer in the correctness of his observations. In general, the period should not be extended to more than six or eight weeks on each side the equinox.

When the series of observations is complete, the results are to be arranged and compared as in the following table:

	A.R. of the Sun as deduced from Transit Observa- tions.			A.R. of the Sun as deduced from observed Declina- tions of the Sun.			Differ.	Sum.	Half sum, or Error.
	°	'	"	°	'	"			
Feb.	17	33.0	23	24.0	33.0	23	27.9	+	3.9
	22	33.5	11	26.2	33.5	11	28.5	+	2.3
March	5	34.5	31	40.9	34.5	31	40.5	+	8.6
	7	34.7	22	48.6	34.7	22	46.7	-	0.9
	15	35.4	43	44.4	35.4	43	55.5	+	11.1
	21	0	11	56.7	0	11	58.3	+	1.6
April	5	13	49	36.3	13	49	42.6	+	6.3
	6	14	44	21.1	14	44	27.0	+	5.9
	7	15	39	0.9	15	39	7.9		7.9
Oct.	26	21.0	12	15.0	21.0	12	22.5	+	7.5
	20	20.4	29	52.5	20.4	29	47.8	-	4.7
Sept.	11	19.6	6	31.9	19.6	6	26.5	-	5.4
	6	19.1	31	20.2	19.1	31	23.8	+	3.6
	27	18.3	21	54.6	18.3	21	54.2	-	0.2
	25	18.1	33	48.4	18.1	33	40.3	-	8.1
	7	16.5	22	56.4	16.5	22	48.1	-	8.3
	6	16.4	28	46.6	16.4	28	42.2	-	4.3
	5	16.3	34	26.5	16.3	34	28.0	+	1.5
Mean of 9, or of Catalogue								+	1.572

Let us examine one comparison, for the sake of example, in the above table; for instance, March 5th. It appears, that on that day the right ascension deduced from the quadrant observation differed $+ 8''.6$ from that observed at the transit. Now it is presumed, that a part of this error may be in the divisions of the quadrant, or in the assumed latitude, or in the obliquity of the ecliptic: we, therefore, compare this result with its corresponding one, Oct. 11th, when we find the error to be $- 5''.4$; hence we infer, that $3''.2$ only is to be attributed to the error of the transit observations, and that $1''.6$, or the half, is the real error of the catalogue common to every star; since, had that quantity been added, the positive and negative error would have been equal, and would have been therefore assigned altogether to the solar observations.

The beauty of Dr. Maskelyne's method, which we have thus endeavoured minutely to describe, consists in this, that it is not only extremely independent of those errors that are most likely to occur in a series of solar observations, but that it is capable of furnishing a clue to ascertain both the amount and cause of those errors. As this would lead us to an investigation rather foreign to the present subject, we shall not at present enter into these considerations.

Secular variation in the longitude of the fixed stars.

When the longitudes and latitudes of a number of stars are determined for a given period, these are computed for any distant period, by applying the precession of the equinoctial points, and likewise the secular variation for each particular star, and for which purpose a very accurate table has already been given under LATITUDE. This secular variation arises from the real change of position in the ecliptic itself; inasmuch as this affects the situation of the equinoctial point. The effect is common to all stars; and, therefore, this part of it only influences the quantity of the general precession; but because the position of the ecliptic is really changed among the constellations, each star becomes referred to a new point.

Though the trigonometrical investigation of the exact quantity of these changes is extremely complicated; yet the principle may be rendered sufficiently intelligible, by recollecting that a change in the position of the equator disturbing the equinoctial points, produces a change in the longitudes, right ascensions, and declinations, the latitudes only remaining the same. But a similar change in the ecliptic produces a change in the longitudes, latitudes, and right ascensions, whilst the declinations remain unaltered. In other words, the displacement of the equator affects every thing but the latitudes, and a displacement of the ecliptic every thing but the declinations.

On the methods of determining the positions of places on the surface of the earth, or their longitudes and latitudes.

The general nature of the problem having been already explained under LATITUDE; and several practical methods of determining the longitude having been described at great length under CHRONOMETER and DEGREE; we have now to explain a variety of astronomical processes which have been devised and brought to a great state of perfection within these last fifty years. Longitude, being only a relative term, to find the longitude of a place, is, in fact, to determine the difference of the longitude of two given places. And here we may observe rather a curious circumstance, which is, that though the problem is in its statement purely geographical, yet it can only be solved by the aid of astronomy, except upon the hypothetical supposition of a trigonometrical measurement extended over the whole surface of the earth, or at least over a great circle of its circumference. This being impossible, we must have recourse to the general principle we have so often had occasion to refer to in former astronomical articles. We suppose, at any given moment,

every point of the convex surface of the earth corresponds with some point in the concave surface of the heavens, called its zenith; and as the angular distance is the same on each, by measuring the angular distance of the celestial arc, which is always accessible, we obtain the corresponding and equal angular distance of the terrestrial arc, which otherwise would be practically impossible. Thus, for instance, one person at London, and another at Jamaica, have no means of knowing the exact proportion of the earth's circumference intercepted between them, except, indeed, by the inaccurate estimate of the length of a ship's track in sailing from one place to another; but if, by some artifice, each could ascertain, at any given moment, his zenith point in the heavens; then, as the angular distance of these zenith points could easily be measured, the corresponding terrestrial arc would immediately be determined. Now to this, or some very similar principle, may every process for finding the longitude be referred.

The investigation of the subject will be much simplified, if we suppose the equator, instead of being divided into 360 degrees, to be divided into 24 parts, and each part into 60, and subdivided again into 60. As each of these larger divisions passes under a celestial meridian in one hour of sidereal time, they are called hours to avoid circumlocution, though it is evident that a portion of a line cannot be an hour, or any part of time. But as the difference of measure will be expressed in the same terms as the difference of time, this mode of division is extremely useful, and shews us at once, that to determine the difference of longitude between two places, is equivalent to determining the difference of apparent time that exists between two places at any one given instant. The most obvious way of accomplishing this, is for two observers to watch some instantaneous phenomenon, and to mark the instant of apparent time at which each observed it. The instantaneous explosion of a mass of gunpowder is extremely well adapted for this purpose when the distance is not great, and has been successfully employed in the south of France, and in the north of Europe. It is evident that this method can only be employed for very limited distances: for places more remote, we are obliged to recur to the celestial phenomena, and we select those which have the greatest resemblance to the above, that is, which are the most instantaneous, and which appear the most nearly alike to two observers at the same actual instant of time. Unfortunately, there are none which unite these desirable combinations of circumstances. Eclipses of Jupiter's satellites, and of the moon, unite them in a very considerable degree, and accordingly have been employed to great advantage, particularly in the early state of geography, and in cases where the situation of the place was previously unknown.

An occultation of a fixed star is a very instantaneous phenomenon, but it is not seen at the identical instant of actual time by each observer; for, from the vicinity of the moon and its consequent parallax, it may to one observer appear to pass over a fixed star, when to another it may appear to pass entirely over or under it: hence, even in the case where an occultation is observed by two persons, the difference of longitude cannot be inferred by simply noting the difference of time at which the phenomenon happened to each observer. This defect, however, may be completely supplied by calculation, and therefore it is justly considered as one of the most accurate methods that can possibly be devised. We shall refer our readers to astronomical writers for examples of the various methods: our object at present is only to give a sketch of the different principles on which they are founded.

The longitude of a place on land may likewise be found with considerable exactness, by observing the passage of the

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moon over the meridian, and comparing it with the passage observed in some fixed observatory. A much greater accuracy will be obtained by this method, if several successive transits of the moon be taken at either place of observation, as then the motion of the moon in right ascension will be obtained without the aid of calculation: but it will be requisite to attend to the equation of second differences, and even then the irregularity of the moon's motion in 24 hours is so great, that a very sensible error may still remain uncorrected.

Several writers, in explaining this method, appear to have fallen into a misconception of the subject, by confounding together the retardation of the moon in 24 hours, with the real retardation observed between two successive transits, and which latter should evidently be used in calculating the proportional retardation corresponding to a given difference in longitude. Suppose, for instance, for the sake of rendering the subject as intelligible as possible, that the motions of the sun and moon were perfectly uniform and in the equator, and that they both passed the meridian of Greenwich at mean noon (which would, according to our supposition, be the same as apparent noon); suppose that the next day the moon passed the meridian of Greenwich at 1^h after noon. It is evident that the retardation would be one hour in twenty-five hours. On the opposite meridian the moon will pass at 0^h 30', at which instant it will be 12^h 30' mean time at Greenwich, or the half of 25 hours, this being the proportion of time answering to a retardation of 30'. In general, the attention of the calculator should be directed to finding the mean time at Greenwich, and to compare with this the mean time at the place of observation. The reader, who wishes to see more on this particular method, may consult a paper by Mr. Gavin Lowe in the 15th vol. of *Tilloch's Philosophical Magazine*.

Hitherto we have supposed two observations made by two observers, one at each place, whose difference of longitude with the other is to be determined; but it is evident that this is impracticable in many cases, and particularly in the one of the greatest importance, namely, when the object is to determine the longitude at sea. Here the mariner must be supplied with one calculated or supposed observation, instead of one really observed. The difficulty to be surmounted in this case is extremely great: of the immense number of methods more or less plausible that have been suggested, two only are in use at present, the one by the means of a *chronometer*, already explained at great length under that article; the other the lunar method, which has been gradually improved by the labour of succeeding astronomers, from the time it was first suggested, many years ago, to the present moment, when it is brought so near perfection, that no reasonable hope can be entertained of any very considerable improvement.

The early navigators had no means of estimating their longitude but by the computed run of the ship; and the dangers they incurred by this inaccurate method, were sufficient to convince every enlightened government, particularly of maritime states, of the importance of encouraging, to the utmost effort of human ingenuity, what could be directed to the improvement of this defective state of navigation.

The early speculations of astronomers were of but little practical utility to the navigation of those times. In the 16th century, eclipses of the moon were strongly recommended; but they happened very seldom, and were too inaccurately computed to be of any great use. Perhaps, now and then, the approximate longitude of an almost unknown country, where a mariner might accidentally be on shore, was computed by this method, but to determine the place of a ship it was perfectly inadequate.

Philip III. of Spain, in 1598, offered an hundred thousand crowns; and the states of Holland, at the beginning of

the seventeenth century, proposed a reward of thirty thousand florins to the person who should be fortunate enough to solve this difficult and important problem. In 1635, John Morin, professor of mathematics at Paris, proposed a method of resolving it to cardinal Richelieu, extremely similar to the lunar method now in use; but it was rejected as of no practical utility: and indeed, at that period, neither the lunar tables were of sufficient accuracy, nor the nautical instruments delicate enough to render the lunar method very promising. However, though the commissioners, who were appointed to examine this method, judged it insufficient, on account of the imperfection of the lunar tables, cardinal Mazarin, in 1645, procured for him a pension of 2000 livres.

Many attempts were founded on the theory of the magnetic variation; but none of these succeeded. It was the general opinion of astronomers, that the moon's motion was the most promising phenomenon to select; but long after the idea was first suggested, neither lunar tables nor instruments were sufficiently exact to render any method, founded on this theory, practically useful. Still, however, there was a rational hope that these difficulties might be overcome.

The first person who recommended the investigation of the longitude, from observing the distance between the moon and some star, is said to have been John Werner, of Nuremberg, who printed his annotations on the first book of Ptolemy's *Geography*, in 1514: Peter Apian, professor of mathematics at Ingolstadt, in 1524; Oronce Fine, of Brancan, about 1530; Gemma Frisius, at Antwerp, in 1530; Nonius or Pedro Nunez, in 1560; and Kepler, in 1630; all suggest and recommend the same method. In 1675, king Charles II. erected the observatory at Greenwich, and appointed Mr. Flamsteed his astronomical observer, with this express command, that he should apply himself with the utmost care and diligence to the rectifying the table of the motions of the heavens, and the places of the fixed stars, in order to find out the so much desired longitude at sea, for perfecting the art of navigation. To the fidelity and industry with which Mr. Flamsteed executed his commission, we are in a great measure indebted for that curious theory of the moon, which was afterwards formed by the immortal Newton. This incomparable philosopher made the best use which human sagacity could make of the observations with which he was furnished; but, as these were interrupted and imperfect, the difference of Sir Isaac's theory from the heavens would sometimes amount at least to five minutes. Dr. Halley employed much time on this subject; and a starry zodiac was published under his direction, containing all the stars to which the moon's appulse can be observed: but for want of proper instruments and correct tables, he could not proceed in making the necessary observations. In a paper on this subject he expresses his hope, that the instrument just invented by Mr. Hadley might be applied to taking angles at sea with the desired accuracy. (See *Phil. Trans.* N^o 421.) This great astronomer, and after him the abbé de la Caille, and others, have reckoned the best astronomical method of finding the longitude at sea, to be that wherein the distance of the moon from the sun, or from a star, is used; for the moon's daily mean motion being about thirteen degrees, her hourly mean motion is about half a degree, or one minute of a degree in two minutes of time; and so an error of one minute of a degree in position will produce an error of two minutes in time, or half a degree in longitude: and if by observation it is determined what part of her daily motion the moon has run through during the interval between a certain point of time under a known meridian, and the instant of time when the observations are made on her, under an unknown meridian, then her daily motion at that time will have, to the part thereof determined by observation,

tion, the same ratio which twenty-four hours has to the interval of time taken to describe that arc.

It was in the year 1714 that the parliament of Great Britain first began to consider this question as an object of national concern. And the loss of sir Cloudesly Shovel's fleet seems to have had some effect in drawing their attention to this subject; at least, if we may judge from the following document, copied from a manuscript in the Royal Observatory, signed by those well-known personages, William Whiston and Humphrey Ditton. It appears to have been one of the many petitions presented to the house of commons on this occasion.

Reasons for a Bill, proposing a Reward for the Discovery of the Longitude.

I. This bill is unexceptionable, because it is general, and not confined to any one project, person, or method; but gives equal hopes to all judicious proposers whatsoever.

II. Because in this bill no money is insisted on, before any method for the discovery of the longitude is, upon trial, actually found practicable and useful.

III. Because sir Isaac Newton's own paper, delivered into the Committee, gives hopes that the known method by the theory of the moon, which is hitherto not exact enough, may, upon due encouragement, in time be brought to perfection.

IV. Because the method now proposed is owned by all, to whom it has been communicated, to be certainly true in theory: it cannot, therefore, be fit to have it concealed, even though it were not yet known to be practicable; because, in that case, future improvements might still make it so.

V. Because its great use at land and in geography is indisputable, and was distinctly observed by sir Isaac Newton and Dr. Halley, upon the first proposal of this method to them: and we beg leave to say, that this use alone is so great and extensive, that if there were no other, it would highly deserve the encouragement of the public.

VI. Because another great use is also undoubted, viz. for all places in the narrow seas, and within about 100 miles of all shores and islands; that is, for all places where ships are in the greatest danger, as sir Isaac Newton owned to the committee; so that if this method extended no farther, yet it would highly deserve the public encouragement.

VII. Because there is little or no reason to doubt of its use at any place at sea, even where ships are allowed to be in the least danger; since, in the most doubtful case of all, sir Isaac Newton has, in his paper delivered to the committee, proposed an effectual remedy, as will be clearly understood, when the method itself is known to the world.

VIII. Because this method will save the nation great sums of money, which the want of it does now occasion, as will appear upon trial.

IX. Because the charges of it will be inconsiderable, in comparison of the advantage, as will also fully appear upon trial.

X. Because it will prevent the loss of abundance of ships and lives of men; as it would certainly have saved all sir Cloudesly Shovel's fleet, had it then been put in practice.

XI. Because it is easy to be understood and practised by ordinary seamen, without the necessity of any puzzling calculations in astronomy.

And we take leave to recommend the learned Savilian professor of geometry at Oxford, Dr. Halley, as the fittest person in the world for the trial, and practice, and improvement of this method; and do hereby declare, that we are willing that he go equal shares with us in the reward, if he please to undertake so useful a work, and the public please to make that reward equivalent to the great dignity and importance of the discovery.

June 10, 1714.

WILL. WHISTON.
HUMPHREY DITTON.

Accordingly an act was passed in this year, 1714, in the British parliament, appointing and empowering certain commissioners to make out a bill for a sum not exceeding 2000*l.* towards making necessary experiments; and also granting a reward to the person who should discover the longitude at sea, proportioned to the degree of accuracy that might be attained by such method; viz. a reward of 10,000*l.*, if it determines the same longitude to one degree of a great circle, or sixty geographical miles; 15,000*l.*, if it determines the same to two-thirds of that distance; and 20,000*l.*, if it determines it to half that distance. It is added, that one moiety or half part of such rewards or sum shall be due and paid when the said commissioners, or the major part of them, do agree that any such method extends to the security of ships, within eighty geographical miles from the shores, which are places of the greatest danger; and the other moiety or half part, when a ship, by the appointment of the said commissioners, or the major part of them, shall thereby actually sail over the ocean, from Great Britain to any such port in the West Indies as those commissioners, or the major part of them, shall chuse or nominate for the experiment, without losing her longitude beyond the limits above mentioned. 12 Ann. cap. 15. See also stat. 14 Geo. II. cap. 39. 26 Geo. II. cap. 25. By stat. 14 Geo. III. all former acts concerning the longitude at sea are repealed, except so much of them as relates to the appointment and authority of the commissioners thereby constituted, and also such clauses as relate to the constructing, printing, publishing, &c. of nautical almanacs, and other useful tables; and it is enacted, that any person, who shall discover any method for finding the longitude by means of a time-keeper, shall be entitled to the proposed reward, as we have already stated under the article CHRONOMETER; which see.

From the very considerable improvements made by sir Isaac Newton in the theory of the moon, and more lately by M. Euler, and others on his principles, Mr. Tobias Mayer, professor of Gottingen, was enabled to calculate lunar tables more correct than any that were before published, and he has succeeded so far as to give the moon's place within one minute of the truth. This has been proved by a comparison of the tables with the observations made at the Greenwich observatory by the late Dr. Bradley, and by Dr. Maskelyne. These tables, for which the widow of Mr. Mayer was rewarded by the British parliament, were published in 1770, by Dr. Maskelyne, by order of the commissioners of longitude. Dr. Maskelyne, in his voyage to St. Helena, in 1761, made use of these tables, and found them to answer for the discovery of the longitude, within a degree; and in order to facilitate the general use of them, he proposed a nautical ephemeris, the scheme of which was adopted by the commissioners of longitude, and first executed in the year 1767; and the publication has been regularly continued ever since. But as the rules that were given in the appendix to one of those publications, for correcting the effects of refraction and parallax, were deemed too difficult for general use, they were reduced to tables: so that by the help of the ephemeris, these tables, and others that are provided, the calculations relating to the longitude, which could not be performed by the most expert mathematician in less than four hours, may now be completed with greater ease and accuracy in half an hour. Dr. Maskelyne observed, that the error of Mr. Mayer's last lunar tables scarce ever exceeds 1' at the most, and seldom amounts to 20"; and, therefore, the uncertainty hence arising in the determination of the longitude, can scarcely exceed half a degree, and generally will not exceed ten miles.

We observe, in general, with regard to the historical part of this article, that when Hadley had invented the quadrant, or octant, which still bears his name, and when Mayer had brought

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brought the lunar tables to an unexpected degree of precision, astronomers of every nation began to conceive the most rational hopes, that, by gradual improvement, this method would at last be found to equal the most sanguine expectation.

Those who first attempted to practise it had to struggle with great difficulties; and the requisite calculations were so formidable, that none but astronomers, or at least very able calculators, could possibly attempt them.

The late astronomer royal, Dr. Maskelyne, practised this method with the greatest success; and it is to him this country is indebted for some of the greatest improvements that have been made. It was he who first proposed and superintended the construction of the Nautical Almanac, which relieves the calculator from all the very laborious part of the process; and the remaining part of the computation has been so simplified by successive improvements, both in the formulæ and construction of tables, that, at present, the necessary observations may be both made and computed by any mariner, who has received a tolerably good nautical education.

As the practical methods of making and computing a lunar observation are given at great length in every nautical book, we shall confine ourselves to explaining the general nature and object of the problem, and refer the reader to professed treatises on navigation for farther information. In Mackay's treatise on the Longitude, the reader will find some excellent methods of solving both this and a variety of other nautical problems, accompanied by very useful tables. Mendoza's tables contain his own valuable method of computing a lunar observation, beside general tables for every nautical purpose. The requisite tables are well known, and are in the hands of every navigator.

Explanation of the principles of the method by which the longitude is found at sea, by observing the distance of the moon from the sun, or a given fixed star.

The requisite data for determining the longitude at sea, by the lunar method, are the apparent distance of the centre of the moon from the centre of the sun or star, and the apparent altitude of the centres of each at the moment of observation. Hence three observers are usually employed: one observes the distance between the sun and moon, one the altitude of the sun, and the other the altitude of the moon. When this cannot be done, the place of the other two may be supplied by computation.

By means of lunar tables, the exact distance of the moon from the sun or star is computed for every three hours, for the meridian of Greenwich. We are not, however, to suppose that these distances are such as the moon and sun would appear to have at Greenwich; but such as they would appear to an observer at the centre of the earth. It is for Greenwich time only that they are computed; a circumstance not sufficiently insisted upon by elementary writers on this subject. From these tables (of the Nautical Almanac) it is easy to infer the distance for any intermediate interval: a simple proportion will be sufficient for this purpose. We may therefore consider ourselves as in possession of an instantaneous phenomenon, answering to every instant of time at Greenwich; since the distance of the sun and the moon are never the same for two successive instants of time. Now if we consider the converse of this proposition, it is equally evident, that if we have given the distance of the moon from the sun, as seen from the centre of the earth; we can, by the same tables, infer the exact time at Greenwich corresponding to this distance. Now the object of a lunar observation is to determine this distance at a given moment of actual time, to ascertain the apparent time at this moment for the meridian of the observer, and to compare it with the moment of Greenwich time, which is to be inferred from the given distance. Now the difficulty of the process arises

from this circumstance, that since, to an observer on the surface of the earth, the moon appears always depressed by the effect of parallax, and the sun elevated by the effect of refraction, the angular distance observed with a sextant, or any other instrument, is not the same as the distance seen from the centre of the earth, and for which alone the nautical tables are calculated. Hence a spherical computation becomes necessary. Two cases of oblique spherical triangles must be computed, before the observed distance can be corrected, and the true distance ascertained.

The general nature of the problem may be more easily understood by a reference to the figure (*Plate XVII. Astronomy, fig. 1.*), which is a projection of the sphere on the plane of the meridian: \odot is the observed or apparent distance of the sun and moon; $Z \odot$ is the zenith distance of the moon; $Z \odot$ that of the sun; m is the true place of the moon, when corrected for refraction and parallax, which together tend to apparently depress it; s is the true place of the sun, when corrected by refraction and parallax, which together tend apparently to elevate it: for the moon's parallax is always greater than the refraction, the sun's always less. For a star, the simple correction for refraction is all that is required.

We have now, therefore, given three sides in the triangle $Z \odot \odot$, and two sides (*viz.* Zm , Zs) in the triangle Zms . In the triangle $Z \odot \odot$, the angle Z may be found from the three given sides; and then with Zm , Zs , and the included angle Z found above, ms , or the true distance, may be obtained.

To shorten the solution of this problem, and to reduce it within the compass of a mariner's ordinary powers of computation, has been an object with the first geometricians in Europe. It would lead us much beyond our limits to give a history of the numerous solutions that have been proposed. The French mathematicians, probably not having a great facility of constructing tables, have directed their attention chiefly to such methods as require only the common tables of logarithms. In our own country, where the board of longitude is always ready to publish any useful tables that may be approved, those methods and formulæ have been in general preferred, which admitted of the shortest solution by means of tables. In this respect, a progressive series of improvement has taken place since the first introduction of the method; and a skilful mariner will now compute the true distance from the apparent in five minutes, when formerly as many hours were required.

Besides the methods founded on a direct trigonometrical solution, there are many (such as Lyon's and Dr. Maskelyne's) which are founded on rather a different principle. The small triangle $\odot mm'$ is computed as if a plane one, $\odot m'$ being the effect of the total depression of the moon in changing the distance: a similar triangle is formed for computing the effect of refraction for the sun or star. Various formulæ have been deduced from each of these principles, for the investigation of which the reader may consult Cagnole's Trigonometry, and various volumes in the *Connaissance des Temps*. A very clear and scientific investigation of all these methods was given by Mr. Mendoza, in the *Philosophical Transactions* for 1797.

To enable the reader to judge of some of the most approved of these, we shall give a solution of the same problem by a variety of different ways.

Given Apparent altitude \odot	-	32° 34' 47"
Apparent altitude \odot	-	39 3 4
Apparent distance $\odot \odot$	-	86 10 19
Horizontal parallax	-	0 58 28

Required the true distance.

The first example we shall give is the method of Borda, which is in general use among the more skilful of the French navigators.

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The formula is as follows:

$$\text{Let } \frac{1}{\cos. \frac{1}{2} (A + H)} \sqrt{\frac{\cos. \frac{1}{2} (d + a + b) \cos. \frac{1}{2} (d - (a + b)) \cos. A \cos. H}{\cos. a \cos. b}} = \sin. N$$

Then $\sin. \frac{1}{2} D = \cos. \frac{1}{2} (A + H) \cos. N$.

In which A = true altitude of \odot

a = apparent altitude of \odot

H = true altitude of \odot

b = apparent altitude of \odot

d = observed or apparent distance $\odot \odot$

D = true distance required.

Example I.—Borda's Method.

Apparent distance $\odot \odot$	-	86° 10' 19"		
Apparent altitude \odot	-	32 34 47	Com. ar. log. cof.	0.0743564
Apparent altitude \odot	-	39 3 4	Com. ar. log. cof.	0.1098114
Sum	-	157 43 10		
Half sum	-	73 54 5	log. cof.	9.2844266
Distance half sum	-	7 16 14	log. cof.	9.9964940
Corrected altitude \odot	-	32 33 25	log. cof.	9.9257539
Corrected altitude \odot	-	39 47 18	log. cof.	9.8855952
Sum	-	72 20 43	Sum	39.2764375
Half sum	-	36 10 21.5	Half sum	19.6382187
			log. cof. {	9.9070039
			Log cof. N. -	9.9256221
			Sum log. fin. of the	9.8326260
			Half distance	42° 51' 29"
			True distance	85 42 58

When Callet's Logarithms are used, much labour may be avoided, by taking the nearest multiple to 10" in the apparent distance and making an equal alteration in the result. In the above example, the distance for calculation might be 86° 10' 20"; and then one second should be deducted from the result, which would have been 85° 42' 59".

Example II.—According to the method given by Dr. Maskelyne in the Preface to Taylor's Logarithms. Let the apparent altitude of the moon's centre be 39° 3' 4", that of the sun 32° 34' 47"; their apparent distance 86° 10' 19", and the moon's horizontal parallax 58' 28". Required the true distance of the sun and moon.

\odot 's horizontal parallax	-	-	-	0 58' 28"	Log. sine	-	-	8.23061
\odot 's apparent altitude	-	-	-	39 3 4	Log. cosine	-	-	9.89019
\odot 's parallax in altitude	-	-	-	0 45 24	Log. sine	-	-	8.12080
\odot 's refraction from Table I.	-	-	-	- 1 10				
Correction of moon's altitude	-	-	-	0 44 14				
\odot 's apparent altitude	-	-	-	39 3 4				
\odot 's true altitude	-	-	-	39 47 18				
\odot 's apparent altitude	-	-	-	32 34 47				
Difference of refraction and parallax	-	-	-	0 1 22				
\odot 's true altitude	-	-	-	32 33 25				
\odot 's true altitude	-	-	-	39 47 18				
Difference of true altitudes of \odot and \odot	-	-	-	7 13 53				
\odot 's apparent altitude	-	-	-	32 34 47				
\odot 's apparent altitude	-	-	-	39 3 4				
Difference of apparent altitudes of \odot and \odot	-	-	-	6 28 17				
Apparent distance	-	-	-	86 10 19				
Sum	-	-	-	92 38 36				

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Difference	-	-	-	-	79	42	2	Log. fine	-	-	9.8592754
Half sum	-	-	-	-	46	19	18	Log. fine	-	-	9.8067114
Half difference	-	-	-	-	39	51	1	Co. ar. log. cofine	-	-	0.1008114
☽'s apparent altitude	-	-	-	-	39	3	4	Log. cofine	-	-	9.8855952
☽'s true altitude	-	-	-	-	39	47	18	Co. ar. log. cofine	-	-	0.0743564
☉'s apparent altitude	-	-	-	-	32	34	47	Log. cofine	-	-	9.9257539
☉'s true altitude	-	-	-	-	32	33	25				

2) 39.6675037
19.8307518
8.7997641

Half difference of true altitudes of ☉ and ☽ 3 36 56

Log. fine - - -
Log. tangent of an arc - 11.9309877 Tang. N.

Corresponding log. cofine N 9.9981254
Log. fine - - - 9.8326264

42 51 29
2

85 42 58 True distance required.

The formula for the above method is nearly similar to that of Borda. It is,

$$\frac{1}{\sin. \frac{1}{2} (A \frown H)} \sqrt{\frac{\sin. \frac{1}{2} (d (a \frown b) \sin. \frac{1}{2} (d - (a \frown b) \cos. A \cos. H)}{\cos. a \cos. b}} = \text{tang. N, and } \sin. \frac{1}{2} D = \frac{\sin. \frac{1}{2} (A \frown H)}{\cos. N}.$$

Example III.—Dunthorn's Method—Let the apparent distance of the sun and moon be 86° 10' 19", the apparent altitude of the sun 32° 34' 47", that of the moon 39° 3' 4", and her horizontal parallax 58' 28". What is their true distance?

				Log. from Table IX.	-	-	9.995526
				Log. from Table X.	-	-	10
				Reserved logarithm	-	-	9.995516
				Cor. ☽'s altitude, Table VIII.	-	-	0 44' 14"
				Cor. ☉'s altitude, Tables I. and II.	-	-	0 1 22
Moon's apparent altitude	-	39°	3' 4"	Cor. apparent altitude	-	-	0 45 36
Sun's apparent altitude	-	32	32 37				6 28 17
Difference of apparent altitudes	-	6	28 17	Half difference true altitude	-	-	7 14 53
Apparent distance	-	86	10 19	Half difference true altitude	-	-	3 37 26
				Sum	-	-	92 38 36 : its half is 46° 19' 18" S.
				Difference	-	-	79 42 2 : its half is 39 51 1 S.
				Reserved logarithm	-	-	9.995516
Half difference true altitude	-	3	36 56				2) 19.661502
Arc	-	42	37 46				9.830751
Sum	-	46	14 42	Cofine	-	-	9.839840
Difference	-	39	0 50	Cofine	-	-	9.890417
							2) 19.730257
Half true distance	-	42	51 24	Cofine	-	-	9.865128
			2				
True distance	-	85	42 58				

LONGITUDE.

Example IV.—By Mendoza's Method.

☉'s altitude $32^{\circ} 35'$. ☾'s altitude $39^{\circ} 3'$. Apparent distance $86^{\circ} 10' 19''$. Horizontal parallax $58' 28''$.

Sun's altitude	-	-	-	$32^{\circ} 35' 0''$		
Moon's altitude	-	-	-	$39^{\circ} 3' 0''$	Table X.	
Sum of app. altitudes of ☉ and ☾				$71^{\circ} 38' 0''$	No. 1.	88083
Compl. corr. Table VII.	-	-	-	$58' 39''$		59
Corr. moon's alt. Table VIII.	-	-	-	$43' 52''$	{	No. 2. 32
Prop. part	-	-	-	22		No. 3. 11
Corrected sum of altitudes	-	-	-	$73^{\circ} 20' 53''$	No. 2.	03202
Apparent distance	-	-	-	$86^{\circ} 10' 0''$	No. 3.	33820
				$85^{\circ} 42' 38.5''$	No. 4.	25207
Seconds reserved				$19.$		021
True distance				$85^{\circ} 42' 57.5''$		186

Table IX.

$20^{\circ} 9'$
 $10'$
 $3'$
 $20^{\circ} 22'$

Aux. arg.

This method is not only extremely short and easy, but is exempt from any possible confusion of signs, all the corrections being additive. It is really so perfect, that it should supersede every other now in use.

Mr. Mendoza's formula is

$$\sin. \text{ver. } D + 4 = \left\{ \begin{array}{l} \sin. \text{ver. } (A + H) + \sin. \text{ver. } (d + M) + \sin. \text{ver. } (d \smile M) = P \\ + \sin. \text{ver. } (a + b + M) + \sin. \text{ver. } ((a + b) \smile M) = Q \end{array} \right.$$

$$2 \text{ cof. } M \text{ being taken} = \frac{\text{of. } A \text{ cof. } H}{\text{cof. } a \text{ cof. } b}$$

The operation performed by his tables is as follows :

Observed altitude ☉	-	-	-	b	
Ditto ☾	-	-	-	a	
Sum	-	-	-	$a + b$	
With b in Table VI. take	-	-	-	$60' - r + p$	$r = \text{refract. } p = \text{parallax}$
— d — take M and	-	-	-	$r - p$	
The sum	-	-	-	$A + H$	

With $(a + b)$ and M in Table XI.	take Number	$I = Q$
— $(A + H)$ — XI.	-	$II = \sin. \text{ver. } (180^{\circ} - (A + H) - 59')$
— d and M — XI.	-	$III = \sin. \text{ver. } (d + M) + \sin. \text{ver. } (d \smile M)$

The sum or number $IV = \sin. \text{ver. } D + 4 = I + II + III = IV$

Example V.

By the method proposed in the Appendix of the requisite Tables published by Dr. Maskelyne a very short time before his death. A very good table of verified lines accompanies it.

The apparent distance of the moon's centre from the sun's centre being $86^{\circ} 10' 19''$; the apparent altitude of the sun's centre $32^{\circ} 34' 47''$; the apparent altitude of the moon's centre $39^{\circ} 3' 4''$; and the moon's horizontal parallax $58' 28''$; required the distance of their centres.

☾'s horizontal parallax	$0^{\circ} 58' 28''$		
☉'s apparent altitude	$32^{\circ} 34' 47''$	$- 1' 22''$	$45' 36''$ whole correction.
☾'s apparent altitude	$39^{\circ} 3' 4''$	$+ 44' 14''$	
Difference of app. altitude	$6^{\circ} 28' 17''$	N. verf.	006373
Apparent distance	$86^{\circ} 10' 19''$	N. verf.	933237
			926864
		Nat. No. to log.	919344
Difference of true altitudes	$7^{\circ} 14' 53''$	N. verf.	007989
True distance	$85^{\circ} 43' 3''$	N. verf.	925333

Table IX.	9.995526
Table X.	10
Reserved logarithm	9.995516
Logarithm	5.967016
Logarithm	5.962532

LONGITUDE.

Example I.—Mackay's Method, which is the same as the preceding.

Let the apparent distance between the centres of the sun and moon be $86^{\circ} 10' 19''$; the apparent altitude of the sun $32^{\circ} 34' 47''$; the apparent altitude of the moon $39^{\circ} 3' 4''$; and the moon's horizontal parallax $58' 28''$.

Apparent distance	-	$86^{\circ} 10' 19''$	N.V.S.	933237		
Difference of apparent altitude	-	$6 28 17$	N.V.S.	006373	Log. diff. Tab. XLII.	9.995517
					Log.	5.967010
Corrected \odot 's altitude	-	$+ 44 14$	Diff.	926864		
Corrected \odot 's altitude	-	$+ 1 22$	N. No.	917333		5.962527
Difference of true altitude	-	$7 14 53$	N.V.S.	007989		
True distance	-	$85 43 2$	N.V.S.	925322		

This is a short and very excellent method, in case the mariner should not possess Mendoza's tables.

Example by Mr. Turner's Method.

Table XV. of Nautical Almanac.					
Horizontal parallax	-	$0^{\circ} 58' 28''$	Prop. log.	-	4884
Moon's altitude	-	$39 3 4$	Cofecant	-	-
Sun's altitude	-	$32 34 47$	Cofecant	-	10.2687
Apparent distance	-	$86 10 19$			
First correction from the Tables	-	$1 47$			
First corrected distance	-	$86 12 6$	Sine	-	9.9990
Second correction	-	$- 29 7$			
Second corrected distance	-	$85 42 59$	Prop. log. $31 34$	2d Part $2 27$	0.7561
					Prop. log. $2 27$
					1.8667
					29 7 2d Correction.

This method was published in a very small volume by the author at Portsmouth.

Apparent distance $86^{\circ} 10' 19''$ Hor. par. $58' 28''$ } \odot 's apparent altitude $32^{\circ} 34' 47''$
 \odot 's apparent altitude $39 3 4$

By Garrard's Tablets.

No. II.	1.2900	} - Hor. par. $0^{\circ} 58' 28''$	\odot 's app. altitude $39^{\circ} 3' 4'' + 44' 14''$	} $45 35$	- Pro. log. 0.5964
No. II. Suppl.	9.9546		\odot 's app. altitude $32 34 47 - 1 21$		
		1 39 22 No. I.	-	6 28 17	
				+ 22 47	
				6 51 4	Argument B. No. III. 1.7139
	9.2076	0 6 41 No. I. app. diff.	86 10 19	Complement No. III.	9.2076
	0.2883 pr. log.	1 32 41		+ $5' 27'' \frac{3}{4}$	= 1.5179
	0.7405 = prop. log.	- $32' 43''$	} - 27 15 $\frac{1}{4}$		
		+ $5 27 \frac{3}{4}$			
				85 43 $3 \frac{3}{4}$	

This method, by a small set of tablets, has lately been published by Mr. W. Garrard, of the Naval Asylum, Greenwich.

There is a formula in Keith's Trigonometry, which might be simplified and reduced to the following method.

Apparent distance $86^{\circ} 10' 19''$	-	Nat. cof.	0.66762		
Difference of apparent altitudes	-	Nat. cof.	993629		
		Difference	926867	-	Log. 5.9670174
Log. diff., or reserved logarithm, Table IX. reg. tab. or				-	Log. 9.9955169
Table XLII. of Mackay	-			-	Sum 5.9625343
Difference of true altitudes	-	Nat. num.	917349	-	
		Nat. cof.	992043		
True distance $85^{\circ} 42' 59''$	-	Nat. cof.	0.74694		

LONGITUDE.

In this example the log. diff., taken from Mackay's Table XLII. is substituted for the following logarithms, which are used by the author, and are indeed common to all the formulæ of this nature.

Log. secant of apparent altitude \odot	-	-	-	0.0743564
Log. secant of apparent altitude \mathcal{D}	-	-	-	0.1098114
Log. cofine of true altitude \odot	-	-	-	9.9257539
Log. cofine of true altitude \mathcal{D}	-	-	-	9.8855952
Sum	-	-	-	<u>9.9955169</u>

This sum is the reserved logarithm of Requisite Tables, and that of Table XLII. of Mackay.

Another Example by Borda's method.

Apparent altitude \odot	-	-	42° 3' 20"		
Correction R — P	-	-	— 56		
\odot 's true altitude	-	-	<u>42° 2' 24"</u>		
Apparent altitude \mathcal{D}	-	-	26° 10' 15"	-	Log. cofine 0.9530262
Horizontal parallax	-	-	56 31.5	-	Log. fine 8.2159471
Parallax of \mathcal{D} in altitude	-	-	+ 50 43.5		
Refraction	-	-	— 1 55		<u>8.1689733</u>

Correction of \mathcal{D} 's altitude	-	-	+ 48 48.5
\mathcal{D} 's true altitude	-	-	<u>26° 52' 3.5"</u>

Apparent distance $\odot \mathcal{D}$	-	100° 8' 20"
Apparent altitude \odot	-	42° 3' 20"
Apparent altitude \mathcal{D}	-	26° 10' 15"
Sum	-	<u>168° 21' 55"</u>

Co. ar. log. cof.	0.1293061
Co. ar. log. cof.	0.0469738

Half sum	-	84° 10' 57.5"
Distance — $\frac{1}{2}$ sum	-	15° 57' 23.5"
True altitude \odot	-	42° 2' 24"
True altitude \mathcal{D}	-	<u>26° 59' 3.5"</u>

Log. cof.	9.0058673
Log. cof.	9.9829357
Log. cof.	9.8708003
Log. cof.	<u>9.9499415</u>

Sum of true altitudes	-	69° 1' 27.5"
-----------------------	---	--------------

Sum	2)38.9888247
-----	--------------

Half sum	-	34° 30' 43.7"
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Half sum	19.4929123	} Diff. = 9.5769816 fin. < N
Log. cof. A	9.9159307	
Log. cof. N	<u>9.9666044</u>	

Half true distance	-	49° 43' 52"
	-	<u>2</u>

Log. fin.	<u>9.8825351</u>
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True distance	-	<u>99° 27' 44"</u>
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Type of Mendoza's Method. Same Example					
\odot 's Apparent altitude	42° 3' 0"	Apparent distance $\odot \mathcal{D}$	100° 8' 20.0"	Auxiliary Argument.	
\mathcal{D} 's Apparent altitude	26° 10' 0"	Horizontal parallax	56 31.5		
Sum	68 13 0	I	{ 31335 102 }	Table IX.	
Correction \odot Table VII.	59 4				
Correction \mathcal{D} Table VIII.	48 20				
Proportional part	28.5				
Sum of corrected altitudes	70 0 52.5	II	{ 58096 34 }	Table IX.	13 21.0 8.5 3.5
Apparent distance $\odot \mathcal{D}$	100 8 20.0	III	{ 74697 41 }		13 33.0
Reserved seconds	99 27 25 + 20	IV	16.4305 4187		
True distance	99 27 45		118		

Same

LONGITUDE.

Same Example by verfed Sines.

Type for this Method.				
Apparent Altitudes.			Correction for Refraction and Parallax.	True Altitudes.
	° ' "		' "	° ' "
☉	42 3 20		— 0 56	42 2 24
☽	26 10 15		+ 48 48	26 59 3
Difference	- - -		- - -	15 3 21
Difference	- - 15 53 5		N.V.S.	038185
	100 8 20		N.V.S.	1176035
			Difference	1137850
Difference of true altitudes	15 3 21		Nat. N.	1130075
True distance	99 27 45		N.V.S.	034327
			N.V.S.	164402
Apparent distance ☉ ☽ 100 8 20				
Horizontal parallax			56 31	
Referred logarithm			9.9970217	
Logarithm			6.0560851	
			6.0531068	

The referred logarithm 9.9970217 is the logarithm of 0.993164, which is twice 0.496582, the natural cofine of 60° 13' 33", the auxiliary angle M in Mendoza's formula.

Another Example by Mendoza's Tables.				
☉'s Apparent altitude	6° 27' 30"	Apparent distance ☉ ☽	108 42' 3"	
☽'s Apparent altitude	54 11 57	Horizontal parallax	0 55 19	
Sum - - -	60 39	I	{ 15795 224	Table X.
Correction ☉ Table VII.	52 14			
Correction ☽ Table VIII.	31 29			
Proportional part -	11			
Sum of corrected altitudes	62 2 54	II	{ 84046 26	Table IX.
Apparent distance ☉ ☽	108 42	III	{ 16566 16	
Referred seconds -	108 27 42 3	IV	{ 16673 477	
True distance -	108 27 45		196	
				Auxiliary argument.
				24 42
				9
				3
				24 54

The above example by direct calculation from M. Mendoza's formulæ, would stand thus :

Apparent distance	-	108° 42' 3"	Horizontal parallax	-	-	55' 19"
Apparent altitude ☉	-	6 27 30 = b	Apparent altitude ☽	-	-	54 11 57 a
Correction p - r	-	7 46	Correction p - r	-	-	+ 31 41
		<u>6 19 44 = H</u>				<u>54 53 38 A</u>

a + b

LONGITUDE.

$$a + b = 60^{\circ} 39' 27''$$

$$M = 60 \quad 24 \quad 54$$

$$\begin{array}{rclcl} (a + b) + M & = & 121 \quad 4 \quad 21 & \text{N.V.S.} & 1.516122 \\ (a + b) - M & = & 0 \quad 14 \quad 33 & \text{N.V.S.} & 0.000010 \\ A + H & = & 61 \quad 3 \quad 22 & \text{N.S.V.S.} & 1.483953 \\ d + M & = & 169 \quad 6 \quad 57 & \text{N.V.S.} & 1.982011 \\ d - M & = & 48 \quad 17 \quad 9 & \text{N.V.S.} & 0.334585 \end{array} \left. \begin{array}{l} \\ \\ \\ \end{array} \right\} \begin{array}{l} 1.516132 = N^{\circ} \text{ I.} \\ 1.483953 = N^{\circ} \text{ II.} \\ 1.316596 = N^{\circ} \text{ III.} \end{array}$$

$$5.316681$$

$$4$$

$$\text{True Distance} \quad 108 \quad 27 \quad 45$$

$$1.316681$$

If the proportional part for seconds of apparent altitudes be taken from the tables, the analogy with the above will be apparent.

☉'s Apparent altitude	-	-	6	27	30"	Apparent distance ☉ ♃	-	-	108°	42'	3"
♃'s Apparent altitude	-	-	54	11	27	Horizontal parallax ,	-	-	0	55	19
Sum of apparent altitudes	-	-	60	39	27	I.	-	15725	} = 16132		
Correction for ☉ Table VII.	-	-	52	14		Proportional part	224				
Ditto for ♃ Table VII.	-	-	31	29		Proportional part	113				
Proportional part	-	-			12	II. {	-	83792	} = 83954		
Sum of corrected altitudes	-	-	62	3	22		-	162			
Apparent distance	-	-	108	42	3	III. {	-	16566	} = 16582		
							-	16			
Reserved seconds	-	-	108	27	42			16668	} = 16668		
					3			16477			
True distance	-	-	108	27	45			191			

The following approximate method, by means of the small triangles, (*Plate XVII. Astronomy, fig. 1.*) is computed without any auxiliary tables, by this formula.

$$\text{Correction } Y = q \text{ cof. } S - p \text{ cof. } L.$$

$$\text{And fin. } \frac{1}{2} L = \sqrt{\left(\frac{\text{cof. } \frac{1}{2} (D + a + b) \text{ fin. } \frac{1}{2} (D + a - b)}{\text{cof. } a \text{ fin. } D} \right)}$$

$$D = \text{apparent distance.}$$

$$a = \text{apparent altitude } \text{♃}.$$

$$\text{fin. } \frac{1}{2} S = \sqrt{\left(\frac{\text{cof. } \frac{1}{2} (D + a + b) \text{ fin. } \frac{1}{2} (D + b - a)}{\text{cof. } b \text{ fin. } D} \right)}$$

$$b = \text{apparent altitude } \text{☉}.$$

Let the apparent distance ☉ ♃ be $108^{\circ} 42' 3''$; apparent altitude ☉ $6^{\circ} 27' 30''$; apparent altitude ♃ $54^{\circ} 12'$; refraction — parallax $7' 43''$ for the ☉; and parallax — refraction $31' 42''$ for the ♃. Required the true distance.

Computation of the angle S at the centre of the Sun.

Computation of the angle L at the centre of the Moon.

$$\begin{array}{rcl} \text{App. dist. } \text{☉ } \text{♃} & 108^{\circ} 42' 0'' & \text{com. ar. log. fin. } 0.02355 \\ \text{App. alt. } \text{☉} & 6 \quad 27 \quad 30 & \text{com. ar. log. cof. } 0.00177 \\ \text{App. alt. } \text{♃} & 54 \quad 12 \quad 0 & - \end{array}$$

$$\begin{array}{rcl} & & 0.02355 \\ & & - \\ & & \text{com. ar. log. cof. } 0.23287 \end{array}$$

$$\begin{array}{rcl} \text{Sum} & 169 \quad 21 \quad 30 & \\ \text{Half sum} & 84 \quad 40 \quad 50 & \log \text{ cof. } 8.96712 \\ \text{Half sum} - \text{app. alt. } \text{♃} & 30 \quad 28 \quad 50 & \log \text{ fin. } 9.70522 \end{array}$$

$$\begin{array}{rcl} \text{Half sum} - \text{app. alt. } \text{☉} & 78^{\circ} 13' 10'' & \log \text{ fin. } 9.99075 \end{array}$$

$$\begin{array}{rcl} \text{Sum} & 18.69866 & \\ \text{Half sum} & 9.34933 & \end{array}$$

$$\begin{array}{rcl} \text{Sum} & 19.21429 & \\ \text{Half sum} & 9.60715 & \end{array}$$

$$\begin{array}{rcl} \text{which is log. fin. } \frac{1}{2} S & = 12 \quad 55' \quad 0'' & \\ \text{therefore } S & = 25 \quad 50 \quad 0 & \log \text{ cof. } 9.95430 \\ \text{Ref. — par. of } \text{☉} & = 463'' & \log. \quad 2.66558 \end{array}$$

$$\text{which is log. fin. } \frac{1}{2} L = 23^{\circ} 52' 25''$$

$$\begin{array}{rcl} \text{therefore } L & = 47 \quad 44 \quad 50 & \log \text{ cof. } 9.82763 \\ \text{Par. — refr. } \text{♃} & = 1902'' & \log. \quad 3.27921 \end{array}$$

$$\text{Carried forward Sum } 2.61988$$

$$\text{Carried forward Sum } 3.10684$$

LONGITUDE.

Brought forward 3.10684 Log. of p cof. $L = 1279'' = 21' 19'' -$
 Brought forward 2.61988 log. of q cof. $S - = 417 = 6 57 +$

Difference 14 22 $- = Y$
 Or total correction required.

Apparent distance $\odot D - - 108^{\circ} 42' 3''$
 Excess of this distance above the reduced 14 22

Distance reduced $\odot D - - 108 27 41$

The only advantage of this method is that it requires only a table of logarithms to five places.

The true distance being thus determined, it only remains to find the corresponding time at Greenwich, and to compare it with that found on board the ship. This latter may be found from the altitude of the sun at the moment of observation: but it may happen that the sun is not favourably situated at this moment, in which case, and indeed generally, the time had better be deduced from solar observations made expressly for the purpose; and which, with a good chronometer, may even be made two or three days before or after the observations for the longitude, if cloudy weather should prevent others being made at a shorter interval; only it must be remembered, that the deduced longitude will correspond with that of the place where the error of the chronometer is determined, and not for the place of observation.

The instruments used for these lunar observations are sextants and reflecting circles. Under CIRCLE we have already described the reflecting circle of Mr. Troughton's construction, which we conceive to be vastly superior to any sextant for obtaining with accuracy the angle subtended by the moon and star. As each observation has three readings, two observations (one on each side) of zero, give six results. This instrument, in the hands of a careful observer, will not give a greater error than $20''$, or about ten geographical miles at the equator. The error of the lunar tables may amount to about as much more, and an error in the altitudes and other data, about the same quantity. Should all these conspire to produce a total error in the same direction, this total error would amount to $60''$, or 30 miles. We trust, there-

fore, that the advantage and importance of this method will every day be more and more appreciated; and that the time will come when no naval officer or mariner of tolerable education will be found ignorant of it. With Mendoza's tables, a circle of the above description, and a good chronometer, the longitude may always be determined within thirty miles, and generally within less.

Some persons still prefer sextants, from an opinion that they derive some advantage from length of radius; but they are subject to errors which have no tendency to correct each other, and should only be used for the altitudes, and the circle to be taken in preference for the observations of the distance. When circumstances do not admit of three observers, the altitudes of the sun and moon may be computed, and we are disposed to think that this would always be the more preferable method, where the observer is sufficiently skilful to make the additional computation without fear of mistakes. The altitudes found in this case by computing the horary angles are the true altitudes, and must be corrected by applying the refraction and parallax *inversely*, but for doing this accurately, tables should be computed for reducing *true distances* to *apparent*. However, a little attention to this circumstance will render the whole operation sufficiently easy, and if the computations are well made, the accuracy of this method will probably exceed that of direct observation. For the method of making these computations, see Mendoza's Tables, Requisite Tables, &c. Mackay's Longitude, &c. &c.

LONGITUDE.

A TABLE containing the Latitudes of Places, with their Longitudes from the Meridian of the Royal Observatory at Greenwich; also the Time of High Water at the Full and Change of the Moon, at those Places where it is known.

Names of Places.	Continents.	Coast, Sea, or Country.	Latitude.	Longitude		H. W.
				In Degrees.	In Time.	
					H. M. S.	H. M.
Aalborg - - -	Europe -	Denmark -	57 2 57 N.	9 56 30 E.	0 39 46 E.	
Aarhuus - - -	Europe -	Denmark -	56 9 35 N.	10 14 0 E.	0 40 56 E.	
Abbeville - - -	Europe -	France -	50 7 4 N.	1 49 45 E.	0 7 10 E.	0 45
Aberdeen - - -	Europe -	Scotland -	57 5 0 N.	2 21 30 W.	0 9 26 W.	
Abo - - -	Europe -	Finland -	60 27 7 N.	22 15 00 E.	1 29 00 E.	10 30
Acheen Head - -	Asia -	Sumatra -	5 22 0 N.	95 26 0 E.	6 21 44 E.	
Adventure (Bay) -	Asia -	New Holland -	43 21 20 S.	147 31 40 E.	9 50 7 E.	
Adventure (Isle) -	America -	Pacific Ocean -	17 5 15 S.	144 17 45 W.	9 37 11 W.	
Aerschot - - -	Europe -	Netherlands -	50 59 15 N.	4 49 31 E.	0 19 18 E.	
Agde - - -	Europe -	France -	43 18 43 N.	3 27 55 E.	0 13 52 E.	
Agen - - -	Europe -	France -	44 12 22 N.	0 36 20 E.	0 2 25 E.	
Agimere - - -	Asia -	Agimere -	26 35 0 N.	75 20 0 E.	5 1 20 E.	
St. Agnes (Lights) -	Europe -	Scillies -	49 53 47 N.	6 20 30 W.	0 25 22 W.	
Agra - - -	Asia -	India -	27 12 30 N.	78 17 0 E.	5 13 08 E.	
Agria - - -	Europe -	Hungary -	47 53 54 N.	20 22 0 E.	1 21 28 E.	
Aguada (Point) -	Asia -	India -	15 28 55 N.	73 48 39 E.	4 55 15 E.	
Aire - - -	Europe -	France -	43 41 52 N.	0 15 45 W.	0 1 3 W.	
Aix - - -	Europe -	France -	43 31 48 N.	5 26 30 E.	0 21 46 E.	
Aix (Isle) - - -	Europe -	France -	46 1 38 N.	1 11 0 W.	0 4 44 W.	
Akerman - - -	Europe -	Turkey -	46 11 58 N.	30 43 45 E.	2 2 55 E.	
Alais - - -	Europe -	France -	44 7 22 N.	0 35 50 E.	0 2 23 E.	
Albano - - -	Europe -	Italy -	41 43 50 N.	12 38 0 E.	0 50 32 E.	
Albany - - -	America -	New Wales -	52 14 41 N.	81 52 50 W.	5 27 31 W.	
Alby - - -	Europe -	France -	43 55 36 N.	2 8 18 E.	0 8 33 E.	
Aleppo - - -	Asia -	Turkey -	36 11 25 N.	37 10 0 E.	2 28 40 E.	
Alexandretta - -	Asia -	Syria -	36 34 47 N.	36 14 45 E.	2 24 59 E.	
Alexandria - - -	Africa -	Egypt -	31 11 20 N.	30 10 15 E.	2 0 41 E.	
Alez - - -	Europe -	France -	42 59 50 N.	2 15 0 E.	0 9 0 E.	
Algiers - - -	Africa -	Algiers -	36 49 30 N.	2 12 45 E.	0 8 51 E.	
Alkmaer - - -	Europe -	Holland -	52 38 34 N.	4 38 0 E.	0 18 32 E.	
Aloft - - -	Europe -	Netherlands -	50 56 18 N.	4 1 58 E.	0 16 8 E.	
Altengaard - - -	Europe -	Lapland -	69 55 0 N.	23 4 0 E.	1 32 16 E.	
Ambrym (Isle) - -	Asia -	Pacific Ocean -	16 9 30 S.	168 12 30 E.	11 12 50 E.	
Amebury - - -	Europe -	England -	51 10 19 N.	1 46 37 W.	0 7 6 W.	
Amiens - - -	Europe -	France -	49 53 38 N.	2 17 56 E.	0 9 12 E.	
Amsterdam - - -	Europe -	Holland -	52 21 56 N.	4 51 30 E.	0 19 26 E.	
Amsterdam (Har.) -	America -	Curazao -	12 8 0 N.	68 20 30 W.	4 33 22 W.	3 0
Amsterdam (Isle) -	Asia -	Indian Ocean -	37 51 0 S.	77 44 0 E.	5 10 56 E.	
Anadirkoi Nofs - -	Asia -	Beering's Straits -	64 14 30 N.	173 31 0 W.	11 34 4 W.	
Ancona - - -	Europe -	Italy -	43 37 54 N.	13 30 30 E.	0 54 2 E.	
Andaman (Little) -	Asia -	Bengal Bay -	10 40 0 N.	92 24 0 E.	6 9 36 E.	
Anderfon's Island -	America -	Beering's Straits -	63 4 0 N.	167 38 0 W.	11 10 32 W.	
Angenga - - -	Asia -	India -	8 39 25 N.	76 50 4 E.	5 7 20 E.	
Anger Point - - -	Asia -	Java -	6 3 17 S.	106 1 57 E.	7 4 8 E.	
Angers - - -	Europe -	France -	47 28 8 N.	0 33 52 W.	0 2 15 W.	
Angouleme - - -	Europe -	France -	45 39 3 N.	0 8 47 E.	0 0 35 E.	
Angra - - -	Europe -	Tercera -	38 39 7 N.	27 12 42 W.	1 48 51 W.	
C. Angra Pequena -	Africa -	Caffraria -	26 36 50 S.	15 16 30 E.	1 1 6 E.	
Anholt (Light) - -	Europe -	Categat -	56 44 20 N.	11 40 0 E.	0 46 40 E.	
St. Ann (Cape) - -	Africa -	Sierra Leone -	7 7 30 N.	12 22 0 W.	0 49 28 W.	

LONGITUDE.

A TABLE of the Latitudes and Longitudes of Places.

Names of Places.	Continents.	Coast, Sea, or Country.	Latitude.	Longitude		H. W.
				In Degrees.	In Time.	
Annamaboe - -	Africa -	Gold Coast -	5 9 52 N.	0 1 39 4 W.	H. M. S. 0 6 36 W.	6 0
Annamocka - -	Asia -	Pacific Ocean -	20 15 20 S.	174 45 0 W.	11 39 0 W.	
Annobona - -	Africa -	Atlantic Ocean -	1 25 0 S.	5 45 0 E.	0 23 0 E.	
St. Anthony's (Cape)	America -	Staten Land -	54 46 45 S.			
Antibes - -	Europe -	France -	43 34 43 N.	7 7 20 E.	0 28 29 E.	
Antigua (St. John's)	America -	Caribbean Sea -	17 4 30 N.	62 9 0 W.	4 8 36 W.	
Anton. Gill's Bay	Africa -	Madagascar -	15 27 23 S.	50 23 15 E.	3 21 33 E.	
Antwerp - -	Europe -	Flanders -	51 13 18 N.	4 24 15 E.	0 17 37 E.	
Aor (Pulo) - -	Asia -	Chinese Seas -	2 45 0 N.	104 40 20 E.	6 58 41 E.	6 0
Apæ (Isle) - -	Asia -	Pacific Ocean -	16 46 15 S.	168 27 30 E.	11 13 50 E.	
Appenrade - -	Europe -	Denmark -	55 2 57 N.	9 26 4 E.	0 37 44 E.	6 0
C. Appollonia - -	Africa -	Gold Coast -	4 59 12 N.	3 10 11 W.	0 12 41 W.	
F. Appollonia - -	Africa -	Gold Coast -	4 59 14 N.	3 4 37 W.	0 12 18 W.	
Apt - -	Europe -	France -	43 52 29 N.	5 23 37 E.	0 21 34 E.	
Araçta - -	Asia -	Turkey -	36 1 0 N.	38 50 0 E.	2 35 20 E.	
Arakootai Isle	America -	Pacific Ocean -	20 1 30 S.	158 14 30 W.	10 32 58 W.	
Archangel - -	Europe -	Russia -	64 34 0 N.	38 54 30 E.	2 35 38 E.	
Arcot - -	Asia -	Arcot -	12 51 24 N.	79 28 4 E.	5 17 52 E.	6 00
Arensburg - -	Europe -	Baltic -	58 15 9 N.	22 13 15 E.	1 28 53 E.	
Arica - -	America -	Peru -	18 26 40 S.	71 13 0 W.	4 44 52 W.	
Arles - -	Europe -	France -	43 40 28 N.	4 37 24 E.	0 18 30 E.	
Arras - -	Europe -	France -	50 17 37 N.	2 45 41 E.	0 11 3 E.	
Aruba (W. End)	America -	Leeward Isles -	12 35 30 N.	69 29 45 W.	4 37 59 W.	
Ascension (Isle)	Africa -	S. Atlantic Ocean	7 56 30 S.	14 21 15 W.	0 57 25 W.	
Affissi - -	Europe -	Italy -	43 4 22 N.	12 35 13 E.	0 50 21 E.	6 00
Afracan - -	Asia -	Siberia -	46 21 12 N.	48 2 45 E.	3 12 11 E.	
Ath - -	Europe -	Netherlands -	50 42 17 N.	3 46 17 E.	0 15 5 E.	
Athens - -	Europe -	Turkey -	38 5 0 N.	23 52 30 E.	1 35 30 E.	
Atooi - -	America -	Sandwich Isles -	21 57 0 N.	159 39 30 W.	10 38 38 W.	
Auch - -	Europe -	France -	43 38 39 N.	0 34 36 E.	0 2 18 E.	
Aveiro - -	Europe -	Portugal -	40 38 17 N.	8 29 15 W.	0 33 57 W.	6 00
St. Augustin (Bay)	Africa -	Madagascar -	23 27 52 S.	44 9 0 E.	2 56 36 E.	
Avignon - -	Europe -	France -	43 56 58 N.	4 48 10 E.	0 19 13 E.	
Avranches - -	Europe -	France -	48 41 21 N.	1 21 51 W.	0 5 27 W.	
Aurillac - -	Europe -	France -	44 55 10 N.	2 27 0 W.	0 9 48 W.	
Aurora (Isle)	Asia -	Pacific Ocean -	15 8 0 S.	168 17 0 E.	11 13 8 E.	
Autun - -	Europe -	France -	46 56 48 N.	4 17 44 E.	0 17 11 E.	
Auxerre - -	Europe -	France -	47 47 57 N.	3 34 06 E.	0 14 16 E.	4 36
Awaticha - -	Asia -	Kamitchatka -	53 0 39 N.	158 44 30 E.	10 34 58 E.	
Babee (Pulo)	Asia -	Straits of Sunda	5 45 0 N.	106 20 30 E.	7 5 22 E.	
Babylon (Ancient)	Asia -	Mesopotamia -	33 0 0 N.	42 46 30 E.	2 51 6 E.	
Bagdad - -	Asia -	Mesopotamia -	33 19 40 N.	44 22 15 E.	2 57 29 E.	
Ballabea (Isle)	Asia -	New Caledonia -	20 7 0 S.	164 22 0 E.	10 57 28 E.	
Ballafore - -	Asia -	India -	21 20 0 N.	87 1 26 E.	5 48 6 E.	
Banana (Big)	Africa -	Sierra Leone -	8 5 30 N.	13 5 0 W.	0 52 20 W.	4 36
Bancoot - -	Asia -	India -	17 56 40 N.	73 7 54 E.	4 52 32 E.	
Bangalore - -	Asia -	Myfore -	13 0 0 N.	77 37 10 E.	5 10 29 E.	
Banguay (Peak)	Asia -	Malacca -	7 18 0 N.	117 17 30 E.	7 49 10 E.	
Bank's Isle - -	Asia -	New Zealand -	43 43 0 S.	173 3 55 E.	11 32 16 E.	

LONGITUDE.

A TABLE of the Latitudes and Longitudes of Places.

Names of Places.	Continents.	Coast, Sea, or Country.	Latitude.	Longitude		H. W.
				In Degrees.	In Time.	
					H. M. S.	H. M.
Banstead -	Europe -	England -	51 19 25 N.	0 11 20 W.	0 0 45 W.	
Bantam Point -	Asia -	Java -	5 50 20 S.	106 9 3 E.	7 4 36 E.	
Barbas (Cape) -	Africa -	Sahaga -	22 15 30 N.	16 40 0 W.	1 6 40 W.	
Barbuda (Isle) -	America -	Atlantic Ocean -	17 49 45 N.	61 50 0 W.	4 7 20 W.	
Barcelona -	Europe -	Spain -	41 26 0 N.	2 13 0 E.	0 8 52 E.	
Barfleur (Cape) -	Europe -	France -	49 40 21 N.	1 15 36 W.	0 5 2 W.	7 30
Barlingues -	Europe -	Portugal -	39 26 0 N.	9 35 20 W.	0 38 21 W.	
Barnevelt's (Isle) -	America -	Terra del Fuego -	55 49 0 S.	66 58 0 W.	4 27 52 W.	
Barren Isle -	Asia -	Bay of Bengal -	12 14 0 N.	93 42 0 E.	6 14 48 E.	
St. Bartholomew (Isle) -	Asia -	New Hebrides -	15 42 0 S.	167 17 30 E.	11 9 10 E.	
Basle -	Europe -	Switzerland -	47 33 34 N.	7 35 12 E.	0 30 21 E.	
Bassa Terre -	America -	Guadaloupe -	15 59 45 N.	62 0 45 W.	4 8 3 W.	
Bassein (Fort) -	Asia -	India -	19 19 0 N.	72 55 24 E.	4 51 42 E.	
Basses (Great) -	Asia -	Ceylon -	6 7 30 N.	81 42 50 E.	5 26 51 E.	
Batavia -	Asia -	Java -	6 11 0 S.	106 50 0 E.	7 7 20 E.	
Bath -	Europe -	England -	51 22 30 N.	2 21 30 W.	0 9 26 W.	
Battersea -	Europe -	England -	51 28 36 N.	0 10 24 W.	0 0 42 W.	
Bauld (Cape) -	America -	Newfoundland -	51 39 45 N.	55 27 5 W.	3 41 51 W.	
Bayeux -	Europe -	France -	49 16 34 N.	0 42 11 W.	0 2 49 W.	
Bayonne -	Europe -	France -	43 29 15 N.	1 28 41 W.	0 5 55 W.	3 30
Bazas -	Europe -	France -	44 26 0 N.	0 13 17 W.	0 9 53 W.	
Beachy Head -	Europe -	England -	50 44 24 N.	0 15 12 E.	0 1 1 E.	10 30
Bear (Isle) -	America -	Hudson's Bay -	54 34 0 N.	79 56 0 W.	5 19 44 W.	12 0
Beauvais -	Europe -	France -	49 26 0 N.	2 4 41 E.	0 8 19 E.	
Beering's Island -	Asia -	Beering's Straits -	55 36 0 N.	167 46 0 E.	11 11 4 E.	
Belle Isle -	Europe -	France -	47 17 17 N.	3 5 0 W.	0 12 20 W.	1 30
Belley -	Europe -	France -	45 45 29 N.	5 41 4 E.	0 22 44 E.	
Bembridge Point -	Europe -	Isle of Wight -	50 40 59 N.	1 3 26 W.	0 4 14 W.	
Bencoolen -	Asia -	Sumatra -	3 49 9 S.	102 2 25 E.	6 48 10 E.	
Bender -	Europe -	Turkey -	46 50 29 N.	29 36 0 E.	1 58 24 E.	
Berg River -	Africa -	St. Helen's Bay -	32 50 47 S.	18 12 0 E.	1 12 48 E.	
Bergen -	Europe -	Norway -	60 23 40 N.	5 11 30 E.	0 20 46 E.	1 30
Bergen-op-zoom -	Europe -	Holland -	51 29 46 N.	4 16 57 E.	0 17 8 E.	
Berlin -	Europe -	Germany -	52 31 30 N.	13 23 0 E.	0 53 32 E.	
Bermudas (Isle) -	America -	Atlantic Ocean -	32 35 0 N.	63 28 0 W.	4 13 52 W.	7 0
Bernal -	Asia -	Siberia -	53 19 59 N.	82 12 15 E.	5 28 49 E.	
St. Bertrand -	Europe -	France -	43 1 27 N.	0 34 4 E.	0 2 16 E.	
Besançon -	Europe -	France -	47 14 12 N.	6 2 46 E.	0 24 11 E.	
Beffsted -	Europe -	Iceland -	64 6 9 N.	21 53 45 W.	1 27 35 W.	
Bexhill -	Europe -	England -	50 50 47 N.	0 28 43 E.	0 1 55 E.	
Beziers -	Europe -	France -	43 20 23 N.	3 12 24 E.	0 12 50 E.	
Bird Island -	America -	Pacific Ocean -	17 49 0 S.	142 43 24 W.	9 30 54 W.	
Bitche -	Europe -	Lorraine -	49 2 21 N.	7 26 20 E.	0 29 45 E.	
Blanco (Cape) -	Africa -	Negroland -	20 55 30 N.	17 10 0 W.	1 8 40 W.	9 45
Blanco (Cape) -	America -	Patagonia -	47 20 0 S.	64 42 0 W.	4 18 48 W.	
Blanco (Cape) -	America -	Pacific Ocean -	43 12 0 N.	124 7 30 W.	8 16 30 W.	
Bligh's Cape -	Asia -	Kerguelen's Land -	48 29 30 S.	68 38 45 E.	4 34 35 E.	
Blois -	Europe -	France -	47 35 20 N.	1 20 1 E.	0 5 20 E.	
Boddam's Isle -	Asia -	Indian Ocean -	5 22 0 S.	72 15 0 E.	4 49 0 E.	
Bojador (Cape) -	Africa -	Negroland -	26 12 30 N.	14 27 0 W.	0 57 48 W.	0 6

LONGITUDE.

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Names of Places.	Continents.	Coast, Sea, or Country.	Latitude.	Longitude		H. W.
				In Degrees.	In Time.	
					H. M. S.	H. M.
Bolabola (Isle) -	America -	Pacific Ocean -	16 32 30 S.	151 52 0 W.	10 7 28 W.	
Bolcheretfk -	Asia -	Kamchatka -	52 54 30 N.	156 56 40 E.	10 27 47 E.	
Bologna -	Europe -	Italy -	44 29 36 N.	11 20 25 E.	0 45 22 E.	
Bolt Head -	Europe -	England -	50 17 0 N.	3 53 30 W.	0 15 34 W.	
Bombay -	Asia -	India -	18 55 42 N.	72 54 24 E.	4 51 38 E.	
Bombay (Light-house) -	Asia -	India -	18 53 0 N.	72 52 54 E.	4 51 32 E.	
Bonavilla (Isle) -	Africa -	Cape Verd -	16 3 40 N.	22 45 32 W.	1 31 2 W.	
Bonaheleon -	Europe -	Netherlands -	50 48 17 N.	5 20 18 E.	0 21 21 E.	
Boscawen's Isle -	Asia -	Pacific Ocean -	15 50 0 S.	174 7 40 W.	11 36 31 W.	
Boston -	America -	New England -	42 25 0 N.	70 37 15 W.	4 42 29 W.	11 25
Botany (Island) -	Asia -	New Caledonia -	22 26 40 S.	167 16 45 E.	11 9 7 E.	
Botany Bay -	Asia -	New Holland -	34 6 0 S.	151 15 0 E.	10 5 0 E.	8 0
Boulogne -	Europe -	France -	50 43 33 N.	1 36 33 E.	0 6 26 E.	11 0
Bourbon (Isle) -	Africa -	Indian Ocean -	20 50 54 S.	55 30 0 E.	3 42 0 E.	
Bourdeaux -	Europe -	France -	44 50 14 N.	0 34 15 W.	0 2 17 W.	3 0
Bourgas -	Asia -	Turkey -	40 14 30 N.	26 26 52 E.	1 45 47 E.	
Bourges -	Europe -	France -	47 4 59 N.	2 23 45 E.	0 9 35 E.	
Bow Island -	America -	Pacific Ocean -	18 17 0 S.	140 43 0 W.	9 22 52 W.	
Brandenburg -	Europe -	Germany -	52 27 0 N.	12 53 0 E.	0 51 32 E.	
Braffe (Pulo) -	Asia -	Straitsof Malacca -	- - -	95 11 0 E.	6 20 44 E.	
Brava (Isle) -	Africa -	Cape Verd -	14 50 58 N.	24 43 4 W.	1 38 52 W.	
Breaker's Point -	America -	Pacific Ocean -	49 15 30 N.	126 41 30 W.	8 26 46 W.	
Breda -	Europe -	Holland -	51 35 29 N.	4 46 9 E.	0 19 5 E.	
Bremen -	Europe -	Germany -	53 5 11 N.	8 49 34 E.	0 35 18 E.	6 00
Breslaw -	Europe -	Silesia -	51 6 30 N.	17 35 30 E.	1 10 22 E.	
Brest -	Europe -	France -	48 22 42 N.	4 30 0 W.	0 18 0 W.	3 15
Bridge Town -	America -	Barbadoes -	13 5 0 N.	59 41 15 W.	3 58 45 W.	
St. Brieux -	Europe -	France -	48 31 2 N.	2 44 10 W.	0 10 57 W.	
Brightelmstone -	Europe -	England -	50 49 32 N.	0 11 55 W.	0 0 48 W.	10 00
Britol -	Europe -	England -	51 28 0 N.	2 34 45 W.	0 10 19 W.	7 00
Bristol (Cape) -	America -	Sandwich Land -	59 2 30 S.	26 51 0 W.	1 47 24 W.	
Bristol River -	America -	Beering's Straits -	58 27 0 N.	158 7 30 W.	10 32 30 W.	
Broach Point -	Asia -	India -	21 38 30 N.	72 43 24 E.	4 50 54 E.	
Brothers (The) -	Asia -	Sea of Borneo -	5 10 20 S.	106 14 4 E.	7 4 56 E.	
Bruges -	Europe -	Netherlands -	51 12 20 N.	3 13 13 E.	0 12 53 E.	
Brunn -	Europe -	Moravia -	49 11 28 N.	16 35 6 E.	1 6 20 E.	
Brussels -	Europe -	Brabant -	50 51 0 N.	4 21 15 E.	0 17 25 E.	
Buda -	Europe -	Hungary -	47 29 44 N.	19 0 0 E.	1 16 0 E.	
Buenos Ayres -	America -	Brazil -	34 35 26 S.	58 23 38 W.	3 53 35 W.	
Bukarest -	Europe -	Wallachia -	44 26 45 N.	26 8 0 E.	1 44 32 E.	
Buller (Cape) -	America -	South Georgia -	53 58 30 S.	37 40 0 W.	2 30 40 W.	
Burgeo (Isles) -	America -	Newfoundland -	47 36 20 N.	57 36 0 W.	3 50 24 W.	
Burhanpour -	Asia -	India -	21 19 0 N.	76 22 0 E.	5 5 28 E.	
Byron's Isle -	Asia -	Pacific Ocean -	1 13 0 S.	177 8 0 E.	11 48 32 E.	
Cabello (Port) -	America -	Terra Firma -	10 30 50 N.	67 32 0 W.	4 30 8 W.	
Cape Cabron -	America -	Hitpaniola -	19 21 52 N.	69 18 40 W.	4 37 15 W.	
Cadiz -	Europe -	Spain -	36 31 7 N.	6 17 15 W.	0 25 9 W.	2 30
Caen -	Europe -	France -	49 11 12 N.	0 21 53 W.	0 1 28 W.	9 0
Cahors -	Europe -	France -	44 26 49 N.	1 26 22 E.	0 5 45 E.	

LONGITUDE.

A TABLE of the Latitudes and Longitudes of Places.

Names of Places.	Continents.	Coast. Sea, or Country.	Latitude.	Longitude		H. W.
				In Degrees.	In Time.	
				° ' " E.	H. M. S.	H. M.
Cajaneburg - -	Europe -	Finland -	64 13 30 N.	27 45 0 E.	1 51 0 E.	
Cairo - - -	Africa -	Egypt -	30 3 30 N.	31 25 30 E.	2 5 42 E.	
Calais - - -	Europe -	France -	50 57 32 N.	1 51 0 E.	0 7 24 E.	11 30
Calcutta (F. Will.)	Asia -	Bengal -	22 34 45 N.	88 27 56 E.	5 53 52 E.	3 5
Callao - - -	America -	Peru -	12 1 53 S.	76 58 0 W.	5 7 52 W.	
Calmar - - -	Europe -	Sweden -	56 40 30 N.	16 25 15 E.	1 5 41 E.	
Calpy - - -	Asia -	India -	26 7 15 N.	80 0 0 E.	5 20 0 E.	
Calymere Point	Asia -	India -	10 20 0 N.	79 46 0 E.	5 19 4 E.	
Cambray - - -	Europe -	France -	50 10 37 N.	3 13 32 E.	0 12 54 E.	
Cambridge - - -	Europe -	England -	52 12 36 N.	0 4 15 E.	0 0 17 E.	
Cambridge - - -	America -	New England -	42 25 0 N.	71 6 0 W.	4 44 24 W.	
Camischin - - -	Europe -	Russia -	50 5 6 N.	45 24 0 E.	3 1 36 E.	
Campbell (Cape) -	Asia -	New Zealand -	41 40 48 S.	174 33 0 E.	11 38 12 E.	
Cananore (Point) -	Asia -	India -	11 51 0 N.	75 25 00 E.	5 1 40 E.	
Canary (Isle) N.E. Pt.	Africa -	Atlantic Ocean -	28 13 0 N.	15 38 45 W.	1 2 35 W.	3 0
Candia (Isle) -	Europe -	Mediterranean Sea	35 18 35 N.	25 18 0 E.	1 41 12 E.	
Candlemas Isles -	America -	Sandwich Land -	57 10 0 S.	27 13 0 W.	1 48 52 W.	
Canfo (Port) - -	America -	Nova Scotia -	45 20 7 N.	60 55 0 W.	4 3 40 W.	
Canterbury - - -	Europe -	England -	51 18 26 N.	1 4 53 E.	0 4 20 E.	
Canton - - -	Asia -	China -	23 6 57 N.	113 16 7 E.	7 33 4 E.	
Capricorn (Cape) -	Asia -	New Holland -	23 26 40 S.	151 5 40 E.	10 4 23 E.	
Carcaffone - - -	Europe -	France -	43 12 45 N.	2 20 49 E.	0 9 23 E.	
Carlescroon - - -	Europe -	Sweden -	56 20 0 N.	15 30 0 E.	1 2 0 E.	
Carisbrook Castle -	Europe -	Isle of Wight -	50 41 18 N.	1 18 26 W.	0 5 14 W.	
Carpentras - - -	Europe -	France -	44 3 8 N.	5 2 35 E.	0 20 10 E.	
Carrickfergus - -	Europe -	Ireland -	54 43 0 N.	5 45 30 W.	0 23 2 W.	
Carthage - - -	Europe -	Spain -	37 36 7 N.	1 1 30 W.	0 4 6 W.	
Carthage - - -	America -	Terra Firma -	10 26 19 N.	75 20 35 W.	5 1 22 W.	
Carwar Head - - -	Asia -	India -	14 47 0 N.	74 12 30 E.	4 56 50 E.	
Cafan - - -	Asia -	Siberia -	55 43 58 N.	49 29 30 E.	3 17 58 E.	
Casbine - - -	Asia -	Perfia -	36 11 0 N.	49 33 0 E.	3 18 12 E.	
Cassel (Hesse) - -	Europe -	Germany -	51 19 20 N.	9 31 45 E.	0 38 7 E.	
Castres - - -	Europe -	France -	43 36 11 N.	2 14 16 E.	0 8 57 E.	
St. Catherine's Isle -	America -	Brasil -	27 32 30 S.	49 15 37 W.	3 17 2 W.	
St. Catharine's Lights	Europe -	Isle of Wight -	50 35 33 N.	1 17 51 W.	0 5 11 W.	
Cavaillon - - -	Europe -	France -	43 50 6 N.	5 1 55 E.	0 20 8 E.	
Cavan - - -	Europe -	Ireland -	54 51 41 N.	7 25 20 W.	0 29 41 W.	
Cayenne - - -	America -	Isle Cayenne -	4 56 15 N.	52 15 0 W.	3 29 0 W.	
Cervia - - -	Europe -	Italy -	44 15 31 N.	12 19 28 E.	0 49 18 E.	
Cette (Lights) - -	Europe -	France -	43 23 42 N.	3 47 46 E.	0 14 47 E.	
Chain Island - - -	America -	Pacific Ocean -	17 25 30 S.	145 30 0 W.	9 42 0 W.	
Chalon fur Saone -	Europe -	France -	46 46 54 N.	4 51 2 E.	0 19 24 E.	
Chalons fur Marne -	Europe -	France -	48 57 28 N.	4 20 15 E.	0 17 21 E.	
Chanderanagor - -	Asia -	Bengal -	22 51 26 N.	88 29 15 E.	5 53 57 E.	
Charkow - - -	Europe -	Russia -	49 59 20 N.	36 15 0 E.	2 25 0 E.	
Charles (Cape) - -	America -	Hudson's Straits	62 46 30 N.	74 15 0 W.	4 57 0 W.	10 0
Q. Charlotte's Cape -	America -	South Georgia -	54 32 0 S.	36 11 30 W.	2 24 46 W.	
Q. Charl. Foreland -	Asia -	New Caledonia -	22 15 0 S.	167 12 45 E.	11 8 51 E.	
Q. Charlotte's Isle -	America -	Pacific Ocean -	19 18 0 S.	138 20 0 W.	9 13 20 W.	
Q. Charlotte's Sound	Asia -	New Zealand -	41 5 57 S.	174 20 50 E.	11 37 23 E.	9 0

LONGITUDE.

A TABLE of the Latitudes and Longitudes of Places.

Names of Places.	Continents.	Coast, Sea, or Country.	Latitude.	Longitude		H. W.
				In Degrees.	In Time.	
					H. M. S.	H. M.
Charlotte Town -	America -	St. John's Island	46 14 0 N.	62 50 0 W.	4 11 20 W.	
Charlton Island -	America -	Hudson's Bay -	52 3 0 N.	79 5 0 W.	5 16 20 W.	
Chartres -	Europe -	France -	48 26 54 N.	1 29 5 E.	0 5 56 E.	
Cherbourg -	Europe -	France -	49 38 31 N.	1 37 18 W.	0 6 29 W.	7 30
Cherfon -	Europe -	Crimea -	46 38 29 N.	32 56 15 E.	2 11 45 E.	
Chichester -	Europe -	England -	50 50 11 N.	0 46 36 W.	0 3 6 W.	
Chilbambum Pagoda	Asia -	India -	11 24 42 N.	79 48 6 E.	5 19 12 E.	
Chislehurst -	Europe -	England -	51 24 33 N.	0 4 39 E.	0 0 19 E.	
Choule (Fort) -	Asia -	India -	18 32 0 N.	72 59 54 E.	4 52 0 E.	
Christchurch -	Europe -	England -	50 43 47 N.	1 46 3 W.	0 7 4 W.	
Christiana -	Europe -	Norway -	59 55 20 N.	10 48 45 E.	0 43 15 E.	
Christiansfjeld -	Europe -	Denmark -	55 21 27 N.	9 29 46 E.	0 37 59 E.	
Christmas Harbour	Africa -	Kerguelen's Land	48 41 15 S.	69 2 0 E.	4 36 8 E.	10 0
Christmas Isle -	America -	Pacific Ocean -	1 57 45 N.	157 35 0 W.	10 30 20 W.	
Christmas Sound -	America -	Terra del Fuego	55 21 57 S.	70 2 50 W.	4 40 11 W.	2 30
St. Christopher's Isle	America -	Caribbean Sea -	17 15 0 N.	62 42 20 W.	4 10 49 W.	
Churchill River -	America -	Hudson's Bay -	58 47 32 N.	94 13 48 W.	6 16 55 W.	7 20
Civita Vecchia -	Europe -	Italy -	42 5 24 N.	11 46 15 E.	0 47 5 E.	
Clapham Observatory	Europe -	England -	51 27 13 N.	0 8 39 W.	0 0 55 W.	
St. Claude -	Europe -	France -	46 23 18 N.	5 51 50 E.	0 23 27 E.	
Clear (Cape) -	Europe -	Ireland -	51 19 0 N.	9 23 15 W.	0 37 33 W.	4 30
Clerke's Isle -	Asia -	Beering's Straits	63 15 0 N.	169 40 0 W.	11 18 40 W.	
Clerke's Rocks -	America -	Atlantic Ocean	55 5 30 S.	34 42 0 W.	2 18 48 W.	
Clermont -	Europe -	France -	45 46 44 N.	3 5 2 E.	0 12 20 E.	
Cochin -	Asia -	Malabar -	9 58 0 N.	76 15 34 E.	5 5 2 E.	
Cocos Isles {	Great	Bay of Bengal -	14 5 0 N.	93 14 0 E.	6 12 56 E.	
	Little	Bay of Bengal -	13 58 0 N.	93 7 0 E.	6 12 28 E.	
Coimbra -	Europe -	Portugal -	40 14 0 N.	8 24 0 W.	0 33 36 W.	
Colenet (Cape) -	Asia -	New Caledonia	20 30 0 S.	164 56 0 E.	10 59 44 E.	
Collioure -	Europe -	France -	42 31 31 N.	3 3 2 E.	0 12 20 E.	
Colmar -	Europe -	France -	48 4 44 N.	7 22 11 E.	0 29 20 E.	
Cologne -	Europe -	Germany -	50 55 21 N.	6 55 0 E.	0 27 40 E.	
Colville (Cape) -	Asia -	New Zealand -	36 24 45 S.	175 48 50 E.	11 43 15 E.	
Comerin (Cape) -	Asia -	India -	8 4 0 N.	77 33 50 E.	5 10 15 E.	
Comnacio -	Europe -	Italy -	44 40 27 N.	12 9 47 E.	0 48 39 E.	
Compiègne -	Europe -	France -	49 24 59 N.	2 40 41 E.	0 11 19 E.	
Conception -	America -	Chili -	36 42 54 S.	73 6 18 W.	4 52 25 W.	
Condom -	Europe -	France -	43 57 49 N.	0 22 7 E.	0 1 28 E.	
Condore (Pulo) -	Asia -	Chinese Sea -	8 40 48 N.	106 42 54 E.	7 6 52 E.	4 16
Condre Isle (N. W. fi.)	America -	Canada -	47 15 33 N.	70 18 57 W.	4 41 16 W.	
Constantinople -	Europe -	Turkey -	41 1 10 N.	28 55 5 E.	1 55 40 E.	
Cook's Town -	Europe -	Ireland -	54 38 20 N.	6 40 0 W.	0 26 40 W.	
Cooper's Isle -	America -	Atlantic Ocean	54 57 0 S.	36 4 20 W.	2 24 17 W.	
Copenhagen -	Europe -	Denmark -	55 41 4 N.	12 35 10 E.	0 50 21 E.	
Coquimbo -	America -	Chili -	29 54 33 S.	71 15 45 W.	4 45 3 W.	
Cordouan (Lights)	Europe -	France -	45 35 14 N.	1 10 10 W.	0 4 41 W.	
Cork -	Europe -	Ireland -	51 53 54 N.	8 28 15 W.	0 33 53 W.	6 30
Corneto -	Europe -	Italy -	42 15 23 N.	11 43 0 E.	0 46 52 E.	
Cornwallis (Port)	Asia -	Andaman -	13 20 30 N.	92 51 0 E.	6 11 24 E.	10 0
Cornwallis (Fort)	Asia -	Port Pinnang -	5 27 0 N.	100 26 30 E.	6 41 46 E.	

LONGITUDE.

A TABLE of the Latitudes and Longitudes of Places.

Names of Places.	Continents.	Coast, Sea, or Country.	Latitude.	Longitude		H. W.
				In Degrees.	In Time.	
Coronation (Cape) -	Asia -	New Caledonia -	22 5 0 S.	167 8 0 W.	11 8 32 E.	10 30
Corvo -	Europe -	Azores -	39 43 38 N.	31 4 56 W.	2 4 20 W.	
Coulaba Island -	Asia -	Indian Ocean -	18 37 20 N.	72 56 30 E.	4 51 46 E.	
Coutances -	Europe -	France -	49 2 54 N.	1 26 35 W.	0 5 46 W.	
Courtray -	Europe -	Netherlands -	50 49 43 N.	3 15 51 E.	0 13 3 E.	
Cowes (West) -	Europe -	Isle of Wight -	50 46 18 N.	1 17 17 W.	0 5 9 W.	
Cracatoa (Isle) -	Asia -	Straits of Sunda -	6 6 0 S.	105 31 40 E.	7 2 7 E.	
Cracow -	Europe -	Poland -	50 10 0 N.	19 5 0 E.	1 19 20 E.	
Cremona -	Europe -	Italy -	45 7 49 N.	10 6 22 E.	0 40 35 E.	
Cremonaster -	Europe -	Germany -	48 3 36 N.	14 7 21 E.	0 56 29 E.	
Croific -	Europe -	France -	47 17 40 N.	2 31 42 W.	0 10 7 W.	5 10
Crooked Isle -	America -	Lucayes -	22 48 50 N.	74 26 5 W.	4 57 44 W.	
Croque Harbour -	America -	Newfoundland -	51 3 17 N.	55 50 0 W.	3 43 20 W.	
Crois Cape -	America -	Pacific Ocean -	57 58 30 N.	136 44 30 W.	9 6 58 W.	
Cuddalore -	Asia -	India -	11 41 0 N.	79 37 45 E.	5 18 31 E.	
Cumberland (Cape) -	Asia -	New Hebrides -	14 39 30 S.	166 47 0 E.	11 7 8 E.	
Cumberland Houfe -	America -	New Wales -	53 56 40 N.	102 9 0 W.	6 48 36 W.	
Cumberland Isle -	America -	Pacific Ocean -	19 18 0 S.	140 52 0 W.	9 23 28 W.	
Cummin (Isle) -	Asia -	Chinese Sea -	31 40 0 N.	121 4 0 E.	8 4 16 E.	
Curreufe Isle -	Asia -	Almirantes -	4 19 0 S.	55 47 0 E.	3 43 8 E.	
Dagger-Ort -	Europe -	Baltic -	58 56 1 N.	22 9 0 E.	1 28 36 E.	11 15
Damoan Fort -	Asia -	India -	20 22 0 N.	73 2 45 E.	4 52 11 E.	
Danger (Point) -	Asia -	New Holland -	28 8 22 S.	153 33 10 E.	10 14 13 E.	
Danger (Isles of) -	Asia -	Pacific Ocean -	10 56 0 S.	165 59 0 W.	11 3 56 W.	
Dantzic -	Europe -	Poland -	54 22 0 N.	18 40 0 E.	1 14 40 E.	
Darby (Cape) -	America -	Beering's Straits -	64 21 0 N.	163 0 0 W.	10 52 0 W.	
Dassen Island -	Africa -	Caffers -	33 25 0 S.	18 1 52 E.	1 12 7 E.	
Dax -	Europe -	France -	43 42 19 N.	1 3 16 W.	0 4 13 W.	
Deal Castle -	Europe -	England -	51 13 5 N.	1 23 59 E.	0 5 36 E.	
Delhi -	Asia -	India -	28 37 0 N.	77 40 0 E.	5 10 40 E.	11 15
Dengenefs or Dungenefs -	Europe -	England -	50 54 52 N.	0 57 40 E.	0 3 51 E.	
Dennis (St.) -	Africa -	Isle of Bourbon -	20 51 43 S.	55 30 0 E.	3 42 0 E.	
Dereham (East) -	Europe -	England -	52 40 20 N.	0 54 30 E.	0 3 38 E.	
Devi-cotta -	Asia -	India -	11 21 0 N.	79 47 0 E.	5 19 8 E.	
Diamond Island -	Asia -	Bay of Bengal -	15 50 0 N.	94 17 54 E.	6 17 12 E.	
Diarbekir -	Asia -	Diarbek -	37 54 0 N.	39 20 0 E.	2 37 20 E.	
Die -	Europe -	France -	44 45 31 N.	5 22 18 E.	0 21 29 E.	
Diego (Cape) -	America -	Terra del Fuego -	54 33 0 S.	65 14 0 W.	4 20 56 W.	
Diego Garcia -	Asia -	Indian Ocean -	7 20 0 S.	72 24 52 E.	4 49 39 E.	
Diego Ramirez -	America -	Southern Ocean -	56 32 30 S.	67 55 0 W.	4 31 40 W.	11 15
Dieppe -	Europe -	France -	49 55 34 N.	1 4 29 E.	0 4 18 E.	
Digby (Cape) -	Asia -	Kerguelen's Land -	49 23 30 S.	70 32 0 E.	4 42 8 E.	
Digges (Isle) -	America -	Hudson's Bay -	62 41 0 N.	78 50 0 W.	5 15 20 W.	
Digne -	Europe -	France -	44 5 18 N.	6 14 4 E.	0 24 56 E.	
Dijon -	Europe -	France -	47 19 25 N.	5 1 48 E.	0 20 7 E.	
Dilla (Mount) -	Asia -	Malabar Coast -	11 59 40 N.	75 14 30 E.	5 0 58 E.	
Dillingen -	Europe -	Germany -	48 34 10 N.	10 29 12 E.	0 41 57 E.	
Difappointment (Cape) -	America -	South Georgia -	54 58 0 S.	36 15 0 W.	2 25 0 W.	
Difappointment (Isle) -	America -	Pacific Ocean -	14 7 0 S.	141 22 0 W.	9 25 28 W.	

LONGITUDE.

A TABLE of the Latitudes and Longitudes of Places.

Names of Places.	Continents.	Coast, Sea, or Country.	Latitude.	Longitude		H. W.
				In Degrees.	In Time.	
			° ' "	° ' " W.	H. M. S.	H. M.
Diseada (Cape) -	America -	Terra del Fuego -	53 4 15 S.	74 18 0 W.	4 57 12 W.	
Diferada -	America -	Caribbee Isles -	16 35 0 N.	61 11 15 W.	4 4 45 W.	
Diu Head -	Asia -	Guzerat -	20 42 0 N.	71 3 30 E.	4 44 14 E.	
Dix Cove Fort -	Africa -	Gold Coast -	4 44 0 N.	2 37 44 W.	0 10 31 W.	
Dixmude -	Europe -	Netherlands -	51 2 5 N.	2 51 39 E.	0 11 27 E.	
Dol -	Europe -	France -	48 33 8 N.	1 45 28 W.	0 7 2 W.	
Domar (Pulo) -	Asia -	Chinefe Sea -	2 47 0 N.	105 21 0 E.	7 1 24 E.	
Dominique (Isle) -	America -	Windward Isles -	15 18 23 N.	61 35 30 W.	4 6 22 W.	
Donna Maria (Cape) -	America -	Hispaniola -	18 37 20 N.	74 35 52 W.	4 58 23 W.	
Dorchester -	Europe -	England -	50 42 58 N.	2 25 40 W.	0 9 43 W.	
Douay -	Europe -	Flanders -	50 22 12 N.	3 4 47 E.	0 12 19 E.	
Dover -	Europe -	England -	51 7 48 N.	1 19 2 E.	0 5 16 E.	11 15
Donglas (Cape) -	America -	Cook's River -	58 56 0 N.	153 50 0 W.	10 15 20 W.	
Drake's Island -	Europe -	Plymouth Sound -	50 21 30 N.	4 13 30 W.	0 16 54 W.	5 45
Dresden -	Europe -	Saxony -	51 2 54 N.	13 41 15 E.	0 54 45 E.	
Dreux -	Europe -	France -	48 44 17 N.	1 21 24 E.	0 5 26 E.	
Drontheim -	Europe -	Norway -	63 26 6 N.	10 22 0 E.	0 41 28 E.	2 15
Druja -	Europe -	Russia -	55 47 29 N.	27 13 30 E.	1 48 54 E.	
Dublin -	Europe -	Ireland -	53 22 0 N.	6 17 0 W.	0 25 8 W.	9 45
Dublin Observatory -	Europe -	Ireland -	53 23 7 N.	6 20 30 W.	0 25 22 W.	
Dundee -	Europe -	Scotland -	56 25 0 N.	3 2 30 W.	0 12 10 W.	
Dundra-Head -	Asia -	Ceylon -	5 51 0 N.	80 41 20 E.	5 22 45 E.	
Dunkirk -	Europe -	France -	51 2 9 N.	2 22 4 E.	0 9 28 E.	11 45
Dusky Bay -	Asia -	New Zealand -	45 47 27 S.	166 18 9 E.	11 5 13 E.	10 57
Dun-Nose -	Europe -	England -	50 37 7 N.	1 11 36 W.	0 4 46 W.	9 45
Eagle Island -	Asia -	Almirantes -	5 10 0 S.	55 37 0 E.	3 42 28 E.	3 30
Eaoowe (Isle) -	Asia -	Pacific Ocean -	21 24 0 S.	174 30 0 W.	11 38 0 W.	7 0
East Cape -	Asia -	Beering's Straits -	66 5 30 N.	169 44 0 W.	11 18 56 W.	
East Cape -	Asia -	New Zealand -	37 44 25 S.	178 58 0 E.	11 55 52 E.	
East Main (Fort) -	America -	Labrador -	52 15 0 N.	78 57 49 W.	5 15 51 W.	
Easter Island -	America -	Pacific Ocean -	27 6 30 S.	109 46 45 W.	7 19 7 W.	2 0
Ecaterinburg -	Asia -	Siberia -	56 50 15 N.	60 50 0 E.	4 3 20 E.	
Edam (Isle) -	Asia -	Batavia Bay -	5 57 30 S.	106 51 0 E.	7 7 24 E.	
Edgecumbe (Cape) -	America -	Pacific Ocean -	57 4 30 N.	135 55 30 W.	9 3 42 W.	
Edinburg -	Europe -	Scotland -	55 56 42 N.	3 12 15 W.	0 12 49 W.	4 30
Edward's (Pr.) Isles -	Africa -	Ind. Ocean { N. S.	46 39 30 S. 46 52 30 S.	38 2 30 E. 37 47 0 E.	2 32 10 E. 2 31 8 E.	
Edystone -	Europe -	English Channel -	50 8 0 N.	4 24 0 W.	0 17 36 W.	5 30
Egmont (Cape) -	Asia -	New Zealand -	39 23 20 S.	174 12 30 E.	11 36 50 E.	
Egmont (Isle) -	America -	Pacific Ocean -	19 20 0 S.	138 46 0 W.	9 15 4 W.	
Eimeo (Isle) -	America -	Pacific Ocean -	17 30 0 S.	149 54 0 W.	9 59 36 W.	
Elephant Point -	Asia -	Ceylon -	6 20 0 N.	81 39 15 E.	5 26 37 E.	
Elias's (St.) Mount -	America -	Pacific Ocean -	60 24 30 N.	141 0 0 W.	9 24 0 W.	
Elizabeth (Cape) -	America -	Pacific Ocean -	59 11 0 N.	152 12 0 W.	10 8 48 W.	
Elmina Castle -	Africa -	Gold Coast -	5 1 38 N.	2 0 12 W.	0 8 1 W.	
Eltham -	Europe -	England -	51 27 4 N.	0 3 10 E.	0 0 13 E.	
Embrun -	Europe -	France -	44 34 7 N.	6 25 54 E.	0 25 44 E.	
Enatum (Isle) -	Asia -	Pacific Ocean -	20 10 0 S.	170 4 0 E.	11 20 16 E.	
Enckhuyfen -	Europe -	Holland -	52 42 22 N.	5 10 0 E.	0 20 40 E.	

LONGITUDE.

A TABLE of the Latitudes and Longitudes of Places.

Names of Places.	Continents.	Coast, Sea, or Country.	Latitude.	Longitude		H. W.
				In Degrees.	In Time.	
English Road -	Asia -	Eaowee -	21 20 30 S.	174 49 0 W.	11 39 16 W.	H. M.
Endeavour River -	Asia -	New Holland -	15 27 11 S.	145 10 0 E.	9 40 40 E.	
Enos -	Europe -	Turkey -	40 41 58 N.	25 58 30 E.	1 43 54 E.	
Erramanga (Isle) -	Asia -	Pacific Ocean -	18 46 30 S.	169 18 30 E.	11 17 14 E.	
Erzerum -	Asia -	Turkey -	39 56 35 N.	48 35 45 E.	3 14 23 E.	
Esperito Santo -	America -	Cuba -	21 57 41 N.	79 49 30 W.	5 19 18 W.	
Eutlachia (Town) -	America -	Caribbean Sea -	17 29 0 N.	63 2 0 W.	4 12 8 W.	
Evout's Isles -	America -	Terra del Fuego -	55 34 30 S.	66 59 0 W.	4 27 56 W.	
Evreux -	Europe -	France -	49 1 30 N.	1 8 54 E.	0 4 36 E.	
Exeter -	Europe -	England -	50 44 0 N.	3 34 30 W.	0 14 18 W.	
Fairlight -	Europe -	England -	50 52 39 N.	0 38 35 E.	0 2 34 E.	5 30
Falmouth -	Europe -	England -	50 8 0 N.	5 3 0 W.	0 20 12 W.	
Falfe (Cape) -	Africa -	Caffres -	34 16 0 S.	18 44 0 E.	1 14 56 E.	
Falfe Bay -	Africa -	Caffres -	34 10 0 S.	18 33 0 E.	1 14 12 E.	
Fano -	Europe -	Italy -	43 51 0 N.	12 59 38 E.	0 51 59 E.	
Fareham -	Europe -	England -	50 51 20 N.	1 10 11 W.	0 4 41 W.	
Farewell (Cape) -	America -	Greenland -	59 38 0 N.	42 42 0 W.	2 50 48 W.	
Farewell (Cape) -	Asia -	New Zealand -	40 37 0 S.	172 49 38 E.	11 31 19 E.	
Farnham -	Europe -	England -	51 13 7 N.	0 47 52 W.	0 3 11 W.	
Fayal (Town) -	Europe -	Azores -	38 32 20 N.	28 41 5 W.	1 54 44 W.	
Fecamp -	Europe -	France -	49 45 24 N.	0 22 48 E.	0 1 31 E.	
Felix and Amb. Isles -	America -	Pacific Ocean -	26 16 0 S.	79 16 0 W.	5 17 4 W.	
Ferdinand Noronha -	America -	Brazil -	3 56 20 S.	32 38 0 W.	2 10 32 W.	
Fermo -	Europe -	Italy -	43 10 18 N.	13 41 26 E.	0 54 46 E.	
Fernando Po -	Africa -	Atlantic Ocean -	3 28 0 N.	8 40 0 E.	0 34 40 E.	
Ferrara -	Europe -	Italy -	44 49 46 N.	11 36 15 E.	0 46 25 E.	
Ferraria (Point) -	Europe -	St. Michael (Az.) -	37 49 41 N.	25 59 49 W.	1 43 59 W.	
Ferro (Town) -	Africa -	Canaries -	27 47 35 N.	17 45 8 W.	1 11 1 W.	
Finisterre (Cape) -	Europe -	Spain -	42 53 30 N.	9 18 24 W.	0 37 14 W.	
Fizeron (Cape) -	Europe -	Portugal -	39 19 0 N.	11 43 53 W.	0 46 56 W.	
Fladstrand -	Europe -	Denmark -	57 27 3 N.	10 33 15 E.	0 42 13 E.	
Flattery (Cape) -	America -	New Albion -	48 15 30 N.	124 58 30 W.	8 19 54 W.	
Flensburg -	Europe -	Denmark -	54 47 8 N.	9 27 6 E.	0 37 48 E.	
Florence -	Europe -	Italy -	43 46 30 N.	11 3 30 E.	0 44 14 E.	
Flores -	Europe -	Azores -	39 26 20 N.	31 11 22 W.	2 4 45 W.	
Flour (Saint) -	Europe -	France -	45 1 53 N.	3 5 24 E.	0 12 22 E.	
Flushing -	Europe -	Holland -	51 26 37 N.	3 34 9 E.	0 14 17 E.	
Foggy Island -	America -	Pacific Ocean -	56 12 0 N.	157 19 30 W.	10 29 18 W.	
Foktzani -	Europe -	Turkey -	45 38 51 N.	27 2 30 E.	1 48 10 E.	
Folkestone -	Europe -	England -	51 5 45 N.	1 11 29 W.	0 4 46 W.	
Fontarabia -	Europe -	Spain -	43 21 36 N.	1 47 29 W.	0 7 10 W.	
S. Foreland (Light) -	Europe -	England -	51 8 21 N.	1 22 6 E.	0 5 28 E.	
N. Foreland -	Europe -	England -	51 22 40 N.	1 26 22 E.	0 5 45 E.	
Fortaventure (W. P.) -	Africa -	Canaries -	28 4 0 N.	14 31 30 W.	0 58 6 W.	
Foul Point -	Africa -	Madagascar -	17 40 14 S.	49 52 30 E.	3 19 30 E.	
Foulweather (Cape) -	America -	Pacific Ocean -	44 53 0 N.	124 10 0 W.	8 16 40 W.	
Frampton House -	Europe -	Wales -	51 25 1 N.	3 29 30 W.	0 13 58 W.	
France (Isle of) -	Africa -	Indian Ocean -	20 9 43 S.	57 31 30 E.	3 50 6 E.	
Francfort (on the M.) -	Europe -	Germany -	50 7 40 N.	8 35 45 E.	0 34 23 E.	

LONGITUDE.

A TABLE of the Latitudes and Longitudes of Places.

Names of Places.	Continents.	Coast, Sea, or Country.	Latitude.	Longitude		H. W.
				In Degrees.	In Time.	
Francfort (on the Od.)	Europe	Germany	52 22 8 N.	14 45 0 E.	11. M. S.	H. M.
Francisco (St.)	America	New Albion	37 48 30 N.	122 7 20 W.	0 59 3 E.	11 15
Francois (Cape)	America	Hispaniola	19 46 40 N.	72 17 45 W.	8 8 30 W.	
Francois (Old Cape)	America	Hispaniola	19 40 30 N.	70 2 0 W.	4 49 11 W.	
Frant	Europe	England	51 5 54 N.	0 16 13 E.	4 40 8 W.	
Frawenburg	Europe	Prussia	54 22 15 N.	20 7 30 E.	0 1 5 E.	
Free Town	Africa	Sierra Leone	8 29 40 N.	13 5 17 W.	1 20 30 E.	
Frehel (Light)	Europe	France	48 41 10 N.	2 18 57 W.	0 52 21 W.	
Frejus	Europe	France	43 25 52 N.	6 43 54 E.	0 9 15 W.	
Frieland's Peak	America	Sandwich Land	59 2 0 S.	26 55 30 W.	0 26 56 E.	
Frio (Cape)	America	Brasil	22 54 0 S.	42 8 15 W.	1 47 42 W.	
Frio (Cape)	Africa	Caffraria	18 40 0 S.	12 26 0 E.	2 48 33 W.	
Fronfac (Strait)	America	Nova Scotia	45 36 57 N.	61 19 30 W.	0 49 44 E.	
Fuego (Isle)	Africa	Cape Verd	14 57 2 N.	24 22 2 W.	4 5 18 W.	
Fulham	Europe	England	51 28 7 N.	0 12 35 W.	1 37 32 W.	
Funchal	Africa	Madeira	32 37 20 N.	16 55 36 W.	0 0 50 W.	
Furneaux (Island)	America	Pacific Ocean	17 11 0 S.	143 6 40 W.	1 7 42 W.	12 4
Furuefs	Europe	Netherlands	51 4 23 N.	2 39 36 E.	9 32 27 W.	
Gabey	Asia	New Guinea	0 6 0 S.	126 23 45 E.	0 10 38 E.	
Galle (Cape de)	Asia	Ceylon	6 1 0 N.	80 19 20 E.	8 25 35 E.	
Gallipoli	Europe	Turkey	40 25 33 N.	26 37 15 E.	5 21 17 E.	
Gand	Europe	Netherlands	51 3 15 N.	3 43 20 E.	1 46 29 E.	
Ganjam	Asia	India	19 22 30 N.	85 18 30 E.	0 14 53 E.	
Gap	Europe	France	44 33 37 N.	6 4 47 E.	5 41 14 E.	
Gaspar (Island)	Asia	Str. of Gaspar	2 25 0 S.	107 7 45 E.	0 24 19 E.	
Gafpee	America	G. St. Lawrence	48 47 30 N.	64 27 30 W.	7 8 31 E.	
Gavarea (Cape)	Asia	Kamtchatka	51 20 30 N.	158 36 0 E.	4 17 50 W.	
Geinhausen	Europe	Germany	50 13 25 N.	9 13 38 E.	10 34 24 E.	
Geneva	Europe	Savoy	46 12 17 N.	6 8 24 E.	0 36 55 E.	
Genoa	Europe	Italy	44 25 0 N.	8 51 15 E.	0 24 34 E.	
St. George (Isle)	Europe	Azores	38 53 30 N.	28 10 0 W.	0 35 25 E.	
St. George (Town)	America	Bermudas	32 22 20 N.	64 14 15 W.	1 52 40 W.	
St. George (Fort)	America	Hispaniola	18 18 40 N.	73 11 49 W.	4 16 57 W.	
St. George (Fort)	Asia	India	13 4 54 N.	80 24 49 E.	4 52 47 W.	
St. George (Cape)	America	Newfoundland	48 30 5 N.	59 20 33 W.	5 21 39 E.	
St. George (Cape)	Asia	New Holland	35 10 30 S.	150 29 0 E.	3 57 22 W.	
St. George (Cape)	Asia	New Britain	4 53 30 S.	153 8 45 E.	10 1 56 E.	
George (Cape)	America	South Georgia	54 17 0 S.	36 32 30 W.	10 12 35 E.	
George (Cape)	Asia	Kerguelen's Land	49 54 30 S.	70 12 0 E.	2 26 10 W.	
Geriah	Asia	Malabar	16 37 0 N.	73 22 24 E.	4 40 48 E.	
Ghent	Europe	Flanders	51 3 15 N.	3 43 20 E.	4 53 30 E.	
Gibraltar	Europe	Spain	36 4 44 N.	5 4 0 W.	0 14 53 E.	
Gilbert's Isle	America	Terra del Fuego	55 13 0 S.	71 6 45 W.	0 20 16 W.	
Glandeve	Europe	France	43 56 43 N.	6 48 10 E.	4 44 27 W.	
Glasgow	Europe	Scotland	55 51 32 N.	4 16 0 W.	0 27 13 E.	
Glocester House	America	New Wales	51 24 26 N.	87 26 2 W.	0 17 4 W.	
Glocester Isle	America	Pacific Ocean	19 11 0 S.	140 20 0 W.	5 49 44 W.	
Gluchow	Europe	Russia	51 40 30 N.	34 20 0 E.	9 21 20 W.	
Gluckstad	Europe	Holstein	53 47 44 N.	9 27 0 E.	2 17 20 E.	

LONGITUDE.

A TABLE of the Latitudes and Longitudes of Places.

Names of Places.	Continents.	Coast, Sea, or Country.	Latitude.	Longitude.		H. W.
				In Degrees.	In Time.	
					H. M. S.	H. M.
Goa - - -	Asia -	India - -	15 28 20 N.	73 58 39 E.	4 55 55 E.	
Goat Isle - -	Asia -	Chinese Sea -	13 55 0 N.	120 2 0 E.	8 0 8 E.	
Goave (La Petit) -	America -	Hispaniola -	18 27 0 N.	72 45 34 W.	4 51 2 W.	
Goes - - -	Europe -	Zeeland - -	51 30 18 N.	3 53 5 E.	0 15 32 E.	
Gogo - - -	Asia -	India - -	21 40 30 N.	72 21 15 E.	4 49 25 E.	
Gomera (Isle) -	Africa -	Canaries - -	28 5 40 N.	17 8 0 W.	1 8 32 W.	
Gonave (Isle N.E. Pt.)	America -	Hispaniola -	18 48 35 N.	72 56 27 W.	4 51 46 W.	
Good Hope (Cape) -	Africa -	Caffraria - -	34 29 0 S.	18 23 15 E.	1 13 33 E.	3 0
Good Hope (Town) -	Africa -	Caffraria - -	33 55 42 S.	18 23 7 E.	1 13 32 E.	2 30
Goodwood - - -	Europe -	England - -	50 52 21 N.	0 44 9 W.	0 2 57 W.	
Goree (Isle) - -	Africa -	Atlantic Ocean -	14 40 5 N.	17 24 30 W.	1 9 38 W.	1 30
Gotha - - -	Europe -	Germany - -	50 56 17 N.	10 41 46 E.	0 42 46 E.	
Gothaah - - -	America -	Greenland - -	64 9 55 N.	51 46 45 W.	3 27 7 W.	
Gottenburg - -	Europe -	Sweden - -	57 42 0 N.	11 57 30 E.	0 47 50 E.	
Gottingen (Obfer.) -	Europe -	Germany - -	51 31 54 N.	9 54 15 E.	0 39 37 E.	
Goudhurst - -	Europe -	England - -	51 6 50 N.	0 27 39 E.	0 1 51 E.	
Grafton (Isle) -	Asia -	Bathees - -	21 4 0 N.	120 55 11 E.	8 3 41 E.	
Grafton (Cape) -	Asia -	New Holland -	16 53 30 S.	145 42 45 E.	9 42 51 E.	
Granada (Fort Royal)	America -	Caribbean Sea -	12 2 54 N.	61 51 15 W.	4 7 25 W.	
Granville - - -	Europe -	France - -	48 50 16 N.	1 36 15 W.	0 6 25 W.	6 45
Grafle - - -	Europe -	France - -	43 39 19 N.	6 55 9 E.	0 27 41 E.	
Gratiosa - - -	Europe -	Azores - -	39 11 0 N.	27 54 30 W.	1 51 38 W.	
Gratz - - -	Europe -	Germany - -	47 4 9 N.	15 25 45 E.	1 1 43 E.	0 0
Gravelines - -	Europe -	Flanders - -	50 59 10 N.	2 7 35 E.	0 8 30 E.	
Gravois (Point) -	America -	Hispaniola -	18 0 55 N.	74 2 15 W.	4 56 9 W.	
Greenwich (Obfer.) -	Europe -	England - -	51 28 40 N.	0 0 0	0 0 0	
Grenaae - - -	Europe -	Denmark - -	56 24 57 N.	10 53 21 E.	0 43 33 E.	
Gregory (Cape) -	America -	Pacific Ocean -	43 29 0 N.	124 9 0 W.	8 16 36 W.	
Grenoble - - -	Europe -	France - -	45 11 42 N.	5 43 34 E.	0 22 54 E.	
Grenville (Cape) -	America -	Pacific Ocean -	57 31 0 N.	152 37 30 W.	10 10 30 W.	
Grouais (Isle) -	Europe -	France - -	47 38 4 N.	3 26 23 W.	0 13 46 W.	
Grinfted (East) -	Europe -	England - -	51 7 25 N.	0 0 10 E.	0 0 1 E.	
Grinfted (West) -	Europe -	England - -	50 58 24 N.	0 19 53 W.	0 1 20 W.	
Gryphifwald - -	Europe -	Germany - -	54 5 15 N.	13 35 15 E.	0 54 5 E.	
Guadaloupe - -	America -	Caribbean Sea -	15 59 30 N.	61 48 15 W.	4 7 15 W.	
Guiaquil - - -	America -	Peru - -	2 11 18 S.	79 20 52 W.	5 17 23 W.	
Gurief - - -	Asia -	Siberia - -	47 7 7 N.	51 59 15 E.	3 27 57 E.	
Hadersleben - -	Europe -	Denmark - -	55 15 6 N.	9 30 15 E.	0 38 1 E.	
Hague - - -	Europe -	Holland - -	52 4 12 N.	4 16 2 E.	0 17 4 E.	8 15
Halifax - - -	America -	Nova Scotia -	44 44 0 N.	63 36 0 W.	4 14 24 W.	7 30
Hamburg - - -	Europe -	Germany - -	53 33 3 N.	9 55 15 E.	0 39 41 E.	6 0
Hammerfoft (Isle) -	Europe -	North Sea - -	70 38 43 N.	23 43 35 E.	1 34 54 E.	
Hampstead - - -	Europe -	England - -	51 33 19 N.	0 10 42 W.	0 0 43 W.	
Hang-lip (Cape) -	Africa -	Caffraria - -	34 16 0 S.	18 44 0 E.	1 14 56 E.	
Hanover - - -	Europe -	Germany - -	52 22 18 N.	9 44 15 E.	0 38 57 E.	
Harbro' (Market) -	Europe -	England - -	52 28 30 N.	0 57 25 W.	0 3 50 W.	
Harefield - - -	Europe -	England - -	51 36 10 N.	0 29 15 W.	0 1 57 W.	
Harlem - - -	Europe -	Holland - -	52 22 14 N.	4 37 0 E.	0 18 28 E.	
Harrow on the Hill -	Europe -	England - -	51 34 27 N.	0 20 3 W.	0 1 20 W.	

LONGITUDE.

A TABLE of the Latitudes and Longitudes of Places.

Names of Places.	Continents.	Coast, Sea, or Country.	Latitude.	Longitude		H. W.
				In Degrers.	In Time.	
					H. M. S.	H. M.
Haftings - -	Europe -	England - -	50 52 10 N.	0 41 10 E.	0 2 45 E.	11 0
Havannah - -	America -	Cuba - -	23 11 52 N.	82 8 36 W.	5 28 34 W.	
Havant - -	Europe -	England - -	50 51 5 N.	0 58 38 W.	0 3 55 W.	
Havre-de-Grace - -	Europe -	France - -	49 29 14 N.	0 6 23 E.	0 0 26 E.	9 0
Hawkhill - -	Europe -	Scotland - -	55 57 37 N.	3 10 15 W.	0 12 41 W.	
Heefe (La) - -	Europe -	Netherlands -	51 23 2 N.	4 44 45 E.	0 18 59 E.	
St. Helena (Ja.To.) -	Africa -	S. Atlantic Ocean	15 55 0 S.	5 43 30 W.	0 22 54 W.	2 15
Hengiftbury Head - -	Europe -	England - -	50 42 57 N.	1 45 11 W.	0 7 1 W.	
Henley Houfe - -	America -	New Wales - -	51 14 28 N.	84 46 15 W.	5 39 5 W.	
Henlopen (Cape) - -	America -	Virginia - -	38 47 8 N.	75 12 31 W.	5 0 50 W.	9 0
Henry (Cape) - -	America -	Virginia - -	36 57 0 N.	76 31 30 W.	5 6 6 W.	
Heraclia - -	Europe -	Turkey - -	41 1 3 N.	27 54 19 E.	1 51 37 E.	
St. Hermogenes (Ifle)	America -	Cook's River -	58 15 0 N.	152 13 0 W.	10 8 52 W.	
Hernofand - -	Europe -	Sweden - -	62 38 0 N.	17 50 15 E.	1 11 21 E.	
Hervey's (Ifle) - -	America -	Pacific Ocean -	19 17 0 S.	158 56 20 W.	10 35 45 W.	
Heffeloe (Ifle) - -	Europe -	Categat - -	56 11 46 N.	11 43 45 E.	0 46 55 E.	
Heve (Cape la) - -	Europe -	France - -	49 30 42 N.	0 4 0 E.	0 0 16 E.	
Highbury Houfe - -	Europe -	England - -	51 33 13 N.	0 5 51 W.	0 0 23 W.	
Highclere - -	Europe -	England - -	51 18 46 N.	1 20 16 W.	0 5 21 W.	
Highgate - -	Europe -	England - -	51 34 16 N.	0 8 50 W.	0 0 35 W.	
Hinchinbroke (Ifle) -	Afia -	Pacific Ocean -	17 25 0 S.	168 38 0 E.	11 14 32 E.	
Hinchinbroke (Cape)	America -	Pr. Wm's Sound	60 16 0 N.	146 55 0 W.	9 47 40 W.	
Hiorin - -	Europe -	Denmark - -	57 27 44 N.	9 59 58 E.	0 40 0 E.	
Hoai-Nghan - -	Afia -	China - -	33 34 40 N.	118 49 30 E.	7 55 18 E.	
Hogue (Cape la) - -	Europe -	France - -	49 44 40 N.	1 56 50 W.	0 7 47 W.	0 0
Hola - -	Europe -	Iceland - -	65 44 0 N.	19 44 0 W.	1 18 56 W.	
Holme Point - -	Europe -	England - -	52 59 40 N.	0 30 45 E.	0 2 3 E.	
Honfleur - -	Europe -	France - -	49 25 13 N.	0 13 59 E.	0 0 56 E.	9 0
Hood's Ifle - -	America -	Pacific Ocean -	9 26 0 S.	138 52 0 W.	9 15 28 W.	
Hoogstraeten - -	Europe -	Netherlands -	51 24 44 N.	4 46 15 E.	0 19 5 E.	
Horn (Cape) - -	America -	Terra del Fuego	55 58 30 S.	67 26 0 W.	4 29 44 W.	
Horndean - -	Europe -	England - -	50 55 33 N.	1 0 21 W.	0 4 1 W.	
Horsham - -	Europe -	England - -	51 3 36 N.	0 19 43 W.	0 1 19 W.	
Hout Bay - -	Africa -	Cafraria - -	34 3 0 S.	18 19 0 E.	1 13 16 E.	
Howe's Ifle - -	America -	Pacific Ocean -	16 46 30 S.	154 6 40 W.	10 16 27 W.	
Howe (Cape) - -	Afia -	New Holland -	37 31 15 S.	145 31 0 E.	9 58 4 E.	
Huahine (Ifle) - -	America -	Pacific Ocean -	16 44 0 S.	151 6 0 W.	10 4 24 W.	
Hueen (Ifle) - -	Europe -	Sound - -	55 54 38 N.	12 41 30 E.	0 50 46 E.	
Hudson's Houfe - -	America -	New Wales - -	53 0 32 N.	106 27 48 W.	7 5 51 W.	
Hunafon Lights - -	Europe -	England - -	52 58 40 N.	0 28 0 E.	0 1 52 E.	
Hurft Lighthouse - -	Europe -	England - -	50 42 23 N.	1 32 50 W.	0 6 11 W.	
Hurlmonceaux - -	Europe -	England - -	50 51 35 N.	0 19 42 E.	0 1 19 E.	
Hufum - -	Europe -	Denmark - -	54 28 48 N.	9 4 7 E.	0 36 16 E.	
Hydrabad - -	Afia -	Goleonda - -	17 12 4 N.	78 51 0 E.	5 15 24 E.	
Jackfon (Port) - -	Afia -	New Holland -	33 51 7 S.	141 13 30 E.	10 4 54 E.	
Jaffrabad (Fort) - -	Afia -	India - -	20 52 50 N.	71 36 30 E.	4 40 26 E.	
Jakutsk - -	Afia -	Siberia - -	62 1 52 N.	129 43 30 E.	8 38 55 E.	
Jakutskoi-Nofs - -	Afia -	Kamchatka -	66 5 30 N.	169 44 0 W.	11 18 56 W.	
Janciro (Rio) - -	America -	Brasil - -	22 54 10 S.	43 10 45 W.	2 52 43 W.	2 5

LONGITUDE.

TABLE of the Latitudes and Longitudes of Places.

Names of Places.	Continents.	Coast, Sea, or Country.	Latitude.	Longitude		H. W.
				In Degrees.	In Time.	
			° ' "	° ' "	H. M. S.	H. M.
Jaroslavl - -	Europe -	Russia - -	57 37 30 N.	40 10 0 E.	2 40 40 E.	
Jarra (Pulo) - -	Asia -	Str. of Malacca -	3 57 0 N.	100 17 0 E.	6 41 8 E.	
Jaffey - -	Europe -	Moldavia - -	47 8 32 N.	27 29 45 E.	1 49 59 E.	
Java Head - -	Asia -	Java - -	6 48 30 S.	105 7 25 E.	7 0 30 E.	
Icy Cape - -	America -	Beering's Straits	70 29 0 N.	161 42 30 W.	10 46 50 W.	
Idolhos (Isles) -	Africa -	Atlantic Ocean -	9 27 0 N.	13 32 30 W.	0 54 10 W.	
Jenikola - -	Europe -	Crimea - -	45 21 0 N.	36 26 30 E.	2 25 46 E.	
Jenifeik - -	Asia -	Siberia - -	58 27 17 N.	91 58 30 E.	6 7 54 E.	
Jeremie (Point) -	America -	Hispaniola - -	18 40 20 N.	74 13 28 W.	4 56 55 W.	
Jerusalem - -	Asia -	Palestine - -	31 55 0 N.	35 20 0 E.	2 21 20 E.	
St. Ildefonso's Isles -	America -	Terra del Fuego	55 51 0 S.	69 28 0 W.	4 37 52 W.	
Ilginskoi - -	Asia -	Siberia - -	- - -	104 59 0 E.	6 59 56 E.	
Immer (Isle) - -	Asia -	Pacific Ocean -	19 16 0 S.	169 46 0 E.	11 19 4 E.	
Ingolstadt - -	Europe -	Germany - -	48 45 50 N.	11 25 30 E.	0 45 42 E.	
Ingornahoix - -	America -	Newfoundland -	50 37 17 N.	57 15 30 W.	3 49 2 W.	
Johanna (Peak) -	Africa -	Comora Isles -	12 16 0 S.	44 46 18 E.	2 59 5 E.	
St. John's - -	America -	Antigua - -	17 4 30 N.	62 9 0 W.	4 8 30 W.	
St. John's - -	America -	Newfoundland -	47 32 44 N.	52 25 30 W.	3 29 42 W.	6 0
St. Joseph - -	America -	California - -	23 3 37 N.	109 40 45 W.	7 18 43 W.	
Joy (Port) - -	America -	Isle of St. John's	46 11 0 N.	62 57 15 W.	4 11 49 W.	
Irkutsk - -	Asia -	Siberia - -	52 18 8 N.	104 33 30 E.	6 58 14 E.	
Irraname (Isle) -	Asia -	Pacific Ocean -	19 31 0 S.	170 21 0 E.	11 21 24 E.	
Islamabad - -	Asia -	India - -	22 20 0 N.	91 49 43 E.	6 7 19 E.	
Isle of Pines - -	Asia -	Pacific Ocean -	22 38 0 S.	167 38 0 E.	11 10 32 E.	
Islington - -	Europe -	England - -	51 32 18 N.	0 6 0 W.	0 0 24 W.	
Ismael - -	Europe -	Turkey - -	45 20 58 N.	28 50 0 E.	1 55 20 E.	
Isfahan - -	Asia -	Persia - -	32 24 34 N.	51 50 0 E.	3 27 20 E.	
St. Juan (Cape) -	America -	Staten Land -	54 47 10 S.	63 47 0 W.	4 15 8 W.	
Juan Fernandes (Isle)	America -	Pacific Ocean -	33 40 0 S.	78 33 0 W.	5 14 12 W.	
Judda - -	Asia -	Arabia - -	21 29 0 N.	39 22 0 E.	2 37 28 E.	
Judonskoi - -	Asia -	Siberia - -	- - -	139 52 30 E.	9 19 30 E.	
St. Julian (Port) -	America -	Patagonia - -	49 10 0 S.	68 44 0 W.	4 34 56 W.	4 45
Jupiter's Inlet -	America -	Anticosta (Isle) -	49 26 0 N.	63 38 15 W.	4 14 33 W.	
Juthia - -	Asia -	India - -	14 18 0 N.	100 50 0 E.	6 43 20 E.	
Kalouga - -	Europe -	Russia - -	54 30 0 N.	36 5 0 E.	2 24 20 E.	
Kamenec - -	Europe -	Poland - -	48 40 53 N.	27 1 15 E.	1 48 5 E.	
Keeling's Islands -	Asia -	Indian Ocean -	12 3 15 S.	97 38 30 E.	6 30 34 E.	
Kamtchatkoi-Nofs -	Asia -	Kamtchatka - -	56 1 0 N.	163 22 30 E.	10 53 30 E.	
Karakakoo (Bay) -	America -	Sandwich Isles -	19 28 10 N.	155 56 23 W.	10 23 46 W.	3 45
Kateringburg - -	Asia -	Siberia - -	56 50 15 N.	60 50 0 E.	4 3 20 E.	
Kayes Island - -	America -	Pacific Ocean -	59 52 0 N.	145 0 0 W.	9 40 0 W.	
Kedgerie - -	Asia -	India - -	21 48 0 N.	88 50 15 E.	5 55 21 E.	
Keppel's Island -	Asia -	Pacific Ocean -	15 56 30 S.	174 10 24 W.	9 36 42 W.	
Kiam-Cheu - -	Asia -	China - -	35 37 0 N.	111 29 15 E.	7 25 57 E.	
Kidnapper's Cape -	Asia -	New Zealand -	39 42 45 S.	177 16 0 E.	11 49 4 E.	
Kiel - -	Europe -	Holstein - -	54 22 25 N.	9 24 45 E.	0 37 39 E.	
Kinfale - -	Europe -	Ireland - -	51 41 30 N.	8 28 15 W.	0 33 53 W.	5 0
Kiow - -	Europe -	Ukraine - -	50 27 0 N.	30 27 30 E.	2 1 50 E.	
Kiringinskoi - -	Asia -	Siberia - -	57 47 0 N.	108 2 0 E.	7 12 8 E.	

LONGITUDE.

TABLE of the Latitudes and Longitudes of Places.

Names of Places.	Continents.	Coast, Sea, or Country.	Latitude.	Longitude		H. W.
				In Degrees.	In Time.	
Kirk-Newton -	Europe -	Scotland -	55 54 30 N.	3 30 33 W.	0 14 2 W.	H. M.
Kittery Point -	America -	New England -	43 4 27 N.	70 44 30 W.	4 42 58 W.	
Koamaroo (Cape) -	Asia -	New Zealand -	41 4 48 S.	174 34 30 E.	11 38 18 E.	
Kola -	Europe -	Lapland -	68 52 26 N.	33 1 30 E.	2 12 6 E.	
Konfwinger -	Europe -	Norway -	60 12 11 N.	11 57 45 E.	0 47 51 E.	
Kormantine Fort -	Africa -	Gold Coast -	5 10 58 N.	1 34 24 W.	0 6 18 W.	
Korfar (Lights) -	Europe -	Denmark -	55 20 22 N.	11 8 30 E.	0 44 34 E.	
Kosloff -	Europe -	Crimea -	45 14 0 N.	33 25 0 E.	2 13 40 E.	
Kowina (Upper) -	Asia -	Kamchatka -	65 28 0 N.	153 35 0 E.	10 14 20 E.	
Kowina (Lower) -	Asia -	Kamchatka -	68 18 0 N.	163 18 0 E.	10 53 12 E.	
Krementzoug -	Europe -	Russia -	49 3 28 N.	33 28 45 E.	2 13 55 E.	
Kronotskoi-Nofs -	Asia -	Kamchatka -	54 43 0 N.	162 13 30 E.	10 48 54 E.	
Kullen (Lights) -	Europe -	Sweden -	56 18 3 N.	12 26 14 E.	0 49 45 E.	
Kurik -	Europe -	Russia -	51 43 30 N.	36 27 30 E.	2 25 50 E.	
La Ciotat -	Europe -	France -	43 10 29 N.	5 36 48 E.	0 22 27 E.	
Ladrone (Grand) -	Asia -	Chinese Sea -	22 2 0 N.	113 56 0 E.	7 35 44 E.	
Lagoon Isle (Cooke's) -	America -	Pacific Ocean -	18 46 33 S.	138 54 15 W.	9 15 37 W.	
Lagoon's Isle (Bligh's) -	America -	Pacific Ocean -	21 38 0 S.	140 37 0 W.	9 22 28 W.	
Lagos -	Europe -	Turkey -	40 58 42 N.	25 3 21 E.	1 40 13 E.	
Laguna -	Africa -	Teneriffe -	28 28 31 N.	16 27 13 W.	1 5 49 W.	
Lambhaus -	Europe -	Iceland -	64 6 17 N.	21 54 30 W.	1 27 38 W.	
Lampfaco -	Asia -	Turkey -	40 20 52 N.	26 36 20 E.	1 46 25 E.	
Lancarota (E. Pt.) -	Africa -	Canaries -	29 14 0 N.	13 26 0 W.	0 53 44 W.	
Landau -	Europe -	France -	49 11 38 N.	8 7 30 E.	0 32 30 E.	
Landferoon -	Europe -	Sweden -	55 52 23 N.	12 48 0 E.	0 51 12 E.	
Langres -	Europe -	France -	47 52 0 N.	5 19 50 E.	0 21 19 E.	
Laon -	Europe -	France -	49 33 54 N.	3 37 12 E.	0 14 29 E.	
Lavaur -	Europe -	France -	43 40 52 N.	1 49 3 E.	0 7 16 E.	
Laufanne -	Europe -	Switzerland -	46 31 5 N.	6 45 15 E.	0 27 1 E.	
St. Lawrence's (Isle) -	Asia -	Beering's Straits -	63 47 0 N.	171 45 0 E.	11 27 0 E.	
Le Croisie -	Europe -	France -	47 17 43 N.	2 30 30 W.	0 10 2 W.	
Lectoure -	Europe -	France -	43 55 54 N.	0 37 11 E.	0 2 29 E.	
Leeds -	Europe -	England -	53 47 33 N.	1 38 30 W.	0 6 34 W.	
Leicester -	Europe -	England -	52 38 0 N.	1 8 30 W.	0 4 34 W.	
Leipfic -	Europe -	Saxony -	51 22 22 N.	12 20 30 E.	0 49 22 E.	
Le Mans -	Europe -	France -	48 0 35 N.	0 11 49 E.	0 0 47 E.	
Leopard's Isle -	Africa -	Sierra Leone -	8 40 10 N.	13 8 0 W.	0 52 32 W.	
Leoltoffe -	Europe -	England -	52 29 0 N.	1 44 9 E.	0 6 57 E.	
Leper's Island -	Asia -	Pacific Ocean -	15 23 30 S.	167 58 15 E.	11 11 53 E.	
Le Puy -	Europe -	France -	45 2 41 N.	3 52 46 E.	0 15 31 E.	
Lefear -	Europe -	France -	43 19 52 N.	0 26 7 W.	0 1 44 W.	
Lefkeard -	Europe -	England -	50 26 50 N.	4 41 45 W.	0 18 47 W.	
Lefparre -	Europe -	France -	45 18 33 N.	0 57 3 W.	0 3 48 W.	
Lewis' Town -	America -	Pennsylvania -	38 47 27 N.	75 15 48 W.	5 1 3 W.	
Leyden -	Europe -	Holland -	52 8 40 N.	4 28 0 E.	0 17 52 E.	
Liege -	Europe -	Netherlands -	50 39 22 N.	5 31 30 E.	0 22 6 E.	
Lilienthal -	Europe -	Saxony -	53 8 25 N.	8 58 0 E.	0 35 52 E.	
Lima -	America -	Peru -	12 1 56 S.	76 54 0 W.	5 7 36 W.	
Limoges -	Europe -	France -	45 49 44 N.	1 15 55 E.	0 5 4 E.	

LONGITUDE.

TABLE of Latitudes and Longitudes of Places.

Names of Places.	Continents.	Coast, Sea, or Country.	Latitude.	Longitude		H. W.
				In Degrees.	In Time.	
				° ' "	H. M. S.	H. M.
Lintz - - -	Europe -	Germany -	48 16 0 N.	13 57 30 E.	0 55 50 E.	
Lisieux - - -	Europe -	France -	49 8 50 N.	0 13 32 E.	0 0 54 E.	
Lisle - - -	Europe -	Flanders -	50 37 50 N.	3 4 16 E.	0 12 17 E.	
Lisbon - - -	Europe -	Portugal -	38 42 20 N.	9 9 10 W.	0 36 37 E.	
Lion's Bank -	Europe -	Atlantic Ocean -	56 40 0 N.	17 45 0 W.	1 11 0 W.	
Lisburne (Cape)	Asia -	New Hebrides -	15 40 45 S.	166 57 0 E.	11 7 48 E.	2 15
Lisburne (Cape)	America -	Beering's Straits -	60 5 0 N.	165 22 30 W.	11 1 30 W.	
Liverpool - -	Europe -	England -	53 22 0 N.	2 56 45 W.	0 11 47 W.	11 18
Livourno - - -	Europe -	Italy -	43 33 2 N.	10 16 30 E.	0 41 6 E.	
Lizard - - -	Europe -	England -	49 57 30 N.	5 13 0 W.	0 20 52 W.	7 50
Lizier (St.) -	Europe -	France -	43 0 3 N.	1 8 5 E.	0 4 32 E.	
Loam-pit Hill -	Europe -	England -	51 28 7 N.	0 1 25 W.	0 0 6 W.	
Lodeve - - -	Europe -	France -	43 43 47 N.	3 18 48 E.	0 13 15 E.	
Loheia - - -	Asia -	Arabia -	15 42 8 N.	42 8 30 E.	2 48 34 E.	
Lombes - - -	Europe -	France -	43 28 21 N.	0 54 24 E.	0 3 38 E.	
London (St. Paul's)	Europe -	England -	51 30 49 N.	0 5 47 W.	0 0 23 W.	2 45
—— Spital Square	Europe -	England -	51 31 9 N.	0 4 20 W.	0 0 17 W.	
—— Christ's Hof.	Europe -	England -	51 30 52 N.	0 5 51 W.	0 0 23 W.	
—— Mr. Graham's	Europe -	England -	51 30 52 N.	0 6 10 W.	0 0 25 W.	
—— Surry-str. Ob.	Europe -	England -	51 30 40 N.	0 6 45 W.	0 0 27 W.	
London Somerfet Place	Europe -	England -	51 30 43 N.	0 6 54 W.	0 0 28 W.	
—— Saville Houfe	Europe -	England -	51 30 38 N.	0 7 42 W.	0 0 31 W.	
Londonderry -	Europe -	Ireland -	54 59 28 N.	7 14 49 W.	0 28 50 W.	6 0
Lopatka (Cape)	Asia -	Kamtchatka -	51 0 15 N.	156 43 30 E.	10 26 50 E.	
Lorenzo (Cape)	America -	Peru -	1 2 0 S.	80 59 45 W.	5 23 59 W.	
Loretto - - -	Europe -	Italy -	43 27 0 N.	13 34 50 E.	0 54 19 E.	
Louis (Port)	America -	Hifpaniola -	18 18 40 N.	73 16 49 W.	4 53 7 W.	
Louis (Port)	Africa -	Mauritius -	20 9 44 S.	57 28 15 E.	3 49 53 E.	
Louifburg - -	America -	Cape Breton -	45 53 50 N.	59 59 15 W.	3 59 57 W.	
Louveau - - -	Asia -	India -	12 42 30 N.	101 1 30 E.	6 44 6 E.	
Louvain - - -	Europe -	Netherlands -	50 53 26 N.	4 41 32 E.	0 18 46 E.	
Lubni - - -	Europe -	Ruffia -	50 0 37 N.	33 3 30 E.	2 12 14 E.	
St. Lucar (Cape)	America -	Mexico -	22 45 0 N.	110 0 0 W.	7 20 0 W.	
St. Lucia (Ile)	America -	Antilles -	13 24 30 N.	60 51 30 W.	4 3 26 W.	
Lucipara - - -	Asia -	Straits of Banka -	3 11 20 S.	106 18 46 E.	7 5 15 E.	
St. Lunaire Bay	America -	Newfoundland -	51 29 0 N.	55 30 0 W.	3 42 0 W.	
Lunden - - -	Europe -	Sweden -	55 42 13 N.	13 11 5 E.	0 52 44 E.	
Luneville - - -	Europe -	France -	48 35 33 N.	6 30 6 E.	0 26 0 E.	
Lufon - - -	Europe -	France -	46 27 15 N.	1 10 0 W.	0 4 40 W.	
Luxembourg - -	Europe -	Netherlands -	49 37 20 N.	6 13 45 E.	0 24 55 E.	
Lydd - - -	Europe -	England -	50 57 7 N.	0 54 15 E.	0 3 37 E.	
Lynn Regis - -	Europe -	England -	52 45 34 N.	0 24 29 E.	0 1 38 E.	6 45
Lyons - - -	Europe -	France -	45 45 52 N.	4 49 9 E.	0 19 17 E.	
Macao (Pia Grand)	Asia -	China -	22 11 20 N.	113 35 15 E.	7 34 15 E.	5 50
Macassar - - -	Asia -	Cel bes -	5 9 0 S.	119 48 45 E.	7 50 15 E.	
Macclesfield Shoal	Asia -	Chinefe Sea -	15 51 18 N.	114 18 0 E.	7 37 12 E.	
Macon - - -	Europe -	France -	46 18 27 N.	4 49 53 E.	0 10 20 E.	
Madeira (Funchal)	Africa -	Atlantic Ocean -	32 37 20 N.	16 55 30 W.	1 7 42 W.	12 4
Madras - - -	Asia -	India -	13 4 54 N.	80 24 49 E.	5 21 39 E.	

LONGITUDE.

A TABLE of the Latitudes and Longitudes of Places.

Names of Places.	Continents.	Coast, Sea, or Country.	Latitude.	Longitude		H.W.
				In Degrees.	In Time.	
			° ' " S.	° ' " W.	H. M. S.	H. M.
Madre de Dios (Port)	America	Marquefas	9 55 30 S.	139 8 40 W.	9 16 35 W.	2 30
Madrid	Europe	Spain	40 25 18 N.	3 38 30 W.	0 14 34 W.	
Maeftricht	Europe	Netherlands	50 51 7 N.	5 40 45 E.	0 22 43 E.	
Mafamale	Africa	Zanquebar	16 21 0 S.	40 20 30 E.	2 41 22 E.	
Magdalen (Isles)	America	G. St. Lawrence	47 17 0 N.	61 26 0 W.	4 5 44 W.	
Magdalena (Isle)	America	Pacific Ocean	10 25 30 S.	138 49 0 W.	9 15 16 W.	
Mahon (Port)	Europe	Minorca	39 51 48 N.	3 48 30 E.	0 15 14 E.	
Majorca (Isle)	Europe	Mediterranean Sea	39 35 0 N.	2 29 45 E.	0 9 59 E.	
Maize (Cape)	America	Cuba	20 18 0 N.	74 23 0 W.	4 57 32 W.	
Malacca	Asia	India	2 12 6 N.	102 8 45 E.	6 48 35 E.	
Malicoy (Island)	Asia	Indian Ocean	8 15 30 N.	73 9 30 E.	4 52 38 E.	
Mallicola (Isle)	Asia	Pacific Ocean	16 15 30 S.	167 39 15 E.	11 10 37 E.	
Maloes (St.)	Europe	France	48 39 3 N.	2 1 26 W.	0 8 6 W.	6 0
Malmoe	Europe	Sweden	55 36 37 N.	13 1 4 E.	0 52 4 E.	
Malta (Town)	Africa	Mediterranean Sea	35 53 50 N.	14 28 30 E.	0 57 54 E.	
Manchester	Europe	England	53 26 30 N.	2 15 0 W.	0 9 0 W.	
Mangalore	Asia	Malabar	12 50 0 N.	74 57 24 E.	4 59 50 E.	
Mangea (Isle)	America	Pacific Ocean	21 56 45 S.	158 3 0 W.	10 32 12 W.	
Manheim	Europe	Germany	49 28 59 N.	8 27 22 E.	0 33 49 E.	
Manilla	Asia	Philippines	14 36 8 N.	120 51 15 E.	8 3 25 E.	
Mansfelt (Isle)	America	Hudson's Bay	62 38 30 N.	80 33 0 W.	5 22 12 W.	
Maria V. Diem. (C.)	Asia	New Zealand	34 29 15 S.	172 46 30 N.	11 31 16 E.	
St. Marcou (Isle)	Europe	France	49 29 52 N.	1 8 56 W.	0 4 36 W.	
Marigalante (Isle)	America	Atlantic Ocean	15 55 15 N.	61 11 0 W.	4 4 44 W.	
Marmara (Isle)	Asia	Sea of Marmara	40 37 4 N.	27 30 35 E.	1 50 2 E.	
Marpurg	Europe	Germany	46 34 42 N.	15 41 20 E.	1 2 45 E.	
Marfeilles	Europe	France	43 17 43 N.	5 22 12 E.	0 21 29 E.	
St. Martha	America	Terra Firma	11 19 2 N.	74 4 30 W.	4 56 18 W.	
St. Martin's Cape	Africa	St. Helen's Bay	32 41 43 S.	17 55 0 E.	1 11 40 E.	
St. Martin's Isle	America	Caribbean Sea	18 4 20 N.	63 2 0 W.	4 12 8 W.	
Martinico (Isle)	America	West Indies	14 44 0 N.	61 21 16 W.	4 5 25 W.	
Martin-Vaz	America	Atlantic Ocean	20 28 16 S.	29 1 0 W.	1 56 4 W.	
St. Mary's Isle	Europe	Scilly Isles	49 55 30 N.	6 16 45 W.	0 25 7 W.	
St. Mary's Town	Europe	Azores	36 56 40 N.	25 9 10 W.	1 40 37 W.	
Mas-a-fuero (Isle)	America	Pacific Ocean	33 45 0 S.	80 22 0 W.	5 21 28 W.	
Mafkelyne's Isles	Asia	New Hebrides	16 32 0 S.	167 59 15 E.	11 11 57 E.	
Mafulipatam	Asia	India	16 8 30 N.	81 11 45 E.	5 24 47 E.	
St. Matthew's Light	Europe	France	48 19 34 N.	4 45 54 W.	0 19 4 W.	
Mauritius (Pt. Louis)	Africa	Indian Ocean	20 9 45 S.	57 29 15 E.	3 49 57 E.	
Maurua (Isle)	America	Pacific Ocean	16 25 40 S.	152 32 40 W.	10 10 11 W.	
Mayence	Europe	Germany	49 54 0 N.	8 20 0 E.	0 33 20 E.	
Mayne's (John) Isle	Europe	Northern Ocean	71 10 0 N.	9 49 30 W.	0 39 18 W.	
Mayo (Isle)	Africa	Cape Verd	15 12 40 N.	23 14 7 W.	1 32 56 W.	
Mayotta (Peak)	Africa	Comora Isles	12 59 15 S.	45 25 0 E.	3 1 40 E.	
Meaux	Europe	France	48 57 40 N.	2 52 30 E.	0 11 30 E.	
Mechlin	Europe	Netherlands	51 1 50 N.	4 28 45 E.	0 17 55 E.	
Mende	Europe	France	44 31 2 N.	3 29 35 E.	0 13 58 E.	
Mercury Bay	Asia	New Zealand	36 48 0 S.	176 0 20 E.	11 44 25 E.	
Mergui	Asia	Siam	12 10 30 N.	98 19 15 E.	6 33 17 E.	
Mefurado Bay	Africa	Grain Coast	6 18 20 N.	10 49 0 W.	0 43 16 W.	
Metz	Europe	France	49 7 10 N.	6 10 13 E.	0 24 41 E.	

LONGITUDE.

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Names of Places.	Continents.	Coast, Sea, or Country.	Latitude.	Longitude		H. W.
				In Degrees.	In Time.	
Mew-Stone - -	Asia -	New Holland -	43 47 15 S.	146 26 30 E.	9 45 46 E.	H. M.
Mexico - -	America -	Mexico - -	19 54 0 N.	99 41 45 W.	6 38 47 W.	
Mezieres - -	Europe -	France - -	49 45 47 N.	4 43 16 E.	0 18 53 E.	
Miatea (Isle) -	America -	Pacific Ocean -	17 52 20 S.	148 6 0 W.	9 52 24 W.	
St. Michael's Isle -	Europe -	Azores - -	37 47 0 N.	25 42 0 W.	1 42 48 W.	
Middleburg - -	Europe -	Zealand - -	51 30 6 N.	3 36 35 E.	0 14 26 E.	
Middleburg (Isle) -	Asia -	Friendly Isles -	21 20 30 S.	174 34 0 W.	11 38 16 W.	
Milan - -	Europe -	Italy - -	45 28 0 N.	9 10 52 E.	0 36 43 E.	
Milo (Isle) - -	Europe -	Mediterranean Sea -	36 41 0 N.	20 0 0 E.	1 40 0 E.	
Minster - -	Europe -	England - -	51 19 50 N.	1 18 46 E.	0 5 15 E.	
Mirepoix - -	Europe -	France - -	48 5 7 N.	1 52 11 E.	0 7 29 E.	
Mirroe (Isle) -	Asia -	Bengal Bay - -	7 29 0 N.	93 37 30 E.	6 14 30 E.	
Mittau - -	Europe -	Courland - -	56 39 10 N.	23 42 45 E.	1 34 51 E.	
Mocca - -	Asia -	Arabia - -	13 16 0 N.	44 0 0 E.	2 56 0 E.	
Mocha (Isle) -	America -	Pacific Ocean -	38 22 30 N.	74 37 0 W.	4 58 28 W.	
Modena - -	Europe -	Italy - -	44 34 0 N.	11 12 30 E.	0 44 50 E.	
Mohilew - -	Europe -	Russia - -	53 54 0 N.	30 24 30 E.	2 1 38 E.	
Monopin Hill -	Asia -	Banka - -	2 1 20 S.	105 21 7 E.	7 1 24 E.	
Mons - -	Europe -	Netherlands -	50 27 10 N.	3 57 15 E.	0 15 49 E.	
Montfieurs - -	Asia -	Borneo - -	4 23 40 S.	115 34 45 E.	7 42 19 E.	
Montague (Cape) -	America -	Sandwich Land -	58 33 0 S.	126 46 0 W.	1 47 4 W.	7 30
Montagu (Isle) -	Asia -	New Hebrides -	17 26 0 S.	168 31 30 E.	11 14 6 E.	
Montalto - -	Europe -	Italy - -	42 59 44 N.	13 35 14 E.	0 54 21 E.	
Montauban - -	Europe -	France - -	44 0 55 N.	1 20 51 E.	0 5 23 E.	
Monte-Christi -	America -	Peru - -	1 2 0 S.	80 49 15 W.	5 23 17 W.	
Montego Bay - -	America -	Jamaica - -	18 31 0 N.	78 20 0 W.	5 13 20 W.	
Monterrey - -	America -	New Albion -	36 36 20 N.	121 34 15 W.	8 6 17 W.	
Montlambert - -	Europe -	France - -	50 43 2 N.	1 38 45 E.	0 6 35 E.	
Montmirail - -	Europe -	France - -	48 52 8 N.	3 32 16 E.	0 14 9 E.	
Montpelier - -	Europe -	France - -	44 36 29 N.	3 51 45 E.	0 15 27 E.	
Montferrat (Isle) -	America -	Caribbean Sea -	16 49 0 N.	62 27 0 W.	4 9 48 W.	10 15
Monument (The) -	Asia -	New Hebrides -	17 14 15 S.	168 38 15 E.	11 14 33 E.	
Moose Fort - -	America -	New Wales - -	51 15 54 N.	80 54 41 W.	5 23 39 W.	
Morant (Point) -	America -	Jamaica - -	17 58 0 N.	70 15 45 W.	5 5 3 W.	
Morokinnee - -	America -	Sandwich Isles -	20 39 0 N.	156 29 30 W.	10 25 58 W.	
Morotoi - -	America -	Sandwich Isles -	21 10 0 N.	157 17 0 W.	10 29 8 W.	
Moscow - -	Europe -	Moscovy - -	55 45 20 N.	37 46 15 E.	2 31 5 E.	
Mosdok - -	Europe -	Russia - -	43 43 23 N.	43 50 0 E.	2 55 20 E.	
Mosketto Cove -	America -	Greenland - -	64 55 13 N.	52 56 45 W.	3 31 47 W.	
Moulins - -	Europe -	France - -	46 34 4 N.	3 20 0 E.	0 13 20 E.	
Mount (Cape) -	Africa -	Grain Coast -	6 46 0 N.	11 48 0 W.	0 47 12 W.	
Mowee (East Point) -	America -	Sandwich Isles -	20 50 30 N.	155 55 0 W.	10 23 40 W.	
Mowee (West Point) -	America -	Sandwich Isles -	20 53 30 N.	150 38 30 W.	10 26 34 W.	
Mulgrave (Point) -	America -	Beering's Straits -	67 45 30 N.	165 12 0 W.	11 0 48 W.	
Munich - -	Europe -	Bavaria - -	48 7 37 N.	11 32 30 E.	0 46 10 E.	
Muswell Hill - -	Europe -	England - -	51 35 32 N.	0 7 20 W.	0 0 29 W.	
Nagpour - -	Asia -	India - -	21 8 30 N.	79 46 0 E.	5 19 4 E.	
Namur - -	Europe -	Netherlands -	50 28 3 N.	4 47 45 E.	0 19 11 E.	
Nancovery Harbour -	Asia -	Nicobar Isles -	7 58 0 N.	93 26 0 E.	6 13 44 E.	
Nancy - -	Europe -	France - -	48 41 55 N.	6 10 15 E.	0 24 41 E.	

LONGITUDE.

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Nangasacki -	Asia	Japan	32 32 0 N.	128 46 15 E.	8 35 5 E.	H. M.
Nankin -	Asia	China	32 4 40 N.	118 47 0 E.	7 55 8 E.	
Nantes -	Europe	France	47 13 7 N.	1 33 0 W.	0 6 12 W.	3 0
Naples -	Europe	Italy	40 50 15 N.	14 18 0 E.	0 57 22 E.	
Narbonne -	Europe	France	43 10 58 N.	3 0 0 E.	0 12 0 E.	
Narcondam -	Asia	Bengal Bay	13 25 15 N.	94 7 0 E.	6 16 28 E.	
Narva -	Europe	Livonia	59 23 27 N.	28 21 45 E.	1 53 27 E.	
Navassa (Isle)	America	Atlantic Ocean	18 23 30 N.	75 1 18 W.	5 0 5 W.	
Needles (Lighthouse)	Europe	Isle of Wight	50 39 53 N.	1 33 55 W.	0 6 16 W.	10 30
Negapatam -	Asia	India	10 46 0 N.	79 48 26 E.	5 19 14 E.	
Negrais (Cape) -	Asia	India	15 56 30 N.	94 18 0 E.	6 17 12 E.	
Nef hin -	Europe	Russia	51 2 45 N.	31 49 30 E.	2 7 18 E.	
Neufacht -	Europe	Austria	47 48 27 N.	16 13 17 E.	1 4 53 E.	
Nevers -	Europe	France	46 59 17 N.	3 9 16 E.	0 12 37 E.	
Newbury -	America	New England	43 2 0 N.	70 37 30 W.	4 42 30 W.	
Newenham (Cape)	America	Beering's Straits	58 41 30 N.	162 19 30 W.	10 49 18 W.	
Newington (Stoke)	Europe	England	51 33 40 N.	0 4 59 W.	0 0 20 W.	
Newtee (Point)	Asia	India	15 56 0 N.	73 36 0 E.	4 54 24 E.	
New-werk (Isle)	Europe	Lower Saxony	53 55 19 N.	8 31 9 E.	0 34 6 E.	
New-year's Harbour	America	Staten Land	54 48 55 S.	64 11 0 W.	4 16 44 W.	
Nice -	Europe	Italy	43 41 47 N.	7 16 22 E.	0 29 5 E.	
Nicholas Mole (St.)	America	Hispaniola	19 49 20 N.	73 29 45 W.	4 53 50 W.	
Nicobar Great)	Asia	Bengal Bay	7 4 0 N.	93 44 0 E.	6 14 50 E.	
Nicobar (Car)	Asia	Bengal Bay	9 10 0 N.	92 50 0 E.	6 11 20 E.	
Nieuport -	Europe	Flanders	51 7 41 N.	2 45 5 E.	0 11 0 E.	11 45
Ningpo -	Asia	China	29 57 45 N.	120 18 0 E.	8 1 12 E.	
Ninnes -	Europe	France	43 50 12 N.	4 18 30 E.	0 17 15 E.	
Noir (Cape)	America	Terra del Fuego	54 32 30 S.	73 3 15 W.	4 52 13 W.	
Noirmoutier (Isle)	Europe	France	47 0 5 N.	2 14 22 W.	0 8 57 W.	
Nootka Sound	America	Pacific Ocean	49 36 7 N.	126 42 10 W.	8 26 41 W.	0 20
Norburg -	Europe	Denmark	55 3 43 N.	9 45 18 E.	0 39 1 E.	
Norfolk Island	Asia	Pacific Ocean	29 1 45 S.	168 19 0 E.	11 12 40 E.	
Noriton -	America	Pennsylvania	40 9 56 N.	75 28 30 W.	5 1 54 W.	
North Cape -	Europe	Lapland	71 10 30 N.	23 49 0 E.	1 43 16 E.	3 44
North (Cape)	America	South Georgia	54 4 45 S.	38 5 0 W.	2 33 0 W.	
North (Cape)	Asia	Beering's Straits	68 56 0 N.	179 11 30 W.	11 56 46 W.	
North Island	Asia	Straits of Sunda	5 37 5 S.	105 55 0 E.	7 3 40 E.	
North Island	Asia	Chinese Sea	25 14 0 N.	141 14 0 E.	0 24 56 E.	
Norton's Sound	America	Beering's Straits	64 30 30 N.	162 47 30 W.	10 51 10 W.	
Noyon -	Europe	France	49 34 59 N.	2 59 48 E.	0 11 50 E.	
Nuremberg -	Europe	Germany	49 27 3 N.	11 0 45 E.	0 44 3 E.	
Oaitipcha Bay	America	Otaheite	17 45 45 S.	149 8 57 W.	9 56 36 W.	
Ochotsk -	Asia	Tartary	59 20 10 N.	143 12 30 E.	9 32 50 E.	
Ohamaneno Harbour	America	Ulitchah	16 45 30 S.	151 37 31 W.	10 6 30 W.	11 30
Oheterom (Isle)	America	Pacific Ocean	22 26 36 S.	150 48 45 W.	10 3 15 W.	
Obawahoa (Isle)	America	Marquesas	9 40 40 S.	139 1 40 W.	9 16 7 W.	
Outaboo (Isle)	America	Marquesas	9 55 30 S.	139 6 0 W.	9 16 24 W.	2 30
Oldenburg -	Europe	Westphalia	53 8 40 N.	8 14 20 E.	0 32 57 E.	
Oleron -	Europe	France	43 11 1 N.	0 36 30 W.	0 2 26 W.	

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				In Degrees.	In Time.	
					H. M. S.	H. M.
Oleron (Isle) -	Europe -	France -	46° 2' 51" N.	0° 1' 24" W.	0 5 38 W.	
Olinde -	America -	Brazil -	8° 13' 0" S.	35° 5' 30" W.	2 20 22 W.	
Olonie (Sable) -	Europe -	France -	46° 29' 52" N.	1° 47' 5" W.	0 7 8 W.	
Omergon (Tower) -	Asia -	India -	20° 10' 30" N.	72° 56' 30" E.	4 51 40 E.	
Omer's (St.) -	Europe -	France -	50° 44' 52" N.	2° 14' 67" E.	0 9 0 E.	
Onateayo (Isle) -	America -	Marquesas -	9° 58' 0" N.	123° 51' 0" W.	9 15 24 W.	
Onecheow (Isle) -	America -	Sandwich Isles -	21° 49' 30" N.	160° 13' 30" W.	10 40 54 W.	
Oonalaska -	America -	Beering's Straits -	53° 54' 29" N.	166° 22' 15" W.	11 5 29 W.	
Oonemak (Cape) -	America -	Beering's Straits -	54° 30' 30" N.	165° 31' 0" W.	11 10 4 W.	
Opapa (Isle) -	America -	Pacific Ocean -	27° 36' 0" S.	144° 8' 32" W.	9 36 34 W.	
Oporto -	Europe -	Portugal -	41° 10' 0" N.	8° 22' 0" W.	0 33 28 W.	
Orange -	Europe -	France -	44° 8' 10" N.	4° 48' 8" E.	0 19 13 E.	
Oreehoua -	America -	Sandwich Isles -	22° 3' 0" N.	160° 6' 30" W.	10 40 26 W.	
Orel -	Europe -	Russia -	52° 56' 40" N.	35° 57' 0" E.	2 23 48 E.	
Orenburg -	Asia -	Tartary -	51° 46' 3" N.	55° 7' 35" E.	3 40 30 E.	
Orford (Cape) -	America -	Pacific Ocean -	42° 52' 0" N.	124° 25' 0" W.	8 17 40 W.	
Orford-Nefs -	Europe -	England -	52° 4' 30" N.	1° 28' 1" E.	0 5 52 E.	
Orleans -	Europe -	France -	47° 54' 10" N.	1° 54' 27" E.	0 7 38 E.	
Orleans (New) -	America -	Louisiana -	29° 57' 45" N.	89° 58' 45" W.	5 59 55 W.	
Oratava -	Africa -	Teneriffe -	28° 23' 35" N.	16° 35' 35" W.	1 6 22 W.	
Ork -	Asia -	Tartary -	51° 12' 32" N.	58° 32' 0" E.	3 54 8 E.	
Ortegall (Cape) -	Europe -	Spain -	43° 46' 37" N.	7° 38' 0" W.	0 30 32 W.	
Ofimo -	Europe -	Italy -	43° 29' 36" N.	13° 27' 8" E.	0 53 46 E.	
Ofnaburg -	Europe -	Germany -	52° 16' 14" N.	7° 47' 30" E.	0 31 10 E.	
Ofnaburg (Isle) -	America -	Pacific Ocean -	17° 52' 20" S.	148° 6' 0" W.	9 52 24 E.	
Ofkend -	Europe -	Netherlands -	51° 15' 10" N.	2° 56' 30" E.	0 11 46 E.	
Ofsia -	Europe -	Italy -	41° 45' 35" N.	12° 16' 20" E.	0 49 5 E.	11 45
Otakootaia (Isle) -	America -	Pacific Ocean -	19° 51' 30" S.	158° 23' 0" W.	10 33 52 W.	
Overberg -	Europe -	Norway -	59° 6' 52" N.	11° 22' 15" E.	0 45 29 E.	
Ower Rocks -	Europe -	England -	50° 39' 57" N.	0° 40' 0" W.	0 2 40 W.	
Owharre Bay -	America -	Huachu -	16° 42' 46" S.	151° 9' 6" W.	10 4 56 W.	11 50
Owhyhee { N. Point } -	America -	Sandwich Isles -	20° 17' 0" N.	155° 59' 0" W.	10 23 56 W.	
{ S. Point } -	America -	Sandwich Isles -	18° 54' 30" N.	155° 48' 0" W.	10 23 12 W.	
{ E. Point } -	America -	Sandwich Isles -	19° 33' 0" N.	154° 52' 0" W.	10 19 28 W.	
Oxford Observatory -	Europe -	England -	51° 45' 38" N.	1° 15' 0" W.	0 5 0 W.	
Paddlesworth -	Europe -	England -	51° 6' 50" N.	1° 8' 9" E.	0 4 33 E.	
Padua -	Europe -	Italy -	45° 23' 40" N.	11° 52' 56" E.	0 47 32 E.	
Paimboeuf -	Europe -	France -	47° 17' 15" N.	2° 1' 46" W.	0 8 7 W.	
Paipa -	America -	Peru -	5° 12' 0" S.			
Paix (Port) -	America -	Hispaniola -	19° 56' 0" N.	72° 52' 15" W.	4 51 29 W.	
Palermo -	Europe -	Sicily -	38° 6' 45" N.	13° 20' 15" E.	0 53 21 E.	
Palliser (Cape) -	Asia -	New Zealand -	41° 38' 0" S.	175° 23' 12" E.	11 41 33 E.	
Palliser's Isles -	America -	Pacific Ocean -	15° 38' 15" S.	146° 30' 15" W.	0 46 1 W.	
Palliser's Port -	Africa -	Kerguelen's Land -	40° 3' 15" S.	69° 35' 0" E.	4 38 20 E.	
Palma (Isle) -	Africa -	Canaries -	28° 36' 45" N.	17° 49' 6" W.	1 11 16 W.	
Palmes (Cape) -	Africa -	Grain Coast -	4° 30' 0" N.	7° 41' 0" W.	0 30 44 W.	
Palmerston's Isle -	America -	Pacific Ocean -	18° 0' 30" S.	163° 12' 0" W.	10 52 48 W.	
Palmiras (Point) -	Asia -	India -	20° 44' 0" N.	87° 1' 26" E.	5 48 6 E.	9 30
Palmiers -	Europe -	France -	43° 6' 44" N.	1° 36' 21" E.	0 6 25 E.	

LONGITUDE.

A TABLE of the Latitudes and Longitudes of Places.

Names of Places.	Continents.	Coast, Sea, or Country.	Latitude.	Longitude		H. W.
				In Degrees.	In Time.	
Panama - -	America -	Mexico - -	8° 58' 12" N.	80° 15' 15" W.	11. M. S. 5 21 1 W.	H. M.
Paoom (Isle) - -	Asia -	New Hebrides -	16° 30' 0" S.	168° 28' 45" E.	11 13 55 E.	
Para - -	America -	River Amazons -	1° 28' 0" S.	48° 40' 0" W.	3 14 40 W.	
Paris (Observatory) -	Europe -	France - -	48° 50' 14" N.	2° 20' 0" E.	0 9 20 E.	
Parma - -	Europe -	Italy - -	44° 44' 50" N.	10° 26' 30" E.	0 41 56 E.	
Passado - -	America -	Peru - -	0° 10' 0" S.	82° 0' 0" W.	5 28 0 W.	
Patrixfiord - -	Europe -	Iceland - -	65° 35' 45" N.	24° 10' 0" W.	1 36 40 W.	
Pau - -	Europe -	France - -	43° 15' 0" N.	0° 9' 0" W.	0 0 36 W.	
Pavia - -	Europe -	Italy - -	45° 10' 59" N.	9° 11' 30" E.	0 36 46 E.	
St. Paul's Isle - -	Africa -	Indian Ocean -	38° 44' 0" S.	77° 18' 0" E.	5 9 12 E.	
St. Paul de Leon - -	Europe -	France - -	48° 41' 24" N.	3° 58' 37" W.	0 15 54 W.	4 0
Pednathias Head - -	Europe -	Scilly Isles -	49° 52' 2" N.			
Pedra Blanca - -	Asia -	Chinese Sea -	22° 16' 0" N.	115° 22' 57" E.	7 41 32 E.	
Pedra Branca - -	Asia -	Straits of Malacca -	1° 18' 0" N.	104° 31' 49" E.	6 58 7 E.	
Pedra (Point) - -	Asia -	Ceylon - -	39° 52' 0" N.	80° 27' 0" E.	5 21 48 E.	
Pekin - -	Asia -	China - -	39° 54' 47" N.	116° 24' 51" E.	7 45 39 E.	
Pellew Isles - -	Asia -	Chinese Sea -	7° 19' 0" N.	134° 40' 0" E.	8 58 40 E.	
Pello - -	Europe -	Finland - -	66° 48' 16" N.	23° 58' 15" E.	1 35 53 E.	
Pera (Pulo) - -	Asia -	Straits of Malacca -	- - -	99° 8' 30" E.	6 36 34 E.	
Perigueux - -	Europe -	France - -	45° 11' 8" N.	0° 43' 19" E.	0 2 53 E.	
Perinaldo - -	Europe -	Italy - -	43° 53' 20" N.	7° 42' 45" E.	0 30 51 E.	
Permera (Rocks) - -	Asia -	Indian Ocean -	13° 13' 0" N.	74° 44' 0" E.	4 58 56 E.	
Peros Banhos - -	Asia -	Indian Ocean -	5° 22' 0" N.	71° 53' 0" E.	4 47 32 E.	
Perpetua (Cape) - -	America -	Pacific Ocean -	44° 4' 30" N.	124° 14' 0" W.	8 16 56 W.	
Perpignan - -	Europe -	France - -	42° 41' 53" N.	2° 53' 35" E.	0 11 34 E.	
Pefaro - -	Europe -	Italy - -	43° 55' 1" N.	12° 53' 21" E.	0 51 33 E.	
St. Petersburg - -	Europe -	Russia - -	59° 56' 23" N.	30° 19' 15" E.	2 1 17 E.	
St. Peter's Fort - -	America -	Martinico -	14° 44' 0" N.	61° 21' 16" E.	4 5 25 W.	
St. Peter's Isle - -	America -	Atlantic Ocean -	46° 46' 30" N.	56° 17' 0" W.	3 45 8 W.	
St. Peter and Paul - -	Asia -	Kamtschatka -	53° 0' 37" N.	158° 44' 30" E.	10 34 58 E.	
Petit Goave - -	America -	Hispaniola -	18° 27' 0" N.	72° 45' 34" W.	4 51 2 W.	3 00
Petrofawodfk - -	Europe -	Russia - -	61° 47' 4" N.	34° 23' 30" E.	2 17 34 E.	
Pettaw - -	Europe -	Styria - -	46° 26' 21" N.	15° 59' 15" E.	1 3 57 E.	
Petworth - -	Europe -	England - -	50° 59' 17" N.	0° 36' 26" W.	0 2 26 W.	
Pevensey - -	Europe -	England - -	50° 49' 12" N.	0° 20' 14" F.	0 1 21 E.	
Philadelphia - -	America -	Pennsylvania -	39° 56' 54" N.	75° 13' 45" W.	5 0 55 W.	
Philip (Straits) - -	Europe -	Flanders - -	51° 16' 55" N.	3° 45' 12" E.	0 15 1 E.	
St. Philip's Fort - -	Europe -	Misorea - -	39° 50' 46" N.	3° 48' 30" E.	0 15 14 E.	
Philipsburg - -	Europe -	Germany - -	49° 14' 1" N.	8° 26' 34" E.	0 33 46 E.	
Philipville - -	Europe -	Netherlands -	50° 11' 19" N.	4° 32' 19" E.	0 18 9 E.	
Pickergill's Harbour -	Asia -	New Zealand -	45° 47' 27" S.	166° 18' 9" E.	11 5 13 E.	10 57
Pickergill's Isle - -	America -	Atlantic Ocean -	54° 42' 30" S.	36° 58' 0" W.	2 27 52 W.	
Pico - -	Europe -	Azores - -	38° 26' 52" N.	28° 27' 40" W.	1 53 51 W.	
Pines (Isle of) - -	Asia -	New Caledonia -	22° 38' 0" S.	167° 38' 0" E.	11 10 32 E.	
Pifa - -	Europe -	Italy - -	43° 43' 7" N.	10° 22' 52" E.	0 41 31 E.	
Piscadores - -	Asia -	Pacific Ocean -	11° 15' 0" N.	167° 20' 20" E.	11 9 21 E.	
Plate-Rack {	N.E. Pt.	America -	West Indies -	20° 31' 0" N.	69° 33' 0" W.	4 38 12 W.
	S. Point	America -	West Indies -	20° 13' 35" N.	69° 37' 45" W.	4 38 31 W.
	N.W. Pt.	America -	West Indies -	20° 30' 0" N.	70° 4' 30" W.	4 40 18 W.
Plymouth - -	Europe -	England - -	50° 22' 30" N.	4° 12' 45" W.	0 16 51 W.	6 0

LONGITUDE.

A TABLE of the Latitudes and Longitudes of Places.

Names of Places.	Continents.	Coast, Sea, or Country.	Latitude.	Longitude		H. W.
				In Degrees.	In Time.	
Poitiers - -	Europe -	France - -	46 34 50 N.	0 20 48 E.	0 1 23 E.	H. M.
Pollingen - -	Europe -	Germany - -	47 48 17 N.	11 7 30 E.	0 44 30 E.	
Pondicherry - -	Asia -	India - -	11 55 41 N.	79 51 30 E.	5 19 26 E.	
Ponoi - -	Europe -	Lapland - -	67 4 30 N.	41 7 45 E.	2 44 31 E.	
Pontoife - -	Europe -	France - -	49 3 2 N.	2 5 37 E.	0 8 22 E.	
Pool - -	Europe -	England - -	50 42 50 N.	1 58 55 W.	0 7 56 W.	
Poolytopu - -	Asia -	India - -	8 8 0 N.	77 15 45 E.	5 9 3 E.	
Popayan - -	America -	New Granada -	2 27 30 N.	76 16 15 W.	5 5 5 W.	
Port au Prince -	America -	Hispaniola -	18 33 42 N.	72 27 33 W.	4 49 50 W.	
Portland (Point) -	Europe -	England - -	50 31 0 N.	2 29 0 W.	0 9 56 W.	
Portland (Isle) -	Europe -	North Sea -	63 22 0 N.	18 54 0 W.	1 15 36 W.	H. O.
Portland (Isle) -	Asia -	Pacific Ocean -	39 24 40 S.	177 51 45 E.	11 51 27 E.	
Porto - -	Europe -	Italy - -	41 46 44 N.	12 14 10 W.	0 48 57 W.	
Porto Bello - -	America -	Mexico - -	0 33 30 N.	79 44 15 W.	5 18 57 W.	
Porto Novo - -	Asia -	India - -	11 30 0 N.	79 45 30 E.	5 19 2 E.	
Porto Praya - -	Africa -	St. Jago - -	14 53 30 N.	23 30 17 W.	1 34 1 W.	
Porto Rica { N.E. Pt.	America -	West Indies -	18 20 0 N.	65 51 25 W.	4 23 26 W.	
Porto Rica { N.W. Pt.	America -	West Indies -	18 31 30 N.	67 18 0 W.	4 29 12 W.	
Porto Sancto (Isle) -	Africa -	Atlantic Ocean -	33 5 35 N.	16 14 51 W.	1 4 59 W.	
Port Paix - -	America -	Hispaniola -	19 56 30 N.	72 58 0 W.	4 51 52 W.	
Port Praslin - -	Asia -	New Britain -	4 49 27 S.	153 6 30 E.	10 12 26 E.	H. 15
Port Royal - -	America -	Jamaica - -	18 0 0 N.	76 44 45 W.	5 6 59 W.	
Port Royal - -	America -	Martinico - -	14 35 55 N.	61 0 0 W.	4 4 36 W.	
Portsmouth Town -	Europe -	England - -	50 47 27 N.	1 5 57 W.	0 4 24 W.	
Portsmouth Academy	Europe -	England - -	50 48 2 N.	1 6 18 W.	0 4 25 W.	
Portsmouth - -	America -	New England -	43 4 15 N.	70 43 15 W.	4 42 53 W.	
Pofen - -	Europe -	Poland - -	52 26 0 N.	5 0 15 E.	1 0 1 E.	
Prague - -	Europe -	Bohemia - -	50 53 4 N.	14 25 15 E.	0 57 41 E.	
Praters { N.E. Point }	Asia -	Chinese Sea {	20 57 30 N.	116 57 30 E.	7 47 50 E.	
Praters { S.W. Point }			20 42 0 N.	116 40 0 E.	7 46 40 E.	
Praule - -	Europe -	England - -	50 14 0 N.	3 49 15 W.	0 15 17 W.	7 20
Preparis (Isle) -	Asia -	Bay of Bengal -	14 48 0 N.	93 34 0 E.	6 14 16 E.	
Prestburgh - -	Europe -	Hungary - -	48 8 7 N.	17 10 30 E.	1 8 42 E.	
Prince's Island - -	Asia -	Straits of Sunda	6 35 10 S.	105 14 20 E.	7 0 57 E.	
Prince's Island - -	Africa -	Atlantic Ocean	1 37 0 N.	7 40 0 E.	1 30 40 E.	
Prince of Wales's Fort	America -	New Wales -	58 47 32 N.	94 13 55 W.	6 16 56 W.	
Prince of Wales's Cape	America -	Beering's Straits	65 45 30 N.	168 17 30 W.	11 13 10 W.	
P. W. Henry's Isle -	America -	Pacific Ocean -	19 0 0 N.	141 22 0 W.	9 25 28 W.	
Providence - -	America -	New England -	41 50 41 N.	71 22 0 W.	4 45 28 W.	
Pudyona - -	Asia -	New Caledonia -	20 18 0 S.	164 41 14 E.	10 58 45 E.	
Pylestaart's Island -	Asia -	Pacific Ocean -	22 23 30 N.	175 49 30 W.	11 43 18 W.	7 30 3 30
Quebec - -	America -	Canada - -	46 48 38 N.	71 5 29 W.	4 44 22 W.	
Quibo (Isle) - -	America -	Pacific Ocean -	7 27 0 N.	82 10 0 W.	5 28 40 W.	
Quilloan - -	Asia -	India - -	8 52 30 N.	76 37 30 E.	5 6 30 E.	
Quimper - -	Europe -	France - -	47 58 29 N.	4 6 0 W.	0 16 24 W.	
St. Quinton - -	Europe -	France - -	49 50 51 N.	3 17 23 E.	0 13 10 E.	
Quiros (Cape) - -	Asia -	New Hebrides -	14 56 8 S.	167 20 0 E.	11 9 20 E.	
Quito - -	America -	Peru - -	0 13 27 S.	78 10 15 W.	5 12 41 W.	

LONGITUDE.

A TABLE of the Latitudes and Longitudes of Places.

Names of Places.	Continents.	Coast, Sea, or Country.	Latitude.	Longitude		H. W.
				In Degrees.	In Time.	
					II. M. S.	II. M.
Race (Cape) -	America -	Newfoundland -	46 40 0 N.	53 3 30 W.	3 32 14 W.	
Rakah (Ancient) -	Asia -	Mesopotamia -	36 1 0 N.	38 50 0 E.	2 35 20 E.	
Ramhead -	Europe -	England -	50 18 24 N.	4 17 30 W.	0 17 10 E.	
Ramsgate -	Europe -	England -	51 19 31 N.	1 24 41 E.	0 5 39 E.	
Ranai (Isle) -	America -	Sandwich Isles -	20 46 30 N.	156 55 30 W.	10 27 42 W.	
Randers -	Europe -	Denmark -	56 27 48 N.	10 3 27 E.	0 40 14 E.	
Ratibon -	Europe -	Germany -	49 0 0 N.	12 6 25 E.	0 48 26 E.	
Ravenna -	Europe -	Italy -	44 25 5 N.	12 10 36 E.	0 48 42 E.	
Recanati -	Europe -	Italy -	43 25 44 N.	13 31 8 E.	0 54 5 E.	
Recif -	America -	Brazil -	8 10 0 N.	35 35 0 W.	2 22 20 W.	
Reculver -	Europe -	England -	51 22 47 N.	1 11 50 E.	0 4 47 E.	
Red-Buoy -	Europe -	Mouth of the Elbe -	53 30 0 N.			
Refuge (Port) -	Asia -	Bligh's Islands -	18 38 30 S.	173 56 0 W.	11 31 44 W.	
Reikianefs (Cape) -	Europe -	Iceland -	63 55 0 N.	22 47 30 W.	1 31 10 W.	
Rennes -	Europe -	France -	48 6 50 N.	1 41 30 W.	0 6 46 W.	
Resolution Bay -	America -	Marquesas -	9 55 30 S.	139 8 40 W.	9 16 35 W.	2 30
Resolution (Isle) -	America -	Hudson's Straits -	61 29 0 N.	65 16 0 W.	4 21 4 W.	
Resolution (Isle) -	America -	Pacific Ocean -	17 23 30 S.	141 45 0 W.	9 27 0 W.	
Resolution (Port) -	Asia -	Tanna -	19 32 25 S.	169 41 5 E.	11 18 44 E.	
Revel -	Europe -	Livonia -	59 26 22 N.	24 39 15 E.	1 38 37 E.	
Rhe (Lights) -	Europe -	France -	46 14 40 N.	1 33 40 W.	0 6 15 W.	3 0
Rheims -	Europe -	France -	49 15 16 N.	4 1 48 E.	0 16 7 E.	
Rhodes -	Europe -	France -	44 21 0 N.	2 34 17 E.	0 10 17 E.	
Riche (Point) -	America -	Newfoundland -	50 40 10 N.	57 23 0 W.	3 49 32 W.	
Richmond (Ober.) -	Europe -	England -	51 28 8 N.	0 18 42 W.	0 1 15 W.	
Rieux -	Europe -	France -	43 15 23 N.	1 12 0 E.	0 4 48 E.	
Riez -	Europe -	France -	43 48 57 N.	6 5 6 E.	0 24 20 E.	
Riga -	Europe -	Livonia -	56 56 24 N.	24 0 15 E.	1 36 1 E.	
Rimini -	Europe -	Italy -	44 3 43 N.	12 32 36 E.	0 50 10 E.	
Ringsted -	Europe -	Denmark -	55 26 51 N.	11 47 55 E.	0 47 12 E.	
Ringwood -	Europe -	England -	50 50 58 N.	1 47 16 W.	0 7 9 W.	
Rio Janeiro -	America -	Brazil -	22 54 10 N.	43 10 45 W.	2 52 43 W.	2 5
Ripa Trafone -	Europe -	Italy -	43 0 24 N.	13 44 30 E.	0 54 58 E.	
Rochelle -	Europe -	France -	46 0 33 N.	1 9 2 W.	0 4 36 W.	3 45
Rochfort -	Europe -	France -	45 56 10 N.	0 57 49 W.	0 3 51 W.	4 15
Rodolfo -	Europe -	Turkey -	40 58 24 N.	27 25 16 E.	1 49 41 E.	
Rodrigues (Isle) -	Africa -	Indian Ocean -	19 40 40 S.	63 9 15 E.	4 12 37 E.	
Roefkilde -	Europe -	Denmark -	55 38 25 N.	12 5 27 E.	0 48 22 E.	
Romaine Key -	America -	Bahama Channel -	22 1 30 N.	77 39 45 W.	5 10 39 W.	
Rome (St. Peter's) -	Europe -	Italy -	41 53 54 N.	12 27 41 E.	0 49 51 E.	
Romney (New) -	Europe -	England -	50 59 7 N.	0 56 22 E.	0 3 45 E.	
Romney (Old) -	Europe -	England -	50 59 25 N.	0 53 50 E.	0 3 35 E.	
Ronde (Pulo) -	Asia -	Straits of Malacca -	- - -	95 13 0 E.	6 20 52 E.	
Rot (Abbey) -	Europe -	Bavaria -	47 59 11 N.	12 3 30 E.	0 48 14 E.	
Rotterdam -	Europe -	Holland -	51 56 0 N.	4 29 0 E.	0 17 56 E.	3 0
Rotterdam (Isle) -	Asia -	Friendly Isles -	20 15 22 S.	174 44 48 E.	11 38 59 E.	6 0
Rouen -	Europe -	France -	49 26 27 N.	1 5 30 E.	0 4 22 E.	1 15
Round Island -	America -	Beering's Straits -	58 56 30 N.	159 53 30 W.	10 39 34 W.	
Roxant (Cape) -	Europe -	Portugal -	38 45 26 N.	9 35 50 W.	0 38 23 W.	
Royan -	Europe -	France -	45 37 28 N.	1 1 32 W.	0 4 6 W.	

LONGITUDE.

A TABLE of the Latitudes and Longitudes of Places.

Names of Places.	Continents.	Coast, Sea, or Country.	Latitude.	Longitude		H. W.
				In Degrees.	In Time.	
Ruttunpour - -	Asia -	Barar - -	22 16 0 N.	82 36 0 E.	H. M. S. 5 30 24 E.	H. M.
Rypen - -	Europe -	Denmark - -	55 19 57 N.	8 47 5 E.	0 35 8 E.	
Saba (Isle) - -	America -	Caribbean Sea -	17 39 30 N.	63 17 15 W.	4 13 9 W.	
Sable (Cape) - -	America -	Nova Scotia -	43 23 43 N.	65 39 15 W.	4 22 37 W.	
Sacrifice (Rocks) - -	Asia -	Malabar Coast -	11 28 0 N.	75 31 5 E.	5 2 4 E.	
Saddle-back (Isles) - -	America -	Hudson's Straits -	62 7 0 N.	68 13 0 W.	4 32 52 W.	
Saaby - -	Europe -	Denmark - -	57 20 2 N.	10 32 54 E.	0 42 12 E.	
Sagan - -	Europe -	Silesia - -	51 42 12 N.	15 22 15 E.	1 1 29 E.	
Saintes - -	Europe -	France - -	45 44 46 N.	0 37 45 W.	0 2 31 W.	
Saintes (Rocks) W. end	Europe -	Bay of Biscay -	48 5 5 N.	5 5 0 W.	0 20 20 W.	
Sainte-Croix - -	Europe -	France - -	48 0 35 N.	7 23 55 E.	0 29 36 E.	
Salatan (Point) - -	Asia -	Borneo - -	4 13 45 S.	114 29 0 E.	7 37 56 E.	
Salée (New) - -	Africa -	Morocco - -	34 5 0 N.	6 43 30 W.	0 26 54 W.	
Salisbury - -	Europe -	England - -	51 3 49 N.	1 47 0 W.	0 7 8 W.	
Salisbury (Isle) - -	America -	Hudson's Bay -	63 29 0 N.	76 47 0 W.	5 7 8 W.	
Sall (Isle) - -	Africa -	Atlantic Ocean -	16 38 15 N.	22 56 15 W.	1 31 45 W.	
Salonica - -	Europe -	Turkey - -	40 41 10 N.	23 8 0 E.	1 32 32 E.	
Salvages (Isles) - -	Africa -	Atlantic Ocean -	30 3 27 N.	16 6 30 W.	1 4 26 W.	
Samana - -	America -	Hispaniola -	19 15 40 N.	69 16 30 W.	4 37 6 W.	
Samara - -	Europe -	Russia - -	48 39 35 N.	35 20 0 E.	2 21 20 E.	
Sambelong (Great) - -	Asia -	Bengal Bay -	7 10 0 N.	93 40 0 E.	6 14 40 E.	
Samganooda - -	America -	Oonalaska - -	53 54 29 N.	166 22 15 W.	11 5 29 W.	
Sancta Cruz - -	Africa -	Teneriffe - -	28 29 4 N.	16 22 30 W.	1 5 30 W.	
Sancta Cruz - -	Africa -	Grand Canary -	28 10 37 N.	15 47 0 W.	1 3 8 W.	
Sandown Castle - -	Europe -	England - -	51 14 18 N.	1 23 59 E.	0 5 36 E.	
Sandfoe - -	Europe -	Lapland - -	68 56 15 N.	16 57 0 E.	1 7 48 E.	
Sandwich - -	Europe -	England - -	51 16 30 N.	1 20 15 E.	0 5 21 E.	
Sandwich Bay - -	America -	South Georgia -	54 42 0 S.	36 12 0 W.	2 24 48 W.	
Sandwich (Cape) - -	Asia -	New Holland -	18 17 11 S.	146 1 13 E.	9 44 5 E.	
Sandwich (Cape) - -	Asia -	Mallicola - -	16 28 0 S.	167 59 0 E.	11 11 56 E.	
Sandwich Harbour - -	Asia -	Mallicola - -	16 25 20 S.	167 53 0 E.	11 11 32 E.	
Sandwich Isle - -	Asia -	New Hebrides -	17 41 0 S.	168 33 0 E.	11 14 12 E.	
Sandy Bay - -	America -	Nova Scotia -	43 31 9 S.	65 39 15 W.	4 22 37 W.	
Sandy Cape - -	Asia -	New Holland -	24 45 48 S.	153 12 22 E.	10 12 49 E.	
Sandy-Hook Lights - -	America -	New Jersey -	44 26 30 N.	74 6 42 W.	4 56 27 W.	
Sapata (Pulo) - -	Asia -	Chinese Sea -	10 2 40 N.	109 12 51 E.	7 16 51 E.	
Saratow - -	Europe -	Russia - -	51 31 28 N.	46 0 0 E.	3 4 0 E.	
Sarlat - -	Europe -	France - -	44 53 20 N.	1 12 49 E.	0 4 51 E.	
Sarum (Old) - -	Europe -	England - -	51 5 45 N.	1 47 28 W.	0 7 10 W.	
Saunders's (Cape) - -	Asia -	New Zealand -	45 57 45 S.	170 16 0 E.	11 21 4 E.	
Saunders's (Cape) - -	America -	South Georgia -	54 6 30 S.	36 57 30 W.	2 27 50 W.	
Saunders's Isle - -	America -	Sandwich Land -	58 0 0 S.	26 58 0 W.	1 47 52 W.	
Savage Isle - -	Asia -	Pacific Ocean -	19 2 15 S.	169 30 30 W.	11 18 2 W.	
Savanna (Lights) - -	America -	Georgia - -	32 0 45 N.	80 56 0 W.	5 23 44 W.	
Schwezingen - -	Europe -	Germany - -	49 23 4 N.	8 26 15 E.	0 33 45 E.	
Silly Lights - -	Europe -	St. Geo. Chan. -	49 53 47 N.	6 29 30 W.	0 25 58 W.	
Scott Head - -	Europe -	England - -	52 59 40 N.	0 44 11 E.	0 2 57 W.	
Sebastian (Cape St.) - -	Africa -	Madagascar -	12 30 0 S.	46 25 0 E.	3 5 40 E.	
Sedan - -	Europe -	France - -	49 42 29 N.	4 57 36 E.	0 19 50 E.	
Seez - -	Europe -	France - -	48 36 23 N.	0 10 44 E.	0 0 43 E.	

LONGITUDE.

A TABLE of the Latitudes and Longitudes of Places

Names of Places.	Continents.	Coast, Sea, or Country.	Latitude.	Longitude		H. W.
				In Degrees.	In Time.	
Selinginfk - -	Asia	Siberia - -	51 6 6 N.	106 40 45 E.	H. M. S. 7 6 43 E.	H. M.
Selfea - -	Europe	England - -	50 43 50 N.	0 47 54 W.	0 3 12 W.	
Senegal - -	Africa	Negroland - -	15 53 0 N.	16 31 30 W.	1 6 6 W.	10 30
Senes - -	Europe	France - -	43 54 40 N.	6 24 5 E.	0 25 36 E.	
Senlis - -	Europe	France - -	49 12 28 N.	2 35 0 E.	0 10 20 E.	
Senones - -	Europe	France - -	48 23 7 N.	6 57 30 E.	0 27 50 E.	
Sens - -	Europe	France - -	48 11 56 N.	3 17 21 E.	0 13 9 E.	
Serdze Kamen - -	Asia	Beering's Straits	67 3 0 N.	171 54 30 W.	11 27 38 W.	
Seringapatam - -	Asia	Myfore - -	12 31 45 N.	76 46 45 E.	5 7 7 E.	
Seven Islands - -	Asia	Chinefe Sea - -	1 5 16 S.	105 24 4 E.	7 1 36 E.	
Severndroog - -	Asia	India - -	17 47 30 N.	73 9 0 E.	4 52 36 E.	
Sevastopolis - -	Europe	Crimea - -	44 41 30 N.	33 35 0 E.	2 14 20 E.	
Seychelles (Isle) - -	Asia	Almirantes - -	4 35 0 S.	55 35 0 E.	3 42 20 E.	5 30
Shepherd's Isles - -	Asia	New Hebrides - -	16 58 0 S.	168 42 0 E.	11 14 28 E.	
Shirburn Castle - -	Europe	England - -	51 39 22 N.	0 58 15 W.	0 3 53 W.	
Shoalness - -	America	Beering's Straits	59 37 0 N.	162 18 30 W.	10 49 14 W.	
Shoreham - -	Europe	England - -	50 50 7 N.	0 16 19 W.	0 1 5 W.	9 30
Siam - -	Asia	India - -	14 18 0 N.	100 50 0 E.	6 43 20 E.	
Siao Isle - -	Asia	Chinefe Sea - -	2 49 0 N.	125 3 45 E.	8 20 15 E.	
Sidney Cove - -	Asia	Port Jackson - -	33 51 7 S.	151 13 30 E.	10 4 54 E.	
Sienna - -	Europe	Italy - -	43 22 0 N.	11 10 0 E.	0 44 40 E.	
Sierra Leone (Cape) - -	Africa	Sierra Leone - -	8 29 30 N.	13 9 17 W.	0 52 37 W.	
Sifran - -	Europe	Russia - -	53 9 53 N.	48 24 45 E.	3 13 39 E.	
Si-ngan-fu - -	Asia	China - -	34 16 30 N.	108 43 45 E.	7 14 55 E.	
Sinigaglia - -	Europe	Italy - -	43 43 16 N.	13 11 30 E.	0 52 46 E.	
Sitteron - -	Europe	France - -	44 11 51 N.	5 56 18 E.	0 23 45 E.	
Skagen (Lights) - -	Europe	Denmark - -	57 43 44 N.	10 37 45 E.	0 42 31 E.	
Skirmish Bay - -	Asia	Chattham Island - -	43 49 3 S.	176 35 0 E.	11 46 20 E.	
Sledge Island - -	America	Beering's Straits	64 30 0 N.	166 8 0 E.	11 4 32 E.	
Sluys - -	Europe	Holland - -	51 18 35 N.	3 22 54 E.	0 13 32 E.	
Smeinogorsk - -	Asia	Siberia - -	51 9 27 N.	82 8 0 E.	5 28 32 E.	
Smokey Cape - -	Asia	New Holland - -	30 54 18 S.	153 1 40 E.	10 12 7 E.	
Smyrna - -	Asia	Natolia - -	38 28 7 N.	27 6 33 E.	1 48 26 E.	
Snæfell (Mount) - -	Europe	Iceland - -	64 52 20 N.	23 54 0 W.	1 35 36 W.	
Socono (Isle) - -	America	Pacific Ocean - -	18 48 0 N.	110 10 0 W.	7 20 40 W.	
Soissons - -	Europe	France - -	49 22 52 N.	3 19 16 E.	0 13 17 E.	
Sombavera (Isles) - -	America	Caribbean Sea - -	18 38 0 N.	63 37 30 W.	4 14 30 W.	
Sonderburg - -	Europe	Denmark - -	54 54 59 N.	9 48 10 E.	0 39 13 E.	
Soolo - -	Asia	Philippines - -	5 57 0 N.	121 15 30 E.	8 5 2 E.	
Southampton - -	Europe	England - -	50 54 0 N.	1 23 56 W.	0 5 36 W.	
South Cape - -	Asia	New Zealand - -	47 16 50 S.	167 20 9 E.	11 9 21 E.	
South Cape - -	Asia	New Holland - -	43 42 30 S.	146 58 0 E.	9 47 52 E.	
South Island - -	Asia	Chinefe Sea - -	24 22 30 N.	141 24 0 E.	9 25 36 E.	
Southern Thule - -	America	Sandwich Land - -	59 34 0 S.	27 45 0 W.	1 51 0 W.	
Spartel (Cape) - -	Africa	Morocco - -	35 46 0 N.	5 57 12 W.	0 23 49 W.	
Speaker Bank - -	Asia	Indian Ocean - -	4 45 0 S.	72 57 0 E.	4 51 48 E.	
Spichel (Cape) - -	Europe	Portugal - -	38 22 15 N.	9 20 12 W.	0 37 21 W.	
Spring-Grove - -	Europe	England - -	51 28 34 N.	10 20 21 W.	0 1 21 W.	
Sproe (Isle) - -	Europe	Great Belt - -	55 19 56 N.	10 56 45 E.	0 43 47 E.	
Stade - -	Europe	Germany - -	53 36 5 N.	0 23 15 E.	0 37 33 E.	
Stalbridge - -	Europe	England - -	50 57 0 N.	2 23 30 W.	0 9 34 W.	

LONGITUDE.

A TABLE of the Latitudes and Longitudes of Places.

Names of Places.	Continents.	Coast, Sea, or Country.	Latitude.	Longitude		H. W.
				In Degrees.	In Time.	
Start point -	Europe -	England -	50 14 20 N.	3 44 30 W.	H. M. S.	H. M.
Stephen's (Cape) -	Asia -	New Zealand -	40 36 50 S.	173 58 30 E.	0 14 58 W.	
Stephen's (Cape) -	Asia -	Beering's Straits -	63 33 3 N.	162 17 0 W.	11 35 54 E.	
Stephen's (Isle) -	Asia -	Cook's Straits -	40 35 26 S.	174 0 22 E.	10 49 8 W.	
Stephen's (Port) -	Asia -	New Holland -	32 45 0 S.	152 12 0 E.	11 36 1 E.	
Stickhufen -	Europe -	Germany -	53 13 33 N.	7 40 6 E.	10 8 48 E.	
Stockholm -	Europe -	Sweden -	59 20 31 N.	18 3 51 E.	0 30 40 E.	
Strabane -	Europe -	Ireland -	54 49 29 N.	7 23 5 W.	1 12 15 E.	
Straßburg -	Europe -	France -	48 34 56 N.	7 44 36 E.	0 29 32 W.	
Strømnefs -	Europe -	Iceland -	65 39 40 N.	24 29 15 W.	0 30 58 E.	
					1 37 57 W.	
Streatham -	Europe -	England -	51 25 46 N.	0 7 47 W.	0 0 31 W.	
Stromnes -	Europe -	Orkneys -	58 56 22 N.	3 31 15 W.	0 14 5 W.	9 0
Succes Bay -	America -	Terra del Fuego -	54 49 45 S.	65 25 0 W.	4 21 40 W.	
Succes (Cape) -	America -	Terra del Fuego -	55 1 0 S.	65 27 0 W.	4 21 48 W.	
Suez -	Africa -	Egypt -	30 2 0 N.	32 28 30 E.	2 9 54 E.	
Sulphur Island -	Asia -	Pacific Ocean -	24 48 0 N.	141 20 0 E.	9 25 20 E.	
Surat -	Asia -	India -	21 11 0 N.	73 2 34 E.	4 52 10 E.	
Swilly Island -	Asia -	New Holland -	43 55 30 S.	147 7 30 E.	9 48 30 E.	
Swinfield -	Europe -	England -	51 8 48 N.	1 11 15 E.	0 4 45 E.	
Table Cape -	Asia -	New Zealand -	39 6 40 S.	178 2 20 E.	11 52 9 E.	
Table Island -	Asia -	New Hebrides -	15 38 0 S.	167 7 0 E.	11 8 28 E.	
Tackararee Point -	Africa -	Gold Coast -	4 46 53 N.	2 27 44 W.	0 9 51 W.	
Taganrok -	Asia -	Tartary -	47 12 40 N.	38 38 45 E.	2 34 35 E.	
Tahora -	America -	Sandwich Isles -	21 42 30 N.	160 24 30 W.	10 41 38 W.	
Tahowrooa -	America -	Sandwich Isles -	20 38 0 N.	156 36 30 W.	10 26 26 W.	
Tambou -	Europe -	Russia -	52 43 44 N.	41 45 0 E.	2 47 0 E.	
Tanjore -	Asia -	India -	10 46 30 N.	79 48 26 E.	5 19 14 E.	
Tanna -	Asia -	New Hebrides -	19 32 35 S.	169 41 5 E.	11 18 44 E.	3 0
Tacukaa Isle -	America -	Pacific Ocean -	14 30 30 S.	145 9 30 W.	9 40 38 W.	
Tarapia -	Europe -	Turkey -	41 8 24 N.	29 0 28 E.	1 56 2 E.	
Taricon -	Europe -	France -	43 48 20 N.	4 39 36 E.	0 18 38 E.	
Tarbes -	Europe -	France -	43 13 52 N.	0 3 59 E.	0 0 16 E.	
Tasman's Head -	Asia -	New Holland -	43 33 30 S.	147 30 30 E.	9 50 2 E.	
Taffa (Isle) -	Europe -	Sea of Marmara -	40 46 40 N.	24 38 54 E.	1 38 36 E.	
Taffacorta -	Africa -	Palma Isle -	28 38 0 N.	17 58 0 W.	1 11 52 W.	
Tava (Pulo) -	Asia -	Chinese Sea -	0 44 30 S.	106 3 15 E.	7 4 13 E.	
Tellicherry -	Asia -	Malabar Coast -	11 45 20 N.	75 29 3 E.	5 1 56 E.	
Temontengis -	Asia -	Soloo -	5 57 0 N.	120 53 30 E.	8 3 54 E.	
Teneriffe (Peake) -	Africa -	Canaries -	28 15 38 N.	16 45 33 W.	1 7 2 W.	
Tenterden -	Europe -	England -	51 4 8 N.	0 41 8 E.	0 2 45 E.	
Tercera -	Europe -	Azores -	38 59 7 N.	27 12 42 W.	1 48 51 W.	
Terracina -	Europe -	Italy -	41 18 14 N.	13 13 7 E.	0 52 52 E.	
St. Thadæus-Nofs -	Asia -	Kamtschatka -	62 50 0 N.	179 5 0 E.	11 56 20 E.	
Thalpeny Isle -	Asia -	Lacca - } N.P. dives } S.P.	10 10 30 N.	73 49 30 E.	4 55 18 E.	
Thionville -	Europe -	France -	10 4 0 N.	73 48 0 E.	4 55 12 E.	
St. Thomas's Isle -	America -	Virgin Isles -	49 21 30 N.	6 10 30 E.	4 24 42 E.	
St. Thomas's Isle -	Africa -	Atlantic Ocean -	18 21 55 N.	64 51 30 W.	0 19 26 W.	
Thorley Hall -	Europe -	England -	0 19 0 N.	6 42 30 E.	0 26 50 E.	
Three Hill Island -	Europe -	England -	51 50 45 N.	0 9 0 E.	0 0 36 E.	
	Asia -	New Hebrides -	17 4 0 S.	168 35 0 E.	11 14 20 E.	

LONGITUDE.

A TABLE of the Latitudes and Longitudes of Places.

Names of Places.	Continents.	Coast, Sea, or Country.	Latitude.	Longitude		H. W.
				In Degrees.	In Time.	
					H. M. S.	H. M.
Three Kings Isle -	Asia -	New Zealand -	34 10 15 S.	172 25 8 E.	11 29 41 E.	
Three Points (Cape) -	Africa -	Gold Coast -	4 40 30 N.	2 43 32 W.	0 10 54 W.	
Thrum Cap -	America -	Pacific Ocean -	18 36 41 S.	139 13 45 W.	9 16 55 W.	
Thule (Southern) -	America -	Sandwich Land -	59 34 0 S.	27 45 0 W.	1 51 0 W.	
Thury -	Europe -	France -	49 21 28 N.	2 18 30 E.	0 9 14 E.	
Tiburou (Cape) -	America -	Hispaniola -	18 19 25 N.	74 34 12 W.	4 58 17 W.	
Timoam (Pulo) -	Asia -	Gulf of Siam -	2 53 30 N.	104 24 37 E.	6 57 38 E.	
Timor (S.W. Point) -	Asia -	India -	10 6 52 S.	124 4 36 E.	8 16 18 E.	
Timor-Land -	Asia -	India -	8 3 0 S.	132 17 0 E.	8 49 8 E.	
Tinian (Isle) -	Asia -	Pacific Ocean -	15 0 0 N.	145 55 30 E.	9 43 42 E.	
Tobolski -	Asia -	Siberia -	58 12 18 N.	68 18 30 E.	4 33 14 E.	
Tolaga Bay -	Asia -	New Zealand -	38 22 0 S.	178 35 54 E.	11 54 24 E.	
Toledo -	Europe -	Spain -	39 50 0 N.	3 20 0 W.	0 13 20 W.	
Tonik -	Asia -	Siberia -	56 29 58 N.	84 58 30 E.	5 39 54 E.	
Tondern -	Europe -	Denmark -	54 56 19 N.	8 53 17 E.	0 35 33 E.	
Tonga-Tabu (Isle) -	Asia -	Pacific Ocean -	21 8 36 S.	175 1 50 E.	11 40 7 E.	6 50
Tongres -	Europe -	Netherlands -	50 47 7 N.	5 27 23 E.	0 21 50 E.	
Tonnerre -	Europe -	France -	47 51 8 N.	3 58 44 E.	0 15 55 E.	
Toobonai (Isle) -	America -	Pacific Ocean -	23 25 0 S.	149 20 30 W.	9 57 22 W.	
Tornea -	Europe -	Sweden -	65 50 50 N.	24 14 0 E.	1 36 56 E.	
Tortudas -	America }	West } E.P. -	20 0 55 N.	72 42 35 W.	4 50 50 W.	
Toul -	Europe -	France -	48 40 32 N.	5 53 18 E.	0 23 3 E.	
Toulon -	Europe -	France -	43 7 16 N.	5 55 26 E.	0 23 42 E.	
Toulouse -	Europe -	France -	43 35 46 N.	1 26 45 E.	0 5 47 E.	
Tournai -	Europe -	Netherlands -	50 36 57 N.	3 33 17 E.	0 13 33 E.	
Tours -	Europe -	France -	47 23 46 N.	0 41 32 E.	0 2 46 E.	
Trafalgar -	Europe -	Spain -	36 7 56 N.	6 3 0 W.	0 24 45 W.	
Traitor's Head -	Asia -	Erramanga -	18 43 30 S.	169 20 30 E.	11 17 22 E.	
Traquebar -	Asia -	India -	10 56 0 S.	79 40 30 E.	5 18 42 E.	
Treguier -	Europe -	France -	48 46 54 N.	3 13 49 W.	0 12 55 W.	
Treves -	Europe -	Germany -	49 46 37 N.	6 38 5 E.	0 26 32 E.	
Trinidad -	America -	Cuba -	21 47 45 N.	80 19 36 W.	5 21 18 W.	
Trinidad (Isle) -	America -	Atlantic Ocean -	20 30 30 S.	29 33 0 W.	1 58 12 W.	
Trinity Island -	America -	Pacific Ocean -	56 35 0 N.	154 53 0 W.	10 19 32 W.	
Trinkamaly -	Asia -	Ceylon -	8 32 0 N.	81 12 0 E.	5 24 48 E.	
Tripoli -	Africa -	Barbary -	32 53 40 N.	13 21 7 E.	0 53 24 E.	
Trichinopoly -	Asia -	India -	10 49 0 N.	78 38 26 E.	5 14 34 E.	
Trepez (St) -	Europe -	France -	43 16 8 N.	6 38 29 E.	0 26 34 E.	
Troyes -	Europe -	France -	48 18 5 N.	4 4 34 E.	0 16 18 E.	
Tscherkatki -	Europe -	Russia -	47 13 40 N.	39 45 0 E.	2 39 0 E.	
Tschukotskoi -	Asia -	Beering's Straits -	64 14 30 N.	173 31 0 W.	11 34 4 W.	
Tubingen -	Europe -	Germany -	48 31 4 N.	9 2 29 E.	0 36 10 E.	
Tulles -	Europe -	France -	45 16 3 N.	1 46 2 E.	0 7 4 E.	
Turin -	Europe -	Italy -	45 4 14 N.	7 40 0 E.	0 30 40 E.	
Turuagair (Cape) -	Asia -	New Zealand -	40 32 30 S.	176 49 0 E.	11 47 16 E.	
Turk's Isle -	America -	Widdw. Passage -	21 11 0 N.	71 15 22 E.	4 45 1 W.	
Turtle Island -	Asia -	Pacific Ocean -	19 48 45 S.	177 57 0 W.	11 51 48 W.	
Two Groups -	America -	Pacific Ocean -	18 12 36 S.	142 11 45 W.	9 28 47 W.	
Typa -	Asia -	China -	22 9 20 N.	113 43 45 E.	7 34 55 E.	
Tyrnaw -	Europe -	Hungary -	48 23 30 N.	17 34 36 E.	1 10 18 E.	

LONGITUDE.

A TABLE of the Latitudes and Longitudes of Places

Names of Places.	Continents.	Coast, Sea, or Country.	Latitude.	Longitude		H. W.
				In Degrees.	In Time.	
					H. M. S.	H. M.
Ubes (St.) - -	Europe -	Portugal - -	38 22 15 N.	8 54 22 W.	0 35 37 W.	
Ufa - - -	Europe -	Russia - -	54 42 45 N.	55 53 30 E.	3 43 34 E.	
Uliateah - -	America -	Pacific Ocean -	16 45 0 S.	151 31 0 W.	10 6 4 W.	
Ulm - - -	Europe -	Germany - -	48 23 45 N.	9 58 51 E.	0 39 55 E.	
Umba - - -	Europe -	Lapland - -	66 39 48 N.	34 14 45 E.	2 16 59 E.	
Unst - - -	Europe -	Shetland - -	60 44 0 N.	0 46 0 W.	0 3 4 W.	
Upfal - - -	Europe -	Sweden - -	59 51 50 N.	17 38 9 E.	1 10 33 E.	
Ural'sk - -	Asia -	Tartary - -	51 11 0 N.	51 35 15 E.	3 36 24 E.	
Uraniberg - -	Europe -	Denmark - -	55 54 17 N.	12 53 0 E.	0 50 51 E.	
Urbine - - -	Europe -	Italy - -	43 43 36 N.	12 36 50 E.	0 50 27 E.	
Uthant Lights -	Europe -	France - -	48 28 8 N.	5 3 21 W.	0 20 13 W.	
Ustic (Novo) -	Europe -	Russia - -	59 23 54 N.	56 32 15 E.	3 46 9 E.	
Ust-kamenogorsk -	Asia -	Siberia - -	49 56 49 N.	82 38 30 E.	5 30 34 E.	
Utrecht - -	Europe -	Netherlands -	52 5 0 N.	5 9 45 E.	0 20 39 E.	
Uzes - - -	Europe -	France - -	44 0 45 N.	4 25 2 E.	0 17 40 E.	
Vabres - - -	Europe -	France - -	43 56 27 N.	2 50 16 E.	0 11 21 E.	
Vaison - - -	Europe -	France - -	44 14 28 N.	5 3 54 E.	0 20 16 E.	
Valence - -	Europe -	France - -	44 55 59 N.	4 53 10 E.	0 19 33 E.	
Valenciennes -	Europe -	France - -	50 21 27 N.	3 31 40 E.	0 14 7 E.	
Valery (St.) sur Som -	Europe -	France - -	50 11 21 N.	1 37 36 E.	0 6 30 E.	10 0
Valery (St.) en Caup -	Europe -	France - -	49 52 12 N.	0 41 10 E.	0 2 45 E.	9 45
Valparaíso - -	America -	Chili - -	33 1 29 S.	72 19 15 W.	4 49 17 W.	
Van Dieman's Road -	Asia -	Tonga-Tabu -	21 4 15 S.	175 6 0 W.	11 40 24 W.	7 15
Vannes - - -	Europe -	France - -	47 39 26 N.	2 45 19 W.	0 11 1 W.	3 45
Vauxe's Tomb - -	Asia -	India - -	21 4 30 N.	72 48 44 E.	4 51 15 E.	
Vence - - -	Europe -	France - -	43 43 13 N.	7 6 29 E.	0 28 26 E.	
Venice - - -	Europe -	Italy - -	45 27 4 N.	12 3 15 E.	0 48 13 E.	
Venus (Point) - -	America -	Otaheite - -	17 29 15 S.	149 30 22 W.	9 58 1 W.	10 38
Vera Cruz - - -	America -	Mexico - -	19 9 36 N.	95 3 0 W.	6 20 12 W.	
Verd (Cape) - -	Africa -	Negroland - -	14 47 13 N.	17 33 16 W.	1 10 13 W.	
Verdun - - -	Europe -	France - -	49 9 24 N.	5 22 41 E.	0 21 31 E.	
Verona - - -	Europe -	Italy - -	45 26 26 N.	11 1 0 E.	0 44 4 E.	
Verfailles - -	Europe -	France - -	48 48 21 N.	2 7 7 E.	0 8 28 E.	
Victoria (Fort) - -	Asia -	Malabar Coast -	17 56 40 N.	73 7 54 E.	4 52 32 E.	
Vienna (Observatory)	Europe -	Germany - -	48 12 36 N.	16 21 54 E.	1 5 28 E.	
Vigo - - -	Europe -	Spain - -	42 13 20 N.	8 27 45 W.	0 33 51 W.	
Villa Franca - -	Europe -	Italy - -	43 40 20 N.	7 19 15 E.	0 29 17 E.	
St. Vincent's (Cape) -	Europe -	Portugal - -	37 1 0 N.	9 2 22 W.	0 36 9 W.	
St. Vincent's (Isle) -	America -	Caribbean Sea -	13 10 15 N.	61 30 51 W.	4 6 3 W.	
Vingorla Rocks - -	Asia -	Malabar Coast -	15 55 30 N.	73 30 0 E.	4 54 0 E.	
Vintimiglia - -	Europe -	Italy - -	43 53 20 N.	7 37 30 E.	0 30 30 E.	
Virgin-Gorda (Fort) -	America -	West Indies -	18 18 0 N.	64 18 40 W.	4 17 15 W.	
Virgin (Cape) - -	America -	Patagonia - -	52 23 0 S.	67 54 0 W.	4 51 36 W.	10 0
Vifagapatam - -	Asia -	India - -	17 42 0 N.	83 23 52 E.	5 33 35 E.	
Viviers - - -	Europe -	France - -	44 28 57 N.	4 40 45 E.	0 18 43 E.	
Wakefield - - -	Europe -	England - -	53 41 0 N.	1 35 0 W.	0 6 20 W.	
Wales (P. of) Cape -	America -	Beering's Straits -	65 45 30 N.	168 17 30 W.	11 13 10 W.	
Wales (P. of) Fort -	America -	New Wales - -	58 47 32 N.	94 13 48 W.	6 16 55 W.	7 20
Wales (P. of) Isles -	America -	Pacific Ocean -	14 58 0 S.	147 48 0 W.	9 51 12 W.	

LONGITUDE.

A TABLE of the Latitudes and Longitudes of Places.

Names of Places.	Continents.	Coast, Sea, or Country.	Latitude.	Longitude		H. W.
				In Degrees.	In Time.	
Wallis's Isle -	Asia -	Pacific Ocean -	13 17 0 S.	176 45 0 W.	H. M. S.	H. M.
Walvisch Bay -	Africa -	Calfraria -	22 57 51 S.	14 40 0 E.	0 58 40 E.	
Wandhead -	Europe -	England -	51 31 21 N.	0 2 35 E.	0 0 10 E.	
Wardden -	Europe -	Hungary -	46 18 18 N.	16 25 51 E.	1 5 43 E.	
Wardbus -	Europe -	Lapland -	70 22 36 N.	31 6 0 E.	2 4 24 E.	
Warsaw -	Europe -	Poland -	52 14 28 N.	21 1 5 E.	1 24 4 E.	
Warwick (Cape) -	America -	Hudson's Straits -	61 29 0 N.	65 16 0 W.	4 21 4 W.	
Wateoo -	America -	Pacific Ocean -	20 1 35 S.	158 14 30 W.	10 32 58 W.	
Watling's Isle (W. P.) -	America -	Bahamas -	23 56 0 N.	74 42 32 W.	4 58 50 W.	
West Cape -	Asia -	New Zealand -	45 56 15 S.	166 6 15 E.	11 4 25 E.	
Weilman (Isles) -	Europe -	Northern Ocean -	63 20 30 N.	20 27 45 E.	1 21 51 E.	
Whitfunday Cape -	America -	Cook's River -	58 13 0 N.	152 36 0 W.	10 10 24 W.	
Whitfun Island -	America -	Pacific Ocean -	19 26 0 S.	138 12 0 W.	9 12 48 W.	
Whitfuntide Isle -	Asia -	Pacific Ocean -	15 44 20 S.	168 20 15 E.	11 13 21 E.	
Whytootachee -	America -	Pacific Ocean -	18 51 40 S.	159 39 45 W.	10 38 39 W.	
Wilborg -	Europe -	North Jutland -	57 27 11 N.	9 26 15 E.	0 37 45 W.	
Wicklow -	Europe -	Ireland -	52 50 0 N.	6 1 0 W.	0 24 4 W.	7 30
Wildefhausen -	Europe -	Germany -	52 54 20 N.	8 27 39 E.	0 33 51 E.	
William (Fort) -	Asia -	Bengal -	22 34 0 N.	88 27 56 E.	5 53 52 E.	
Willis's Isle -	America -	St. Georgia -	54 0 0 S.	38 29 40 W.	2 33 59 W.	
Wilna -	Europe -	Poland -	54 41 0 N.	25 14 5 E.	1 40 59 W.	
Winchelsea -	Europe -	England -	50 55 28 N.	0 42 31 E.	0 2 50 E.	
Windfor -	Europe -	England -	51 29 0 N.	0 35 28 W.	0 2 23 W.	
Wittemburg -	Europe -	Germany -	51 53 0 N.	12 42 45 E.	0 50 51 E.	
Woahoo (Isle) -	America -	Sandwich Isles -	21 40 30 N.	158 1 30 W.	10 32 6 W.	
Wologda -	Europe -	Russia -	59 13 33 N.	40 10 0 E.	2 4 40 E.	
Woliteholme Cape -	America -	Hudson's Straits -	62 39 0 N.	77 48 0 W.	5 11 2 W.	
Woody Point -	America -	Pacific Ocean -	50 0 30 N.	127 57 0 W.	8 31 44 W.	
Worcester -	Europe -	England -	52 9 30 N.	2 0 15 W.	0 8 1 W.	
Woronefeh -	Europe -	Russia -	51 40 30 N.	30 20 45 E.	2 37 23 E.	
Woslak -	Europe -	Russia -	61 15 0 N.	0 19 12 E.	0 1 17 E.	
Wrotham -	Europe -	England -	51 18 54 N.	0 19 12 E.	0 1 17 E.	
Wurtzburg -	Europe -	Germany -	49 46 6 N.	9 54 45 E.	0 30 39 E.	
Xamhay -	Asia -	China -	31 16 0 N.	121 31 45 E.	8 6 7 E.	
Yeu (Isle d') -	Europe -	France -	46 42 26 N.	2 19 50 W.	0 9 10 W.	
Ylo -	America -	Peru -	17 36 15 S.	71 13 0 W.	4 44 52 W.	
York -	Europe -	England -	53 57 45 N.	1 6 4 W.	0 4 24 W.	
York Cape -	Asia -	New Holland -	10 38 20 S.	142 12 20 E.	9 28 49 E.	
York Fort -	America -	New Wales -	57 1 48 N.	92 17 11 W.	6 9 9 W.	9 10
York (Duke of) Isle -	Asia -	Pacific Ocean -	8 29 0 S.	172 22 0 W.	11 29 28 W.	
York Minder -	America -	Terra del Fuego -	55 26 20 S.	70 8 0 W.	4 40 32 W.	
York (New) -	America -	Jersey -	40 43 0 N.	74 9 0 W.	4 56 36 W.	9 0
Young (Cape) -	Asia -	Chatham Island -	43 48 0 N.	176 58 0 W.	11 47 52 W.	
Ypres -	Europe -	Netherlands -	50 51 10 N.	2 52 49 E.	0 11 31 E.	
Zachu (Rocks) -	America -	Porto Rico -	18 24 0 N.	67 45 30 W.	4 31 2 W.	
Zaricin -	Europe -	Russia -	48 42 20 N.	44 27 30 E.	2 57 50 E.	
Znaym -	Europe -	Germany -	48 51 15 N.	16 1 42 E.	1 4 7 E.	

LONGITUDE.

A CATALOGUE of the Longitudes and Latitudes of Six Hundred fixed Stars, with the Angle of Position of each Star, adapted to the Beginning of 1800.

N. B. This Catalogue is taken from the Connoissance des Temps P. An. XII. and was calculated from the French Annual Catalogue, by M. Chabrol.

Names of Stars.			Longitude.				Latitude.				Angle of Polition.			Annual Variations.	
			S.	D.	M.	S.	D.	M.	S.	D.	M.	S.	S.		
γ	Pegasi	-	0	6	22	9	12	35	47	N.	24	4	44	—	0.26
ε	Ceti	-	11	28	7	10	10	1	13	S.	23	49	53	—	0.82
α	Calliopezæ	-	1	9	49	58	52	15	38	N.	40	21	56	—	4.01
ζ	Calliopezæ	-	1	2	17	32	44	42	13	N.	33	49	37	—	3.73
ε	Andromedæ	-	0	18	9	41	23	1	20	N.	25	25	55	—	2.77
δ	Andromedæ	-	0	19	1	33	24	20	54	N.	35	42	2	—	2.87
α	Calliopezæ	-	1	5	0	36	46	36	27	N.	35	5	40	—	4.49
β	Ceti	-	11	29	46	3	20	46	54	S.	24	55	15	—	3.09
ζ	Andromedæ	-	0	17	48	12	17	36	45	N.	24	21	20	—	3.48
η	Calliopezæ	-	1	7	25	14	47	3	8	N.	35	13	39	—	5.88
δ	Piscium	-	0	11	21	9	2	10	30	N.	23	8	15	—	3.35
35	ν Andromedæ	-	0	26	22	15	32	32	58	N.	27	45	7	—	4.40
γ	Calliopezæ	-	1	11	9	26	48	47	45	N.	36	22	15	—	7.68
37	μ Andromedæ	-	0	26	23	8	29	38	52	N.	26	41	13	—	4.99
	Polaris	-	2	25	46	14	66	4	39	N.	73	2	22	—	147.57
ε	Piscium	-	0	14	44	11	1	4	57	N.	22	49	14	—	4.58
η	Ceti	-	0	8	57	35	16	6	40	S.	23	38	36	—	5.15
β	Andromedæ	-	0	27	37	5	25	56	52	N.	25	22	5	—	6.14
θ	Calliopezæ	-	1	9	0	25	43	6	38	N.	31	50	9	—	8.68
ζ	Piscium	-	0	17	4	44	0	12	52	S.	22	31	38	—	5.49
46	Andromedæ	-	1	5	4	52	33	48	50	N.	27	10	27	—	8.51
δ	Calliopezæ	-	1	15	8	12	46	23	34	N.	33	15	33	—	12.21
θ	Ceti	-	0	13	26	12	15	45	58	S.	23	6	8	—	6.43
48	Andromedæ	-	1	6	0	2	33	18	9	N.	26	47	9	—	9.08
49	ξ Andromedæ	-	1	7	20	2	34	32	17	N.	27	6	3	—	9.63
η	Piscium	-	0	24	1	28	5	22	5	N.	22	2	48	—	7.13
π	Piscium	-	0	24	7	39	1	53	2	N.	21	44	18	—	7.52
ν	Piscium	-	0	22	42	49	4	42	19	S.	21	37	11	—	7.76
φ	Andromedæ	-	1	11	48	48	36	49	58	N.	27	17	38	—	11.98
110	ο Piscium	-	0	24	56	44	1	37	59	S.	21	23	30	—	8.13
52	τ Ceti	-	0	15	5	27	24	54	15	S.	23	42	17	—	8.41
ε	Calliopezæ	-	1	21	59	9	47	31	37	N.	32	17	45	—	18.45
ζ	Ceti	-	0	19	9	13	20	20	33	S.	22	33	32	—	8.75
α	Tri. Bor.	-	1	4	4	47	16	47	52	N.	22	3	54	—	9.79
γ	Arietis	-	1	0	23	35	7	9	26	N.	21	12	40	—	9.12
β	Arietis	-	1	1	10	39	8	28	50	N.	21	13	59	—	9.09
50	f Calliopezæ	-	2	0	46	51	54	21	54	N.	37	38	54	—	28.21
γ	Andromedæ	-	1	11	26	28	27	47	22	N.	23	26	10	—	12.48
α	Piscium	-	0	26	34	47	9	4	28	S.	20	52	22	—	9.38
α	Arietis	-	1	4	51	58	9	57	42	N.	20	42	44	—	10.49
β	Tri. Bor.	-	1	9	33	36	20	34	3	N.	21	44	39	—	11.86
γ	Tri. Bor.	-	1	10	43	51	18	56	1	N.	21	4	1	—	12.41
ο	Ceti	-	0	28	43	45	15	56	13	S.	20	29	13	—	10.72
35	δ Calliopezæ H.	-	1	29	27	1	48	57	21	N.	30	29	39	—	27.47
ε	Ceti	-	0	26	55	1	25	15	5	S.	21	23	20	—	11.51

LONGITUDE.

Names of Stars.			Longitude.	Latitude.	Angle of Position.	Annual Variations.
			S. D. M. S.	D. M. S.	D. M. S.	S.
ξ ²	Ceti	-	1 4 40 25	5 52 9 S.	19 17 26	- 11.40
σ	Ceti	-	0 27 18 27	28 32 13 S.	21 36 43	- 12.14
δ	Ceti	-	1 4 46 27	14 28 30 S.	19 5 35	- 12.13
ε	Ceti	-	1 0 32 6	26 0 2 S.	20 35 11	- 12.48
θ	Persei	-	1 21 51 53	31 36 25 N.	21 43 37	- 18.40
35	Arietis	-	1 14 8 47	11 17 44 N.	18 40 44	- 13.79
γ	Ceti	-	1 6 38 51	12 0 25 S.	18 58 56	- 12.39
μ	Ceti	-	1 9 7 56	5 34 40 S.	18 14 17	- 12.63
π	Ceti	-	1 0 57 17	28 15 37 S.	20 40 29	- 12.92
1 τ	Eridani	-	0 29 14 19	32 44 35 S.	21 37 10	- 13.32
39	Arietis	-	1 15 34 22	12 28 22 N.	18 28 35	- 14.32
η	Persei H.	-	1 25 55 6	37 27 34 N.	22 55 40	- 22.01
16	P ¹ Persei	-	1 19 2 25	20 55 58 N.	19 12 23	- 16.04
41	Arietis	-	1 15 24 47	10 26 19 N.	18 11 23	- 14.23
τ	Persei	-	1 25 7 41	34 21 6 N.	21 40 15	- 20.88
2 τ ²	Eridani	-	0 29 49 53	35 31 55 S.	21 50 49	- 14.00
21	Persei	-	1 18 23 12	14 25 30 N.	17 59 36	- 15.43
22	π Persei	-	1 21 7 0	21 42 45 N.	18 43 22	- 17.63
η	Eridani	-	1 5 56 6	24 32 58 S.	19 5 21	- 13.50
λ	Ceti	-	1 12 17 57	7 48 10 S.	17 18 27	- 13.59
γ	Persei	-	1 27 14 17	34 30 30 N.	20 50 13	- 22.36
α	Ceti	-	1 11 31 32	12 35 48 S.	17 22 28	- 13.66
25 ε	Persei	-	1 22 7 7	20 33 40 N.	18 5 28	- 17.36
11	Eridani	-	1 1 42 52	38 57 10 S.	21 50 51	- 15.10
10 ε	Eridani	-	1 8 24 35	23 55 35 S.	18 23 7	- 13.95
β	Persei	-	1 23 22 51	22 24 22 N.	18 6 41	- 18.39
κ	Persei	-	1 25 0 40	26 2 17 N.	18 32 12	- 19.41
δ	Arietis	-	1 18 3 9	1 48 26 N.	16 20 49	- 14.97
α	Fornacis	-	1 1 45 25	44 43 51 S.	22 57 41	- 16.55
ζ	Eridani	-	1 11 1 36	25 56 29 S.	17 44 13	- 14.73
α	Persei	-	1 29 17 39	30 6 19 N.	18 6 28	- 22.56
16	Eridani	-	1 7 17 55	38 31 23 S.	20 3 1	- 16.01
97 κ	Ceti	-	1 16 3 1	14 17 12 S.	16 3 55	- 14.81
2	Giraf. H.	-	2 3 47 44	39 30 25 N.	20 6 8	- 29.18
ο	Tauri	-	1 18 22 26	9 21 1 S.	15 30 19	- 15.15
4	Giraf. H.	-	2 2 13 12	35 11 41 N.	18 45 22	- 26.05
2 ξ	Tauri	-	1 19 6 57	8 48 54 S.	15 18 8	- 15.31
35 τ	Persei	-	1 29 49 17	28 1 20 N.	17 9 57	- 22.31
5 f	Tauri	-	1 20 47 51	5 26 5 S.	14 55 29	- 15.68
17	Eridani	-	1 16 2 46	23 21 23 S.	16 7 43	- 15.45
37 ↓	Persei	-	2 0 57 29	27 56 56 N.	16 37 53	- 22.89
ε	Eridani	-	1 15 25 54	27 45 2 S.	16 29 31	- 15.77
19	Eridani	-	1 11 23 48	39 27 17 S.	18 50 14	- 16.86
10	Tauri	-	1 19 10 37	18 25 48 S.	15 5 21	- 15.70
δ	Persei	-	2 2 0 51	27 16 53 N.	15 56 37	- 23.24
41 ν	Persei	-	2 1 2 10	22 7 45 N.	15 1 25	- 21.46
ο	Eridani	-	1 18 3 15	28 44 15 S.	15 42 13	- 16.34
ν	Pleiadum	-	1 27 12 1	4 1 54 N.	13 36 8	- 17.63
26 π	Eridani	-	1 18 9 29	31 8 22 S.	15 48 11	- 16.63
27	Eridani	-	1 14 34 44	41 52 52 S.	18 3 57	- 17.82

LONGITUDE.

Names of Stars.		Longitude.	Latitude.	Angle of Position.	Annual Variations.
		S. D. M. S.	D. M. S.	D. M. S.	S.
46	ζ Persei	2 0 19 59	11 18 37 N.	13 19 59	— 19.27
	ε Eridani	2 4 25 21	26 50 1 N.	14 40 37	— 24.28
	δ Persei	1 8 56 56	54 19 28 S.	22 45 21	— 20.60
	ε Persei	2 2 53 18	19 5 33 N.	13 35 11	— 21.50
33	ε Eridani	1 16 3 28	43 39 56 S.	17 47 0	— 18.40
	γ Eridani	1 21 3 50	33 12 55 S.	14 57 7	— 17.34
	λ Tauri	1 27 50 23	7 58 55 S.	12 30 38	— 17.23
36	λ Eridani	1 18 9 52	43 29 27 S.	16 58 58	— 18.63
47	λ Persei	2 6 57 45	28 51 31 N.	13 58 4	— 26.27
38	ν Tauri	1 27 7 23	14 28 16 S.	12 32 27	— 17.07
	Α' Tauri	2 0 39 31	1 14 30 N.	12 6 29	— 18.28
51	μ Persei	2 8 0 20	26 41 0 N.	12 50 59	— 25.86
	α Eridani	1 26 37 58	27 28 43 S.	12 45 30	— 17.50
49	μ Tauri	2 0 47 9	12 12 17 S.	11 19 47	— 17.72
	γ Tauri	2 3 0 21	5 45 12 S.	10 47 30	— 18.32
41	ε Eridani	1 19 41 25	53 59 0 S.	18 10 5	— 21.50
	δ' Tauri	2 4 4 20	3 59 25 S.	10 29 37	— 18.63
	δ Tauri	2 4 19 48	4 7 57 S.	10 23 25	— 18.66
42	ξ Eridani	2 0 30 55	25 0 3 S.	11 20 2	— 17.94
43	δ Eridani	1 21 40 25	54 33 40 S.	17 26 0	— 21.84
	ε Tauri	2 5 39 58	2 35 17 S.	9 58 37	— 19.03
	Aldebaran	2 6 59 37	5 28 46 S.	9 19 19	— 19.04
47	ε Eridani	2 2 32 55	29 52 40 S.	10 42 12	— 18.51
50	ν' Eridani	1 25 52 7	52 52 52 S.	15 18 21	— 21.67
48	ν Eridani	2 4 0 59	25 8 49 S.	10 4 9	— 18.40
51	ζ Eridani	2 4 30 57	24 19 29 S.	9 52 42	— 18.43
52	ν' Eridani	1 27 4 56	51 50 3 S.	14 37 8	— 21.47
53	ε Eridani	2 2 27 46	36 1 7 S.	10 58 20	— 19.08
54	ε Eridani	2 1 55 28	41 23 54 S.	11 30 31	— 19.74
9	Camelopardalis	2 18 11 18	43 23 28 N.	11 33 4	— 45.76
	μ Eridani	2 6 32 22	25 13 27 S.	9 8 25	— 18.70
1	Orionis	2 9 0 13	15 24 14 S.	8 13 13	— 18.90
2	π' Orionis	2 9 34 18	13 30 21 S.	8 4 47	— 19.01
3	Orionis	2 9 18 20	16 47 45 S.	8 7 26	— 18.90
	σ' Orionis	2 10 41 56	8 14 56 S.	7 47 35	— 19.41
8	ζ Orionis	2 9 41 41	20 1 42 S.	7 56 4	— 18.93
3	ι Aurigæ	2 13 50 51	10 25 49 N.	7 24 34	— 22.52
9	σ Orionis	2 11 33 15	9 5 10 S.	7 26 8	— 19.46
10	Camelopardalis	2 18 28 38	37 24 18 N.	9 11 25	— 38.00
	ε Aurigæ	2 16 3 0	20 55 3 N.	7 36 23	— 20.23
10	Orionis	2 10 44 34	20 52 31 S.	7 32 56	— 19.04
8	ζ Aurigæ	2 15 50 33	18 10 40 N.	7 23 20	— 25.15
102	ι Tauri	2 13 59 28	1 13 10 S.	6 46 8	— 20.51
139	Camelopardalis	2 19 43 43	39 20 36 N.	8 45 23	— 40.98
10	ν Aurigæ	2 16 39 13	18 15 43 N.	6 50 25	— 25.35
	ι Leporis	2 9 15 16	44 59 6 S.	8 47 29	— 20.87
	β Eridani	2 12 20 20	27 52 55 S.	6 54 43	— 19.37
69	λ Eridani	2 12 25 8	31 34 3 S.	6 59 44	— 19.56
	Capella	2 19 3 49	22 51 44 N.	6 13 7	— 27.77
5	μ Leporis	2 12 35 38	30 4 18 S.	7 8 5	— 20.24

LONGITUDE.

Names of Stars.		Longitude.				Latitude.			Angle of Position.			Annual Variations.	
		S.	D.	M.	S.	D.	M.	S.	D.	M.	S.	S.	
	Rigel - -	2	14	2	1	31	8	45 S.	6	21	28	-	19.65
20	Orionis - -	2	15	3	8	29	51	41 S.	5	56	25	-	19.64
	β Tauri - -	2	19	46	54	5	22	14 N.	4	36	26	-	22.29
	γ Orionis - -	2	18	9	11	16	50	27 S.	4	42	59	-	19.73
	η Orionis - -	2	17	21	51	25	33	26 S.	5	0	9	-	19.63
	β Leporis - -	2	16	52	37	43	56	6 S.	5	33	17	-	21.09
	δ Orionis - -	2	19	34	6	23	34	43 S.	4	8	5	-	19.73
36	ν Orionis - -	2	19	7	3	30	34	4 S.	4	20	54	-	19.91
	α Leporis - -	2	18	35	13	41	4	58 S.	4	45	6	-	20.78
39	λ Orionis - -	2	20	54	47	13	23	37 S.	3	39	33	-	20.06
	ϵ Columbæ - -	2	15	54	19	58	39	0 S.	6	51	6	-	24.31
	ι Orionis - -	2	20	12	9	29	13	25 S.	3	54	26	-	19.60
	ζ Tauri - -	2	21	59	30	2	13	10 S.	3	24	25	-	21.19
	ϵ Orionis - -	2	20	40	10	24	31	56 S.	3	42	10	-	19.80
125	Tauri - -	2	22	38	47	2	30	48 N.	3	14	40	-	22.00
48	σ Orionis - -	2	21	18	5	25	57	20 S.	3	27	24	-	19.85
	ζ Orionis - -	2	21	53	21	25	19	9 S.	3	13	22	-	19.86
	α Columbæ - -	2	19	22	41	57	23	55 S.	5	5	27	-	24.01
	γ Leporis - -	2	22	5	25	45	49	28 S.	3	24	3	-	21.54
132	Tauri - -	2	24	42	37	1	7	42 N.	2	18	43	-	21.87
14	ζ Leporis - -	2	23	10	51	38	14	22 S.	2	48	16	-	20.61
	κ Orionis - -	2	23	36	19	33	5	47 S.	2	34	45	-	20.11
	δ Leporis - -	2	24	21	28	44	17	8 S.	2	24	7	-	21.36
	δ Aurigæ - -	2	27	7	10	30	40	35 N.	1	57	46	-	34.15
	β Columbæ - -	2	23	37	26	59	13	47 S.	3	7	39	-	24.63
	α Orionis - -	2	25	57	38	16	3	7 S.	1	37	14	-	20.13
	β Aurigæ - -	2	27	7	8	21	29	0 N.	1	37	10	-	28.19
	θ Aurigæ - -	2	27	8	51	13	45	9 N.	1	25	31	-	25.07
16	η Leporis - -	2	26	6	42	37	38	12 S.	1	35	46	-	20.61
	γ Columbæ - -	2	26	15	3	58	44	45 S.	1	49	43	-	24.50
61	μ Orionis - -	2	27	48	40	13	48	50 S.	0	53	2	-	20.28
1	H. Geminorum - -	2	28	9	14	0	11	28 S.	0	48	0	-	21.77
	ν Orionis - -	2	29	3	34	8	40	56 S.	0	23	14	-	20.09
	θ Leporis - -	2	29	6	23	38	23	19 S.	0	22	6	-	20.71
2	Lyncis - -	3	0	18	36	35	35	45 N.	0	14	24	+	38.92
	η Geminorum - -	3	0	38	48	0	54	44 S.	0	16	44	+	21.67
	μ Geminorum - -	3	2	30	21	0	50	20 S.	1	4	50	+	21.65
	ζ Canis Major - -	3	4	35	28	53	23	57 S.	2	6	32	+	23.07
	ϵ Monocerotis - -	3	3	27	49	18	44	21 S.	1	22	59	+	20.04
	β Canis Major - -	3	4	23	58	41	16	46 S.	1	50	21	+	20.98
	δ Columbæ - -	3	5	38	34	56	44	12 S.	2	41	11	+	23.90
	ν Geminorum - -	3	4	0	34	3	4	52 S.	1	42	5	+	21.28
13	Monocerotis - -	3	5	41	31	15	53	18 S.	2	16	58	+	20.09
	γ Geminorum - -	3	6	18	35	6	45	40 S.	2	37	1	+	20.74
42	Camelopardalis - -	3	3	58	2	44	24	9 N.	4	10	30	+	52.42
15	Monocerotis - -	3	7	34	24	13	12	0 S.	5	3	20	+	20.15
	ϵ Geminorum - -	3	7	8	46	2	2	45 N.	3	8	29	+	21.92
43	Camelopardalis - -	3	4	5	19	45	44	31 N.	4	33	49	+	55.53
2	ζ Geminorum - -	3	8	25	26	10	7	6 S.	3	26	1	+	20.32
	Sirius - -	3	11	19	32	39	33	38 S.	4	40	37	+	20.60

LONGITUDE.

Names of Stars.			Longitude.	Latitude.	Angle of Position.	Annual Variations.
			S. D. M. S.	D. M. S.	D. M. S.	S.
18	Monocerotis	-	3 9 59 7	20 31 9 S.	3 57 48	+ 19.76
34	Geminorum	-	3 8 19 40	11 0 29 N.	3 59 53	+ 23.83
	α ² Canis Major	-	3 15 47 25	55 10 18 S.	7 21 51	+ 23.26
18	μ Canis Major	-	3 14 15 27	36 40 47 S.	5 47 45	+ 20.17
20	ι Canis Major	-	3 14 44 17	39 40 1 S.	6 4 28	+ 20.46
	ε Canis Major	-	3 17 59 8	51 22 59 S.	8 3 32	+ 22.26
	ζ Geminorum	-	3 12 11 51	2 3 49 S.	5 9 55	+ 20.86
	δ Canis Major	-	3 18 46 45	50 15 5 S.	8 19 18	+ 21.97
24	ν ² Canis Major	-	3 18 13 17	46 9 14 S.	7 48 25	+ 21.21
	γ Canis Major	-	3 16 49 23	38 1 0 S.	6 51 50	+ 20.16
	δ Canis Major	-	3 20 37 2	48 28 33 S.	8 58 54	+ 21.51
	δ Geminorum	-	3 15 43 40	0 12 6 S.	6 42 6	+ 20.68
	ι Geminorum	-	3 16 10 10	5 44 26 N.	7 13 39	+ 21.55
	τ Canis Major	-	3 26 45 44	50 37 50 S.	11 49 15	+ 21.61
	β Canis Minor	-	3 19 24 18	13 30 25 S.	7 41 28	+ 19.13
	Castor	-	3 17 27 17	10 4 53 N.	8 7 30	+ 22.18
69	ν Geminorum	-	3 18 33 2	5 11 59 N.	8 11 54	+ 21.04
	Procyon	-	3 23 1 33	15 58 46 S.	9 0 22	+ 18.62
26	Monocerotis	-	3 26 30 5	30 28 13 S.	10 22 0	+ 18.66
	α Geminorum	-	3 20 52 25	3 3 31 N.	8 59 49	+ 20.29
	Pollux	-	3 20 27 18	6 40 1 N.	9 6 39	+ 20.92
	ξ	-	4 3 16 5	44 57 30 S.	13 52 20	+ 10.87
9	Navis	-	4 0 33 50	34 9 30 S.	12 0 46	+ 18.54
11		-	4 4 51 54	42 35 45 S.	14 14 55	+ 19.27
13		-	3 29 37 27	17 46 29 S.	11 18 27	+ 17.70
		-				
	ζ Navis	-	4 15 47 47	58 21 44 S.	21 41 40	+ 22.63
	δ Cancri	-	3 26 27 0	5 19 7 N.	11 23 30	+ 19.37
	ν ² Navis	-	4 8 36 54	43 17 23 S.	15 45 8	+ 18.98
57	Camelopardalis	-	3 17 49 13	41 30 46 N.	15 37 44	+ 58.14
	β Cancri	-	4 1 28 12	10 18 16 S.	12 10 43	+ 17.33
1	ο Urfæ Major	-	3 20 11 58	40 13 38 N.	16 40 35	+ 34.87
30	Monocerotis	-	4 7 4 14	22 27 52 S.	13 54 42	+ 16.63
4	δ Hydræ	-	4 7 31 4	12 24 36 S.	14 7 28	+ 16.13
	γ Cancri	-	4 4 44 58	3 10 37 N.	14 11 18	+ 17.05
7	η Hydræ	-	4 9 30 52	14 16 0 S.	14 42 56	+ 15.77
	δ Cancri	-	4 5 55 35	0 4 21 N.	14 17 46	+ 16.59
31	Monocerotis	-	4 12 45 27	24 27 5 S.	15 47 21	+ 15.77
	ε } Hydræ {	-	4 9 33 53	11 6 54 S.	14 48 38	+ 15.66
	ζ } Hydræ {	-	4 11 47 31	10 59 3 S.	15 20 52	+ 15.16
	α ² Cancri	-	4 10 18 44	5 29 35 S.	15 17 35	+ 15.40
	α Urfæ Major	-	4 0 1 15	29 34 32 N.	17 36 42	+ 22.81
	α ² Cancri	-	4 10 50 54	5 5 44 S.	15 28 48	+ 15.27
	α Urfæ Major	-	4 1 8 8	28 57 48 N.	17 53 56	+ 22.03
17	Urfæ Major II	-	4 4 44 2	20 52 38 N.	17 2 24	+ 18.76
	α Cancri	-	4 13 22 45	5 35 4 S.	16 12 16	+ 14.63
22	δ Hydræ	-	4 17 29 10	13 3 8 S.	17 5 44	+ 13.92
38	Lyncis	-	4 7 46 7	20 5 23 N.	17 50 19	+ 17.37
40	Lyncis	-	4 9 3 23	17 57 0 N.	17 53 18	+ 19.04
	α Leonis	-	4 12 29 58	10 24 51 N.	17 34 46	+ 14.96
23	δ Urfæ Major	-	3 28 0 21	45 8 38 N.	25 10 42	+ 29.93

LONGITUDE.

Names of Stars.	Longitude.	Latitude.	Angle of Position.	Annual Variation.
	S. D. M. S.	D. M. S.	D. M. S.	S.
24 <i>d</i> Urfæ Major - -	3 23 31 42	51 13 11 N.	28 44 10	+ 39.60
<i>α</i> Hydræ - -	4 24 29 44	22 23 41 S.	19 5 55	+ 13.13
<i>θ</i> Urfæ Major - -	4 4 30 15	34 55 34 N.	21 47 30	+ 21.23
<i>λ</i> Lyncis - -	4 15 4 39	7 52 32 N.	17 57 16	+ 14.04
5 <i>ξ</i> Leonis - -	4 18 51 29	3 9 49 S.	17 51 57	+ 13.08
↓ Navis - -	5 11 59 55	51 9 47 S.	29 26 13	+ 16.44
<i>ι</i> Hydræ - -	4 24 50 47	14 17 17 S.	19 0 3	+ 12.21
<i>ο</i> Leonis - -	4 21 27 41	3 45 55 S.	18 29 13	+ 12.37
<i>ε</i> Leonis - -	4 17 54 39	9 42 11 N.	18 58 49	+ 13.06
29 <i>υ</i> Urfæ Major - -	4 3 28 26	42 38 49 N.	26 1 55	+ 23.41
<i>μ</i> Leonis - -	4 18 38 34	12 20 32 N.	19 35 24	+ 12.76
<i>ν</i> Leonis - -	4 25 32 44	2 47 16 S.	19 30 5	+ 11.12
<i>π</i> Leonis - -	4 26 31 21	3 55 19 S.	19 39 2	+ 10.91
<i>η</i> Leonis - -	4 25 6 34	4 51 22 N.	20 3 9	+ 10.79
15 Sextantis - -	5 1 18 59	11 7 40 S.	20 26 53	+ 10.18
Regulus - -	4 27 2 53	0 27 30 N.	20 3 3	+ 10.44
<i>λ</i> Hydræ - -	5 6 35 31	22 0 35 S.	21 53 6	+ 10.14
<i>λ</i> Urfæ Major - -	4 16 45 9	29 52 39 N.	23 44 38	+ 13.36
<i>ζ</i> Leonis - -	4 24 45 55	11 51 13 N.	20 55 38	+ 10.52
<i>γ</i> Navis - -	5 24 14 23	48 15 41 S.	31 44 24	+ 12.64
<i>γ</i> Leonis - -	4 26 47 55	8 48 19 N.	20 53 17	+ 9.98
<i>μ</i> Urfæ Major - -	4 18 26 10	28 59 6 N.	23 50 10	+ 12.49
42 <i>μ</i> Hydræ - -	5 12 15 34	24 40 7 S.	23 12 58	+ 9.08
2 <i>ξ</i> Leonis - -	5 3 35 48	0 8 37 N.	21 15 24	+ 8.41
37 Leo Minor - -	4 26 2 35	21 37 27 N.	23 11 47	+ 9.38
4 <i>ν</i> Hydræ et C. - -	5 17 35 3	21 48 42 S.	23 45 34	+ 7.11
54 Leonis - -	5 2 42 28	16 29 23 N.	23 8 52	+ 7.17
<i>β</i> Urfæ Major - -	4 16 36 51	45 6 45 N.	32 32 25	+ 11.24
<i>ο</i> Hydræ et C. - -	5 20 56 9	22 42 42 S.	24 18 47	+ 6.30
<i>α</i> Urfæ Major - -	4 12 23 4	49 40 11 N.	36 0 5	+ 12.95
<i>χ</i> Leonis - -	5 11 43 54	1 20 52 N.	22 28 24	+ 5.69
52 ↓ Urfæ Major - -	4 26 0 18	35 31 47 N.	28 8 45	+ 7.60
<i>β</i> Hydræ et C. - -	5 25 46 10	25 37 46 S.	25 18 35	+ 5.41
<i>δ</i> Leonis - -	5 8 30 18	14 19 54 N.	23 29 15	+ 5.26
<i>θ</i> Leonis - -	5 10 37 33	9 40 31 N.	23 4 8	+ 5.07
74 <i>z</i> Leonis - -	5 18 41 54	7 38 33 S.	23 0 32	+ 4.63
53 <i>ξ</i> Urfæ Major - -	5 4 32 37	24 45 27 N.	25 16 48	+ 5.40
54 <i>ν</i> Urfæ Major - -	5 3 50 42	26 9 7 N.	25 35 59	+ 5.48
<i>δ</i> Hydræ et C. - -	5 23 54 41	17 34 42 S.	24 3 3	+ 4.51
<i>σ</i> Leonis - -	5 15 54 57	1 41 47 N.	22 54 26	+ 4.30
<i>ι</i> Leonis - -	5 14 45 34	6 6 8 N.	23 5 42	+ 4.12
14 <i>ε</i> Hydræ et C. - -	5 23 27 50	13 28 2 S.	23 40 3	+ 4.00
15 <i>γ</i> Hydræ et C. - -	5 26 27 13	19 39 40 S.	24 30 1	+ 4.08
<i>τ</i> Leonis - -	5 18 43 2	0 33 17 S.	23 2 39	+ 3.69
<i>λ</i> Draconis - -	4 7 30 58	57 13 26 N.	46 23 20	+ 10.54
<i>ε</i> Leonis - -	5 21 35 7	5 42 12 S.	23 12 44	+ 3.47
<i>ξ</i> Hydræ et C. - -	6 5 13 17	31 34 54 S.	27 28 44	+ 3.72
21 <i>θ</i> Hydræ et C. - -	5 25 43 23	11 17 59 S.	23 41 17	+ 2.94
91 <i>υ</i> Leonis - -	5 22 14 43	3 2 48 S.	23 14 21	+ 2.90
27 <i>ζ</i> Hydræ et C. - -	6 1 17 49	18 17 3 S.	24 38 4	+ 2.31

LONGITUDE.

Names of Stars.		Longitude.	Latitude.	Angle of Position.	Annual Variations.
		S. D. M. S.	D. M. S.	D. M. S.	S.
3	Urfæ Major -	5 0 51 13	41 32 19 N.	31 56 3	+ 3.26
93	Virginis -	5 21 21 50	4 35 57 N.	23 24 18	+ 2.15
	Leonis -	5 16 10 51	17 18 34 N.	24 31 35	+ 2.09
	Leonis -	5 18 50 26	12 16 57 N.	23 56 28	+ 1.92
	Virginis -	5 24 19 33	0 41 41 N.	23 22 33	+ 1.72
	Hyd. et C -	6 10 40 9	31 27 36 S.	27 44 37	+ 1.78
30	Urfæ Major -	4 27 39 3	47 7 34 N.	35 42 40	+ 2.54
	Hyd. et C -	6 3 18 51	16 4 59 S.	24 26 0	+ 1.29
	Corvi -	6 9 27 19	21 44 24 S.	25 23 3	+ 0.18
	Corvi -	6 8 53 7	19 39 47 S.	25 0 56	+ 0.01
	Urfæ Major -	4 28 14 2	51 35 26 N.	39 54 6	- 0.90
	Corvi -	6 7 56 52	14 29 23 S.	24 16 42	- 0.50
	Virginis -	6 2 2 27	1 22 22 N.	23 27 4	- 0.84
	Corvi -	6 10 40 20	12 10 27 S.	23 56 49	- 1.77
	Corvi -	6 14 34 51	18 1 50 S.	24 36 49	- 2.25
	Draconis -	4 13 26 1	61 44 47 N.	56 44 51	- 6.62
	Comæ Berenicis -	5 25 38 36	24 7 20 N.	25 42 19	- 2.37
	Virginis -	6 7 22 34	2 48 34 N.	23 15 39	- 2.74
	Urfæ Major -	5 6 5 46	54 18 25 N.	42 0 44	- 7.21
	Virginis -	6 8 41 10	8 38 8 N.	23 15 24	- 3.96
12	Cor. Caroli -	5 21 45 55	40 7 28 N.	30 39 56	- 5.23
6	Virginis	6 6 48 56	16 56 57 N.	23 55 28	- 4.64
53		6 15 26 33	1 45 26 N.	22 38 37	- 5.16
61		6 19 58 27	7 53 36 S.	22 48 32	- 5.49
		6 22 14 57	9 12 11 S.	22 41 34	- 6.12
	Hydra -	6 24 13 33	13 43 30 S.	23 4 35	- 6.32
	Centauri -	7 0 21 33	25 59 15 S.	25 0 53	- 7.34
	Spica Virginis -	6 21 3 0	2 2 20 S.	22 10 43	- 6.50
	Urfæ Major -	5 12 51 20	56 22 13 N.	42 50 39	- 11.62
	Virginis -	6 19 21 8	8 39 18 N.	22 4 8	- 7.21
	Centauri -	7 8 22 29	28 14 47 S.	24 18 37	- 10.90
	Bootis -	6 15 9 13	26 32 0 N.	23 54 16	- 8.73
	Centauri -	7 5 14 33	21 34 57 S.	22 56 19	- 9.93
	Urfæ Major -	5 24 6 37	54 23 40 N.	38 20 25	- 13.20
5	Bootis -	6 16 24 12	25 12 42 N.	23 31 2	- 8.82
	Bootis -	6 16 31 26	28 6 38 N.	23 52 35	- 9.40
5	Centauri -	7 9 32 23	22 1 13 S.	22 7 29	- 11.80
	Draconis -	5 4 36 37	66 21 20 N.	59 33 0	- 23.79
	Virginis -	7 1 42 1	2 55 25 N.	20 4 51	- 10.31
99	Virginis -	7 0 59 26	7 14 41 N.	20 2 26	- 10.46
	Bootis -	5 27 6 32	58 53 59 N.	41 3 16	- 17.30
	Arcturus -	6 21 26 24	30 52 35 N.	23 16 3	- 11.18
	Virginis -	7 4 9 30	0 30 36 N.	19 43 14	- 10.88
	Bootis -	6 4 9 24	54 39 8 N.	35 37 30	- 15.63
	Bootis -	5 28 16 45	58 50 40 N.	40 36 10	- 17.47
	Virginis -	7 2 39 38	11 46 56 N.	19 35 34	- 11.33
	Bootis -	5 29 45 37	60 8 19 N.	41 10 26	- 18.78
	Bootis -	6 19 58 49	42 27 40 N.	25 57 45	- 13.69
	Bootis -	6 14 51 20	49 33 30 N.	29 46 33	- 15.18
5	Urfæ Minor -	4 5 32 54	71 25 24 N.	93 40 53	- 51.05

LONGITUDE.

Names of Stars.				Longitude.	Latitude.	Angle of Position.	Annual Variations.
				S. D. M. S.	D. M. S.	D. M. S.	S.
29	π	Bootis	-	6 29 2 58	30 22 52 N.	21 22 53	- 12.85
	ζ	Bootis	-	7 0 13 45	27 53 47 N.	20 49 34	- 12.70
107	μ	Virginis	-	7 7 10 16	9 42 27 N.	18 31 43	- 12.40
109		Virginis	-	7 5 43 19	17 7 20 N.	18 53 4	- 12.62
	ϵ	Bootis	-	6 25 17 51	40 38 25 N.	24 2 45	- 14.27
2	α	Libræ	-	7 12 17 35	0 21 39 N.	17 46 20	- 13.32
37	γ	Bootis	-	7 0 43 43	33 47 17 N.	21 21 13	- 13.83
	δ	Libræ	-	7 12 29 18	8 16 16 N.	17 14 13	- 13.66
	β	Urfæ Minor	-	4 10 27 49	72 58 19 N.	94 39 40	- 52.50
	γ	Scor. vel Lib.	-	7 17 53 53	7 37 2 S.	17 3 33	- 15.02
	β	Bootis	-	6 21 25 30	54 10 4 N.	29 30 36	- 18.34
24	ϵ	Libræ	-	7 18 12 40	1 49 18 N.	16 18 4	- 15.02
	β	Libræ	-	7 16 34 50	8 31 20 N.	16 4 18	- 14.70
	δ	Bootis	-	7 0 19 40	48 59 14 N.	24 30 55	- 17.63
	δ	Lupis	-	7 25 49 50	21 24 33 S.	16 57 6	- 19.09
	ϵ	Libræ	-	7 18 33 2	8 4 38 N.	15 30 20	- 15.16
51	μ	Bootis	-	7 0 22 8	53 26 16 N.	25 52 54	- 19.25
11	γ	Urfæ Minor	-	4 18 46 30	74 56 32 N.	92 53 2	- 50.62
	β	Coronæ	-	7 6 19 8	46 4 20 N.	21 42 2	- 17.64
	ϵ	Draconis	-	6 2 5 4	71 5 50 N.	52 0 11	- 30.41
13	γ	Urfæ Minor	-	4 18 43 29	75 13 40 N.	93 50 43	- 51.32
35	δ	Libræ	-	7 22 13 22	2 15 35 N.	14 42 46	- 16.05
	γ	Lupis	-	7 28 42 33	21 12 59 S.	15 46 40	- 20.29
	γ	Libræ	-	7 22 20 23	4 24 37 N.	14 31 43	- 16.05
39		Libræ	-	7 25 49 2	8 28 49 S.	14 36 12	- 17.58
	δ	Serpentis	-	7 15 32 38	28 54 18 N.	16 31 6	- 15.92
	α	Cor. Borealis	-	7 9 28 21	44 20 51 N.	10 15 23	- 17.65
40		Libræ	-	7 26 33 30	9 59 28 S.	14 32 46	- 17.95
	α	Libræ	-	7 24 57 50	0 0 38 N.	13 59 36	- 16.82
	ζ	Coronæ	-	7 5 27 18	53 58 0 N.	24 3 46	- 20.08
	η	Libræ	-	7 24 33 32	4 1 41 N.	13 49 55	- 16.59
	γ	Coronæ	-	7 12 4 11	44 31 35 N.	19 21 52	- 18.06
	α	Serpentis	-	7 19 15 50	25 31 38 N.	15 10 44	- 16.23
	λ	Serpentis {	-	7 19 36 57	26 34 10 N.	15 6 6	- 16.38
	β		-	7 17 8 10	34 21 10 N.	16 22 19	- 16.90
	μ	Serpentis {	-	7 23 8 42	16 16 0 N.	13 50 6	- 16.37
	ϵ		-	7 21 31 29	24 1 32 N.	14 24 10	- 16.50
	δ	Coronæ	-	7 14 13 24	44 47 32 N.	18 37 36	- 18.41
	λ	Libræ	-	7 27 40 53	0 6 42 N.	13 3 26	- 17.49
	θ	Libræ	-	7 27 4 23	3 29 28 N.	13 1 18	- 17.19
38	ϵ	Serpentis	-	7 16 42 44	40 1 26 N.	17 4 32	- 17.76
	ϵ	Scorpii {	-	8 0 21 8	8 34 6 S.	12 57 59	- 18.93
	π		-	8 0 8 48	5 26 45 S.	12 41 19	- 18.53
	η	Lupis	-	8 2 58 45	17 25 7 S.	13 41 16	- 21.17
48	\downarrow	Libræ	-	7 27 36 16	6 6 42 N.	12 41 4	- 17.22
	γ	Serpentis	-	7 19 56 3	35 17 6 N.	15 29 6	- 17.45
	δ	Scorpii	-	7 29 46 37	1 57 26 S.	12 29 18	- 18.13
	ζ	Urfæ Minor	-	3 24 28 17	75 7 56 N.	124 52 4	- 84.48
	ξ	Libræ	-	7 28 30 48	9 15 44 N.	12 13 27	- 17.34
	π	Serpentis	-	7 19 19 37	42 28 32 N.	16 25 22	- 18.57

LONGITUDE.

Names of Stars.			Longitude.	Latitude.	Angle of Position.	Annual Variation.
			S. D. M. S.	D. M. S.	D. M. S.	S.
β	Scorpii	-	8 0 23 42	1 2 8 N.	12 1 35	- 18.06
9	α' Scorpii	-	8 0 52 32	0 14 28 N.	11 54 40	- 18.22
6	Draconis	-	6 13 53 1	74 26 47 N.	48 50 2	- 33.59
	Scorpii	-	8 1 50 55	1 29 47 N.	11 27 21	- 18.32
δ	Ophiuchi	-	7 29 30 23	17 16 35 N.	11 40 33	- 17.52
18	Scorpii	-	8 0 41 31	12 45 17 N.	11 20 50	- 17.70
ϵ	Ophiuchi	-	8 0 42 35	16 27 49 N.	11 15 53	- 17.71
σ	Scorpii	-	8 5 0 25	4 0 27 S.	10 42 25	- 19.56
γ	Herculis	-	7 26 24 51	40 1 51 N.	13 31 32	- 18.97
τ	Herculis	-	7 11 32 54	65 50 58 N.	25 48 24	- 26.14
	Antares	-	8 6 58 9	4 32 29 S.	9 58 45	- 20.05
ϵ	Ophiuchi	-	8 5 52 26	5 13 39 N.	9 45 24	- 18.87
10	λ Ophiuchi	-	8 2 47 46	23 35 14 N.	10 29 54	- 18.18
η	Draconis	-	6 11 55 4	78 26 57 N.	56 6 42	- 38.69
β	Herculis	-	7 28 17 41	42 43 48 N.	13 2 20	- 19.61
29	h Herculis	-	8 1 26 12	33 1 34 N.	11 13 16	- 18.66
τ	Scorpii	-	8 8 39 48	6 5 25 S.	9 25 32	- 20.64
ζ	Ophiuchi	-	8 6 26 0	11 25 4 N.	9 18 28	- 18.65
σ	Herculis	-	7 20 25 20	63 11 2 N.	20 14 57	- 25.11
15	A Draconis	-	8 2 24 58	81 2 1 N.	96 21 7	- 51.91
ζ	Herculis	-	7 28 42 19	53 7 12 N.	14 6 47	- 21.94
η	Herculis	-	7 25 57 54	60 19 10 N.	16 44 31	- 24.14
ϵ	Scorpii	-	8 12 34 28	11 41 24 S.	8 15 41	- 22.55
μ^1	} Scorpii {	-	8 13 21 43	15 23 40 S.	8 17 2	- 23.69
μ^2		-	8 13 27 15	15 20 58 S.	8 14 9	- 23.70
25	} Ophiuchi {	-	8 7 51 8	32 31 58 N.	8 46 57	- 19.26
27		-	8 9 2 45	31 52 0 N.	8 18 24	- 19.31
ϵ	Herculis	-	8 5 31 45	53 16 28 N.	11 7 20	- 22.40
η	Ophiuchi	-	8 15 10 24	7 13 13 N.	6 4 8	- 20.03
21	μ Draconis	-	7 21 56 8	76 15 20 N.	25 20 7	- 33.53
α	Herculis	-	8 13 21 21	37 18 44 N.	6 46 11	- 20.10
δ	Herculis	-	8 11 57 53	47 43 21 N.	7 49 26	- 21.50
ϵ	Ursæ Minor	-	3 6 19 53	73 53 52 N.	160 45 46	- 146.12
π	Herculis	-	8 9 16 1	59 34 45 N.	10 10 22	- 24.43
22	ζ Draconis	-	5 19 17 28	84 52 54 N.	88 47 30	- 49.83
ϵ	Ophiuchi	-	8 18 5 47	2 3 37 N.	5 2 36	- 20.89
53	ν Serpents	-	8 17 29 55	10 17 34 N.	5 4 4	- 20.01
δ	Ophiuchi	-	8 18 36 5	1 48 47 S.	4 58 22	- 21.51
70	Herculis	-	8 13 59 11	47 31 11 N.	6 56 44	- 21.50
75	ϵ Herculis	-	8 12 34 27	60 9 15 N.	8 37 35	- 24.72
34	} Scorpii {	-	8 21 13 8	13 58 45 S.	4 22 20	- 24.66
λ		-	8 21 47 30	13 45 36 S.	4 4 44	- 24.63
α	Ophiuchi	-	8 19 38 39	35 52 37 N.	4 12 30	- 20.28
β	Draconis	-	8 9 9 8	75 18 14 N.	13 26 52	- 32.48
ξ	Serpents	-	8 21 45 27	7 58 5 N.	3 23 33	- 20.51
57	μ Ophiuchi	-	8 21 31 34	15 14 34 N.	3 23 49	- 20.00
ν^1	Draconis	-	8 7 27 38	78 10 5 N.	15 33 40	- 34.83
ν^2	Draconis	-	8 7 31 57	78 9 38 N.	15 30 37	- 34.83
α	Scorpii	-	8 23 40 39	15 37 2 S.	3 13 51	- 25.47
β	Ophiuchi	-	8 22 32 48	27 57 35 N.	2 58 14	- 19.94

LONGITUDE.

Names of Stars.			Longitude.	Latitude.	Angle of Polition.	Annual Variation.
			S. D. M. S.	D. M. S.	D. M. S.	S.
1462	Scorpii	-	8 24 43 53	16 41 11 S.	2 44 14	- 25.96
	Herculis	-	8 17 5 18	69 17 38 N.	7 22 32	- 28.68
	Telecopi	-	8 25 7 24	13 35 42 S.	2 25 41	- 24.91
	Ophiuchi	-	8 23 50 27	26 8 40 N.	2 27 6	- 19.94
	Draconis	-	4 9 24 37	86 53 42 N.	135 31 45	- 55.20
	Herculis	-	8 22 27 23	51 10 33 N.	3 23 21	- 22.53
64	Ophiuchi	-	8 26 57 39	13 42 0 N.	1 13 39	- 20.27
	Herculis	-	8 25 41 7	60 42 43 N.	2 9 29	- 25.12
	Serpentis	-	8 27 19 35	19 46 49 N.	1 3 59	- 21.03
	Herculis	-	8 26 24 11	52 42 55 N.	1 38 28	- 22.92
32	Draconis	-	8 21 55 38	80 18 14 N.	5 52 43	- 36.61
67	Ophiuchi	-	8 27 23 13	26 24 0 N.	1 2 30	- 20.02
68	Ophiuchi	-	8 27 41 13	24 46 49 N.	0 55 16	- 20.00
	Draconis	-	8 25 10 46	74 57 4 N.	3 4 57	- 32.12
	Sagittarii	-	8 28 18 13	6 7 2 S.	0 46 36	- 22.99
	Sagittarii	-	8 28 28 15	6 57 3 S.	0 42 21	- 23.19
95	Herculis	-	8 27 42 7	45 3 38 N.	0 59 3	- 21.51
70	Ophiuchi	-	8 28 42 25	26 1 18 N.	0 30 55	- 20.03
34	Draconis	-	3 1 5 33	84 30 38 N.	178 35 25	- 64.83
103	Herculis	-	8 29 54 27	52 12 44 N.	0 2 31	- 22.82
	Sagittarii	-	9 0 25 12	2 22 13 N.	0 10 45	+ 21.45
	Telecopi	-	9 0 50 27	13 20 25 S.	0 25 6	+ 24.99
	Sagittarii	-	9 1 47 3	6 26 29 S.	0 49 10	+ 23.06
20		-	9 2 17 12	11 0 59 S.	1 6 15	+ 24.24
		-	9 2 55 21	20 30 10 N.	1 9 53	+ 20.01
109	Herculis	-	9 4 59 47	45 5 32 N.	2 8 21	+ 21.49
	Sagittarii	-	9 3 31 32	2 5 48 S.	1 33 17	+ 22.12
	Aquilæ	-	9 6 13 37	14 57 59 N.	2 30 8	+ 20.11
44	Draconis	-	2 13 30 14	83 32 0 N.	157 43 42	+ 66.68
	Lyræ	-	9 12 30 42	61 44 44 N.	6 20 17	+ 25.38
	Sagittarii	-	9 7 23 6	3 55 41 S.	3 17 55	+ 22.26
	Aquilæ	-	9 9 35 21	18 12 55 N.	3 49 4	+ 19.83
23	Urfæ Minor	-	2 28 24 13	69 55 17 N.	169 20 29	+ 329.35
111	Herculis	-	9 12 4 25	41 2 20 N.	5 1 25	+ 20.74
	Lyræ	-	9 16 6 20	56 0 38 N.	7 34 51	+ 23.48
	Sagittarii	-	9 9 35 25	3 25 5 S.	4 15 8	+ 21.98
	Serpentis	-	9 12 57 48	26 54 10 N.	5 8 14	+ 19.65
	Lyræ	-	9 18 53 45	59 20 33 N.	9 15 0	+ 24.41
	Draconis	-	10 12 11 43	80 49 15 N.	31 26 6	+ 38.16
	Sagittarii	-	9 10 50 49	7 9 4 S.	4 58 17	+ 22.59
	Aquilæ	-	9 15 28 56	37 35 51 N.	6 18 45	+ 20.20
12	Aquilæ	-	9 13 15 29	16 52 27 N.	5 16 8	+ 19.62
	Lyræ	-	9 19 8 47	55 2 17 N.	8 54 4	+ 23.11
	Sagittarii	-	9 12 11 49	0 53 30 N.	5 12 24	+ 21.02
50	Draconis	-	2 9 35 22	80 22 34 N.	147 5 31	+ 76.21
	Sagittarii	-	9 12 2 41	5 2 46 S.	5 23 51	+ 22.01
	Antinoi	-	9 14 32 43	17 35 48 N.	5 45 48	+ 19.50
	Aquilæ	-	9 17 0 46	36 13 2 N.	6 53 2	+ 19.97
52	Draconis	-	1 17 38 29	83 12 12 N.	124 23 13	+ 59.67
	Sagittarii	-	9 13 27 31	1 28 3 N.	5 42 35	+ 20.80

LONGITUDE.

Names of Stars.			Longitude.	Latitude.	Angle of Position.	Annual Variations.
			S. D. M. S.	D. M. S.	D. M. S.	S.
δ	Draconis	-	0 14 31 38	82 52 55 N.	87 46 11	+ 49.39
×	Cygni	-	10 12 10 30	73 49 1 N.	26 22 45	+ 31.60
δ	Aquilæ	-	9 20 50 2	24 50 26 N.	8 9 5	+ 18.96
60 γ	Draconis	-	1 22 14 32	80 40 9 N.	123 35 12	+ 64.30
π	Draconis	-	0 0 45 19	81 49 50 N.	72 33 8	+ 45.08
6	Vulpis	-	9 26 44 30	45 53 14 N.	11 20 8	+ 20.61
β	Cygni	-	9 28 28 41	48 59 26 N.	12 21 58	+ 21.12
μ	Aquilæ {	-	9 24 0 50	28 41 31 N.	9 23 46	+ 18.81
×		-	9 22 3 56	14 22 17 N.	8 40 38	+ 18.77
ι	Antinoi	-	9 23 2 58	20 2 12 N.	8 58 25	+ 18.61
6	Cygni	-	10 15 53 32	69 57 25 N.	26 16 24	+ 28.56
α	Sagittæ	-	9 28 17 34	38 49 4 N.	11 25 6	+ 19.35
6	-	-	9 28 25 31	38 14 42 N.	11 26 2	+ 19.26
61 γ	Draconis	-	0 28 18 29	80 55 12 N.	96 46 59	+ 52.10
γ	Aquilæ	-	9 28 9 12	31 16 7 N.	11 0 12	+ 18.54
δ	Cygni	-	10 13 29 26	64 25 50 N.	22 39 29	+ 25.56
α	Aquilæ	-	9 28 57 12	29 18 50 N.	11 14 7	+ 18.29
×	Antinoi	-	9 27 38 51	21 32 53 N.	10 38 55	+ 18.05
β	Aquilæ	-	9 29 38 33	26 42 39 N.	11 25 13	+ 18.02
γ	Sagittæ	-	10 4 15 34	39 12 49 N.	13 42 40	+ 18.77
θ	Antinoi	-	10 2 7 30	18 45 3 N.	12 13 44	+ 17.29
1 α	Capricorni {	-	10 0 58 39	7 0 44 N.	12 8 54	+ 17.49
2 α		-	10 1 3 51	6 57 18 N.	12 10 53	+ 17.48
30 α	Cygni	-	10 25 17 36	63 42 33 N.	28 14 13	+ 24.59
β	Capricorni	-	10 1 15 11	4 36 46 N.	12 22 26	+ 17.52
γ	Cygni	-	10 22 5 5	57 8 23 N.	24 4 15	+ 21.60
41 ι	Cygni	-	10 17 56 45	47 28 1 N.	19 54 11	+ 18.80
ζ	Delphinis {	-	10 11 16 45	29 5 40 N.	15 30 13	+ 16.49
ζ		-	10 12 58 34	32 10 23 N.	16 14 15	+ 16.58
71	Aquilæ	-	10 8 55 45	16 48 33 N.	14 29 51	+ 15.99
β	Delphinis {	-	10 13 33 18	31 56 26 N.	16 25 12	+ 16.45
α		-	10 14 35 52	33 2 31 N.	16 50 35	+ 16.43
δ		-	10 15 20 21	31 57 48 N.	17 0 2	+ 16.16
α	Cygni	-	11 2 34 45	59 55 0 N.	29 44 54	+ 21.94
ι	Aquarii	-	10 8 55 54	8 6 12 N.	14 43 47	+ 15.75
γ	Delphinis	-	10 16 35 47	32 43 49 N.	17 27 50	+ 16.05
ι	Cygni	-	10 24 56 24	49 25 35 N.	22 50 1	+ 18.45
54 λ	Cygni	-	10 26 58 56	51 37 32 N.	24 17 53	+ 18.92
η	Cephei	-	0 1 46 56	71 44 42 N.	55 18 7	+ 31.53
μ	Aquarii	-	10 10 15 58	8 15 59 N.	15 8 13	+ 15.45
58 γ	Cygni	-	11 3 22 57	54 55 27 N.	27 52 23	+ 19.39
62 ξ	Cygni	-	10 8 2 41	56 35 23 N.	50 24 19	+ 19.59
γ	Equulei	-	10 20 38 40	25 12 31 N.	18 10 55	+ 14.30
ζ	Cygni	-	11 0 16 20	43 42 36 N.	23 23 21	+ 15.93
δ	Equulei {	-	10 21 40 0	24 46 2 N.	18 26 51	+ 14.03
α		-	10 20 19 46	20 8 42 N.	17 54 16	+ 13.83
γ	Cygni	-	11 5 49 2	50 32 36 N.	27 7 56	+ 17.23
67 σ	Cygni	-	11 7 35 18	51 30 5 N.	28 5 12	+ 17.32
ι	Pegasi	-	10 27 31 26	33 17 50 N.	20 48 20	+ 14.10
β	Equulei	-	10 22 38 51	21 2 48 N.	18 33 29	+ 13.40
α	Cephei	-	0 10 2 3	68 54 41 N.	55 55 0	+ 28.13
ζ	Capricorni	-	10 14 8 28	0 58 15 S.	17 34 11	+ 14.34

LONGITUDE.

Names of Stars.	Longitude.	Latitude.	Angle of Position.	Annual Variation.
	S. D. M. S.	D. M. S.	D. M. S.	S.
β Aquarii - -	10 20 36 16	8 37 57 N.	18 2 24	+ 12.87
ϵ Capricorni - -	10 17 24 10	4 57 29 S.	18 13 8	+ 13.30
β Cephei - -	1 2 48 38	71 8 7 N.	74 33 52	+ 35.87
ϵ Cygni - -	11 17 23 36	55 11 38 N.	33 9 5	+ 17.48
γ Capricorni - -	10 18 59 14	2 32 6 S.	18 22 12	+ 12.85
91 vel μ Pifcis Auris - -	10 14 27 0	18 18 53 S.	19 38 15	+ 14.43
ϵ Pegafi - -	10 29 5 58	22 6 47 N.	20 14 15	+ 12.02
π Cygni - -	11 25 31 47	58 52 40 N.	38 24 39	+ 18.52
μ Cygni - -	11 7 40 24	39 31 32 N.	24 37 11	+ 13.37
\times Pegafi - -	11 6 8 53	36 39 9 N.	23 38 23	+ 12.98
10 δ Pifcis Auris - -	10 15 48 54	16 32 11 S.	19 38 7	+ 13.84
δ Capricorni - -	10 20 44 25	2 33 50 S.	18 48 41	+ 12.30
γ Gruis - -	10 14 36 38	23 1 46 S.	20 52 31	+ 14.46
α Aquarii - -	11 0 33 45	10 49 34 N.	20 17 48	+ 10.35
ϵ Aquarii - -	10 25 55 32	2 3 45 S.	19 57 2	+ 10.69
14 μ vel δ Pifcis Auris - -	10 19 18 38	20 3 43 S.	21 20 48	+ 12.36
24 ϵ Pegafi - -	11 11 36 51	34 16 7 N.	24 30 38	+ 11.17
26 θ Pegafi - -	11 4 1 57	16 21 25 N.	21 4 10	+ 10.04
21 ζ Cephei - -	0 11 13 12	61 8 32 N.	46 10 39	+ 17.93
θ Aquarii - -	11 0 27 58	2 43 21 N.	20 31 19	+ 9.64
ϵ Cephei - -	0 10 16 2	59 57 19 N.	44 33 54	+ 10.87
γ Aquarii - -	11 3 55 5	8 14 54 N.	20 58 31	+ 9.14
π Aquarii - -	11 5 48 30	10 29 3 N.	21 17 58	+ 8.85
ζ Aquarii - -	11 6 6 37	8 51 30 N.	21 21 19	+ 8.58
β Pifcis Auris - -	10 24 22 33	21 20 44 S.	22 48 7	+ 10.12
5 Lacertæ - -	0 2 27 54	51 24 15 N.	35 26 48	+ 12.19
27 δ Cephei - -	0 14 51 9	59 31 58 N.	45 35 3	+ 15.45
7 Lacertæ - -	0 5 22 24	53 17 29 N.	37 24 25	+ 12.58
η Aquarii - -	11 7 36 39	8 9 38 N.	21 30 31	+ 8.05
γ vel ϵ Pifcis Auris - -	10 28 31 40	17 15 25 S.	22 38 21	+ 8.72
ζ Pegafi - -	11 13 21 47	17 41 19 N.	22 46 46	+ 7.65
η Pegafi - -	11 22 56 27	35 6 39 N.	26 54 45	+ 8.43
λ Pegafi - -	11 20 15 34	28 46 24 N.	25 8 9	+ 7.68
μ Pegafi - -	11 21 36 1	29 23 43 N.	25 27 1	+ 7.43
λ Aquarii - -	11 8 46 55	0 22 48 S.	22 3 12	+ 6.72
ϵ Cephei - -	1 0 30 26	62 36 10 N.	54 43 56	+ 15.78
δ Aquarii - -	11 6 4 49	8 10 49 S.	22 21 29	+ 6.81
Fomalhaut - -	11 0 58 40	21 14 44 S.	23 55 20	+ 7.34
α Andromedæ - -	0 5 0 43	43 44 49 N.	31 50 51	+ 7.70
β Pifcium - -	11 15 47 49	9 3 38 N.	22 44 8	+ 5.71
β Pegafi - -	11 26 34 57	31 8 10 N.	26 29 45	+ 6.37
α Pegafi - -	11 20 41 59	19 24 47 N.	23 54 22	+ 5.79
88 ϵ Aquarii - -	11 7 12 52	14 28 51 S.	23 22 14	+ 5.71
ϕ Aquarii - -	11 14 20 52	1 2 5 S.	22 43 55	+ 4.88
γ Pifcium - -	11 18 37 28	7 16 39 N.	22 59 46	+ 4.61
16 λ } Andromedæ { - -	0 15 31 27	43 47 25 N.	33 6 23	+ 3.99
17 ϵ } - - - - -	0 13 18 45	41 1 20 N.	31 31 9	+ 3.71
19 \times } - - - - -	0 14 31 23	41 42 44 N.	31 56 28	+ 3.51
γ Cephei - -	1 27 18 29	64 38 21 N.	67 16 42	+ 10.74
29 Pifcium - -	11 26 25 5	2 57 30 S.	23 28 57	+ 0.74
33 Pifcium - -	11 26 8 55	5 46 12 S.	23 35 13	+ 0.43
α Andromedæ - -	0 11 31 36	25 41 47 N.	26 13 22	+ 0.19
β Calliopezæ - -	1 2 19 23	51 13 30 N.	39 28 54	+ 0.23

LONGITUDE, *Angle of*. See **ANGLE**.

LONGITUDE, *Argument of*. See **ARGUMENT**.

LONGITUDE, *Circles of*. See **CIRCLE**.

LONGITUDE, *Degrees of*. See **DEGREE**.

LONGITUDE, *Parallax of*. See **PARALLAX**.

LONGITUDE, *Refraction of*. See **REFRACTION**.

LONGITUDE of *Motion*, is used by Dr. Wallis for the measure of motion, estimated according to the line of direction; on which principle, longitude of motion is the distance, or length, which the centre of any moving body runs through, as it moves on in a right line.

The same author calls the measure of any motion, estimated according to the line of direction of the vis motrix, the *altitude* of it.

Bellini also uses the terms longitude and altitude in the same sense, in many places of his writings, which an ordinary reader finds hard to understand, for want of this interpretation. By *altitude* also in his 10th proposition De Febribus, he makes the thickness of the viscid matter in the blood-vessels; or the greatest length a viscid particle is extended into, from the side of a canal to its axis.

LONGITUDINALIS SINUS, a name given to two of the venous cavities of the dura mater; they are distinguished by the epithets superior and inferior. See **VEIN**.

LONGJUMEAU, in *Geography*, a town of France, in the department of the Seine and Oise, and chief place of a canton, in the district of Corbeil; 10 miles S. of Paris. The place contains 1434, and the canton 13,650 inhabitants, on a territory of $47\frac{1}{2}$ kilometres, in 25 communes.

LONGNESS POINT, a cape on the S. coast of the Isle of Man; 10 miles S.S.W. of Douglas.

LONGOBARDO, a town of Naples, in Calabria Citra; 10 miles S.W. of Cosenza.

LONGOBUCO, a town of Naples, in Calabria Citra; 14 miles S. of Rosano.

LONGOMONTANUS, CHRISTIAN, in *Biography*, an eminent Danish astronomer, son of a labouring peasant, was born at Longomontium, a village in Jutland, whence he took his surname, in the year 1562. His father was anxious to afford him a good education, but dying before he was eight years of age, he was committed to the care of an uncle, who finding the expence devolved on him by the lad more than he could bear, advised him to return to his mother, and to earn his living by the sweat of his brow. The youth, who shewed a great inclination for learning, was mortified at the proposal, but not wholly disheartened; he returned to the labours of an agricultural life, and at the same time improved every leisure moment in acquiring useful knowledge. At length he was driven, by the jealousies of his brothers, to quit his home, and he sought an asylum at Wiburg, where there was a college. Here he spent eleven years, and made great progress in the mathematical sciences, though he was at the same time obliged to support himself by his industry. From Wiburg he went to Copenhagen, and became an assistant to Tycho Brahe, with whom he continued eight years. During this period, he afforded Tycho much assistance in observing the heavens and in his calculations, and was so accurate and laborious, and at the same time so skillful, that he became the confidential friend of that great man. At length he returned to his native country, with the highest recommendations from Tycho, who furnished him with money to defray the expences of so long a journey. He travelled through Poland, in order that he might have a sight of the place which witnessed Copernicus's astronomical labours. At Copenhagen he met with a noble-hearted patron in the chancellor Christian Friis, who afforded him an honourable employment in his family. In 1605 he was nomi-

nated to a professorship of mathematics in the university of Copenhagen, a situation which had ever been the object of his highest ambition, and for which his genius and talents peculiarly qualified him; and he discharged the duties of it with the greatest ability, and highest reputation, till his death, which took place in 1647, when he was about the age of eighty-five. He was author of many valuable works, of which the most distinguished is entitled "*Astronomia Danica*," which contains all the great discoveries of Regiomontanus, Purbach, and Tycho Brahe. The titles of his other works are given in Hutton's Dictionary. Obscure as his native place and father were, he contrived to immortalize both, by taking his name from the village, and in the title-page to some of his works, calling himself Severini filius, his father's name being Severin, or Severinus.

LONGOTOMA, in *Geography*, a town of Chili, on the N. side of a river of the same name, that runs into the Pacific ocean, S. lat. $31^{\circ} 30'$. The town is distant 84 miles S. from Coquimbo.

LONGSPIEL, a very ancient musical instrument, found by sir Joseph Banks and Dr. Solander in Iceland, when they visited that country in 1773. This instrument, of a long and narrow form, and strung with four strings of copper, is extremely rude and clumsy. One of the four strings is used as a drone, the rest are played with a bow. Pieces of wood are placed at different distances on the finger-board, to serve as frets. It seems, indeed, to have been the primitive idea of a fiddle, and is a proof that the use of the bow, that wonderful engine, which the ancients, with all their ingenuity and musical refinements, had never been able to discover, and which has been rendered so miraculous, was known by the Scalds in Iceland, at least as early as in any other part of Europe. See **SCALDS**.

LONG-TAN, in *Geography*, a town of Corea; 42 miles S. of Hetfin.

LONG-TCHANG CHING, a town of China, in Chang-tong; 15 miles E. of Tei-nan.

LONG-TCHIAN, a mountain of Thibet. N. lat. $27^{\circ} 48'$. E. long. $86^{\circ} 39'$.

LONG-TCHUEN, a town of Corea; 55 miles W.N.W. of Han-tcheou.

LONGTOWN, a market town in the parish of Arthuret and ward of Eskdale, in the county of Cumberland, England, is situated on the borders of Scotland, near the conflux of the rivers Esk and Liddel, 9 miles distant from Carlisle, and 313 N. from London. The houses are mostly built in the modern style, and some of the streets are regular and spacious. At the north-end of the town is a stone bridge over the Esk. Longtown was returned to parliament, in the year 1801, as containing 176 houses, inhabited by 1335 persons, of whom 648 were stated to be employed in trades and manufactures. A market is held on Thursdays; and two fairs annually. Longtown stands in the midst of the estate of sir James Graham, of Netherby, whose predecessor, Dr. Robert Graham, may be considered as having been the principal cause of the prosperous state of this part of Cumberland. Under his patronage Longtown became populous; and by constructing the little harbour at Sarkfoot, he furnished the people with an easy mode of exporting their produce and supplying themselves with necessities.

Netherby, the seat of sir James Graham, is much celebrated in the topographical annals of this county, from the vast improvements that were made here during the latter part of the last century: nor is it less interesting to the antiquary from the assemblage of Roman remains that have been here preserved; and from its having been a Roman

station. The mansion, which stands on an eminence near the river Elk, was erected by the late Dr. Graham, about the year 1760, but has been much improved by the present proprietor. It is elegantly fitted up; and contains a valuable collection of ancient and modern medals, and a library furnished with a selection of classic and other valuable authors. The gardens and pleasure grounds are disposed with much taste and judgment. Beauties of England and Wales, vol. iii.

LONGUEP, a town of France, in the department of the Maine and Loire, and chief place of a canton, in the district of Baugé; 16 miles S. of Baugé. The place contains 5003, and the canton 13,935 inhabitants, on a territory of 280 kilometres, in 17 communes.

LONGUE, a small island in the Indian sea; 15 miles N. of Mauritius.

LONGUEUIL, CHRISTOPHER DE, in *Biography*, born at Mehlis in 1488, was natural son of Antony de Longueuil, bishop of Leon, and chancellor of Anne, queen of Bretagne. He was taken to Paris while he was very young, and carefully educated in classical learning and the sciences. After this he studied the law, practised in the profession, and obtained the place of a counsellor in parliament. He travelled into Italy, Spain, England, Germany, and Switzerland, for the purpose of improvement. At Rome he made an harangue before pope Leo X., who highly admired his eloquence. He died at Padua, at the age of thirty-four. His works consist of epistles and harangues; they were published at Paris in 1553, with his life, by cardinal Pole. He acquired a great reputation among those scholars in that age who were ambitious of being the close imitators of the style of Cicero, and were, on that account, termed *Ciceronians*. Erasmus bestows great praises on his genius and acquisitions, but laments that all the force of his powers should have been devoted to this one object.

LONGUEIL, in *Geography*, a township of Glengary county, in Upper Canada, being the second in ascending the Ottawa river.

LONGUEVAL, JAMES, in *Biography*, a learned French Jesuit, descended from a family in humble life, was born near Peronne, in Picardy, in the year 1680. He was educated in grammar-learning at Amiens, and pursued his maturer studies at Paris, where he was soon distinguished among his fellow students by his proficiency in learning. In the year 1699, he entered into the society of Jesuits, and after he had completed his studies, he taught the belles-lettres at the college of La Fleche with great applause, during about five years, when he commenced his lectures in divinity and the sacred scriptures. He died in the year 1735, at the age of fifty-five. His reputation as a writer, is chiefly founded on his elaborate history of the Gallican church, of which he lived to publish eight volumes: these bring the latter down to the year 1137. This work displays profound erudition and deep research, and is written in a beautifully simple style. While he was engaged on this work he was allowed an annual pension of 800 livres by the French clergy, whose esteem he had secured by his learned labours, his piety, and the amiable traits of his manners. The work, afterwards completed by fathers Brunoy and Berthier, made 18 vols. 4to. Mareri.

LONGUEVILLE, in *Geography*, a town of France, in the department of the Lower Seine, and chief place of a canton, in the district of Dieppe; 9 miles S. of Dieppe. The place contains 430, and the canton 7875 inhabitants, on a territory of 130 kilometres, in 29 communes.

LONGUS, in *Biography*, author of a romance in Greek prose, entitled "Pastorals," and relating to the loves of Daph-

nis and Chloe, is supposed to have lived in the reign of Theodosius the Great. His work is a curious specimen of that kind of composition in its simplest form, and is said to contain many descriptive beauties; but some of its scenes are such as the lowest modern writer would scarcely venture to paint. The best edition is that of Villoison, Gr. et Lat. Svo. in two vols. Paris 1778.

LONGUS, *Long*, an epithet given by *Anatomists* to a great number of muscles, hereby contradistinguished from *brevis*.

LONGUS *Colli*, præ-dorso-atloiden of Dumas, is a muscle situated on the anterior and lateral parts of the bodies of the three first vertebrae of the back, and the six last of the neck. It extends from the body of the third dorsal vertebra to the anterior arch of the atlas. It is elongated, broad in the middle, and pointed at the ends. On the front it is covered by the rectus capitis anticus, the pharynx, the carotid artery, the nerve of the eighth pair, and the œsophagus. Its posterior surface covers the lateral portion of the anterior surface of the bodies of the three first dorsal, and six last cervical vertebrae, to which it is attached, as well as to the intervertebral ligaments. It is also attached to the front edge of the transverse processes of the five last cervical vertebrae; and it covers the vertebral artery in the intervals of these processes. The outer edge of the muscle is attached below to the bodies of the two first dorsal vertebrae: here it is separated from the anterior scalenus by an interval in which the vertebral artery and vein are found. This margin is then fixed to the front of the transverse processes of the five last cervical vertebrae; and it is unattached in the rest of its extent. The internal edge is fixed to the longitudinal line, which may be observed on the front of the bodies of the two first dorsal, and the six last cervical vertebrae. Between these bones it is attached to the intervertebral ligaments. The inferior extremity is attached to the front and lateral portion of the body of the third dorsal vertebra: from this point it rises nearly parallel to that of the opposite side, becoming larger as far as the middle: then it gradually decreases to the superior extremity. The latter, joined to the opposite muscle, is attached to the tubercle of the anterior arch of the atlas. It is rather difficult to develop the structure of this muscle: its fleshy fibres are placed obliquely between aponeuroses, some of which cover the anterior surface, both above and below, while others are situated in the substance of the muscle. These fibres are short, although the muscle itself is long. Its action inclines the neck forwards, and resists the efforts which might tend to carry it backwards.

LONGUY, in *Geography*, a town of France, in the department of the Orne, and chief place of a canton, in the district of Mortagne; 9 miles E. of Mortagne. The place contains 1917, and the canton 7308 inhabitants, on a territory of 210 kilometres, in 11 communes.

LONGUYON, a town of France, in the department of the Moselle, and chief place of a canton, in the district of Briey; 7 miles S.W. of Longwy. The place, in which is a considerable iron forge and foundry of cannon, contains 1532, and the canton 9509 inhabitants, on a territory of 237½ kilometres, in 26 communes. N. lat. 49° 37'. E. long. 5° 40'.

LONGWY, a town of France, in the department of the Moselle, and chief place of a canton, in the district of Briey, situated on the Chiers. The place contains 2011, and the canton 10,743 inhabitants, on a territory of 242½ kilometres, in 35 communes. This place was merely a village, surrounded with three sharp mountains, on which was built, by Louis XIV. a new town, fortified by Vauban. N. lat. 49° 37'. E. long.

E. long. 5° 50'.—Also, a town of France, in the department of the Jura, on the Doubs; 9 miles S. of Dôle.

LONHANKO, a town of the Burman empire; 65 miles N. of Munchaboo.

LONICERA, in *Botany*, well known to every lover of British poetry by the name of Honeyfuckle, or Woodbine, received its name from Linnæus; the *Lonicera* of Plummer being a *Loranthus*. This name is intended to commemorate the merits of an old physician and naturalist, who lived during the middle of the sixteenth century. Adam Lonicer, a physician at Frankfort, was born at Marburg, Oct. 10th, 1528, and died at the age of 58. He published two volumes folio, in Latin, upon the *Materia Medica*; and a German Herbal, with wooden cuts, which are occasionally to be met with rudely coloured.—Few plants are more generally known, or admired, than several species of Honeyfuckle, whose beauty is only exceeded by the exquisite delicacy of their fragrance. Like the richest exotics they find a place in every one's fancy, and though as common as almost any other field or hedge plant, they have always been held in the greatest estimation.—Linn. Gen. 93. Schreb. 128. Willd. Sp. Pl. v. 1. 982. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 260. Ait. Hort. Kew. ed. 2. v. 1. 377. Lamarck Illustr. t. 150. (Caprifolium; Tournef. t. 378. Juss. 219. Gærtn. t. 27.—*Periclymenum*; Tournef. t. 378.—*Chamaecerasus*; Tournef. t. 379.—*Xylosteon*; Tournef. t. 379. Juss. 212.—*Diervilla*; Tournef. Act. 1706. t. 7. f. 7. Dill. Gen. App. 154. Juss. 211.—*Symphoricarpos*; Dill. Hort. Elth. 273. Juss. 211.—Class and order, *Pentandria Monogynia*. Nat. Ord. *Aggregate*, Linn. *Caprifolia*, Juss.

Gen. Ch. *Cal.* Perianth superior, five-cleft, small. *Cor.* of one petal, tubular; tube oblong, gibbous; limb in five revolute segments, one of which is more deeply separated. *Stam.* Filaments five, awl-shaped, about as long as the corolla; anthers oblong. *Pist.* Germen inferior, roundish; style thread-shaped, the length of the corolla; stigma obtusely capitate. *Peric.* Berry umbilicate, of two cells. *Seeds* roundish, compressed.

Obs. The synonyms above quoted are all referred by Linnæus and succeeding writers to *Lonicera*, by whom the generic names of Tournefort and Dillenius are retained for the sake of distinguishing the several species originally so called. We find the following remarks upon their differences in the *Genera Plantarum*.—*Caprifolium* has the lower segment of the limb separated twice as deeply as the rest, and the berries distinct.—*Periclymenum* has all the divisions of the corolla equal; the berries also distinct.—*Chamaecerasus* has the lower division of the corolla twice as deeply cut, with two berries seated upon the same base.—*Xylosteon* has the divisions of the corolla almost equally separated, and two berries on the same base. In *Symphoricarpos*, the corolla is nearly bell-shaped; the fruit simple, two-celled, seeds foliary.

L. alpigena and *cerulea* are remarkable for having one germin for two florets, as in *Mitchella*.

Eff. Ch. Corolla of one petal, irregular. Berry inferior, of two cells, with several seeds.

Thirteen species of *Lonicera* are described in the *Species Plantarum* of Linnæus, sixteen in the *Syst. Veg.* ed. 14, and twenty by Willdenow. The genus is divided into three sections, from which we have selected the following examples. Some of these sections, as it will appear, comprehend, each of them, more than one of Tournefort's supposed genera.

SECT. 1. *Periclymenum*, stem twining.

L. Caprifolium. Pale perfoliate Honeyfuckle. Linn.

Sp. Pl. 246. Engl. Bot. t. 799. Jacq. Austr. t. 357.—Flowers ringent, whorled, terminal. Leaves deciduous; the uppermost united and perfoliate.—First known as a native of this country from being found by the Rev. Mr. Relhan at Hinton near Cambridge. It flowers in May or June.—Stem shrubby, woody, twining. Branches nearly opposite, round, smooth. Almost all the leaves are combined, elliptical, obtuse, entire, smooth, rather glaucous beneath; the upper one, in united perfoliate pairs, somewhat orbiculate, accompanying the flowers. Flowers in whorls, spreading, yellowish, with a flesh-coloured tube, very fragrant. Berries of an orange red, crowned by the almost entire calyx.

L. Periclymenum. Common Honeyfuckle, or Woodbine. Linn. Sp. Pl. 247. Engl. Bot. t. 800. Curt. Lond. fasc. 1. t. 15. Fl. Dan. t. 908.—Heads of flowers ovate, imbricated, terminal. Leaves all separate, deciduous. Corolla ringent.—Found almost universally in groves and hedges, flowering in June and July, occasionally in the autumn.—Stem shrubby, woody, twining. Branches opposite, round. Leaves opposite, on very short footstalks, elliptical, entire, sometimes pubescent, glaucous beneath. Flowers in a terminal head, spreading in a radiate manner, yellowish-white, and bluish-coloured, very fragrant, and more particularly so early in the evening. Berries red, crowned with the five-toothed calyx, bitter, with a sweetish flavour.—Dr. Smith observes that this species is liable to many variations in the different degrees of smoothness or hairiness of its leaves, fruit, and younger branches; and that, by the coast, its flowers are often quite green.—A remarkable variety sometimes occurs with sinuated, variegated leaves, called the Oak-leaved Honeyfuckle.

SECT. 2. *Chamaecerasus*, Stalks bearing two flowers.

L. Xylosteum. Upright Honeyfuckle. Linn. Sp. Pl. 248. Engl. Bot. t. 916.—Stalks two-flowered. Berries distinct. Leaves entire, downy.—Admitted as an English plant by Dr. Smith since the publication of his Flora, on the authority of Mr. W. Borrer, who found it "growing plentifully, and certainly wild, in a coppice called the Hacketts, to the east of Houghton-bridge, four miles from Arundel, Sussex." It flowers in July.—Stem upright, bushy, much branched. Leaves opposite, on footstalks, ovate, clothed with soft hairs, deciduous. Flowers odororous, in pairs, on solitary, axillary stalks, shorter than the leaves, yellowish-white, tinged with red, downy. Berries oval, red, containing six or more seeds.

L. cerulea. Blue-berried upright Honeyfuckle. Willd. n. 14. Pall. Ross. v. 1. p. 1. 58. t. 37. Jacq. Austr. App. t. 17.—Two flowers on a stalk. Berries united, globular. Styles undivided.—A native of Switzerland, Austria, Siberia, and the islands adjacent to America. It flowers in the spring.—Stems three or four feet high. Branches slender, covered with a smooth, purplish bark. Flowers white, two on a stalk. Berries of a beautiful blue colour, single and distinct.—The wood of *L. cerulea* is very hard, and handsomely veined with grey and pale yellow. The juice of the berry stains paper of a strong purple colour, and might perhaps be useful in dyeing.—The buds of this shrub lasted three together, one above another, being provided for three years beforehand.

SECT. 3. *Stem erect*. Stalks many-flowered.

L. Symphoricarpos. Shrubby St. Peter's-wort. Linn. Sp. Pl. 249. (Symphoricarpos foliis alatis; Dill. Elth. 371. t. 278. f. 360.)—Heads of flowers lateral, on footstalks. Leaves nearly sessile.—A native of Virginia and Carolina, where it flowers in the autumn.—Stem about four feet high, sending forth many slender branches. Leaves

opposite, ovate. *Flowers* in whorls, round the stalk, small, of a greenish colour. *Berry* hollow and fleshy, containing cartilaginous, roundish seeds.

L. Diervilla. Yellow-flowered upright Honeyfuckle. Linn. Sp. Pl. 249 (*Diervilla*; Dill. Gen. App. 154. t. 10. Linn. Hort. Cliff. 63. t. 7.)—Heads of flowers terminal. Leaves serrated. A native of North America, and first introduced into Europe by M. Dierville, a French surgeon, whose name it still commemorates. It flowers from May to September. —*Stem* about three feet high. *Bark* of a reddish colour. *Leaves* opposite, slightly serrated, pointed. *Flowers* small, pale yellow, two or three together at each division of the bunch. *Berries* oval, black, with one hard seed in each cell. They seldom, however, come to maturity in this country.

LONICERA, in *Gardening*, contains plants of the deciduous, flowering, shrubby, and evergreen kinds; of which the species mostly cultivated are, the black-berried upright honeyfuckle (*L. nigra*); the Tartarian upright honeyfuckle (*L. Tatarica*); the fly honeyfuckle (*L. xylosteum*); the Pyrenean upright honeyfuckle (*L. Pyrenaica*); the red-berried upright honeyfuckle (*L. alpigena*); the blue-berried upright honeyfuckle (*L. cerulea*); the shrubby St. Peter's-wort (*L. lymphoriarpos*); the yellow-flowered upright honeyfuckle (*L. diervilla*); the common honeyfuckle (*L. periclymenum*); the Italian honeyfuckle (*L. caprifolium*); the trumpet honeyfuckle (*L. sempervirens*); and the evergreen honeyfuckle (*L. grata*).

The second sort varies in shady groves, and other similar situations, with white flowers.

And the ninth kind has several varieties, as the *late red*, which produces a greater variety of flowers together, than either the Italian or Dutch sorts, making a finer appearance than either of them during the time of flowering; but it has not been so long cultivated as the latter. This was formerly termed the Flemish honeyfuckle.

There are also sometimes varieties with striped leaves.

The Dutch variety may be trained with stems, and formed into heads, which the wild sort cannot, the branches being too weak and trailing for the purpose.

And there are two sub-varieties of it, the *long blowing*, and the *late red*, in which the stems are stronger, the leaves, flowers, and heads of berries larger, and the corollas redder than in the woodbine sort; the oak-leaved variety has sinuate leaves, cut like the oak, but smooth.

And there is likewise a variety which has variegated leaves.

The tenth species has a yellow variety, in which the shoots are much similar to it, but the bark darker in colour, the leaves of a deeper green, the flowers of a yellowish-red, appearing a little after it, being not of much longer duration, but are succeeded by red berries, containing one hard seed inclosed in the soft pulp in each, which ripens in the autumn.

And besides this, some mention other varieties, such as the early red-flowering, the late red-flowering, and the evergreen red-flowering.

Method of Culture.—An increase in all these plants may be effected either by layers or cuttings, but the latter is the better practice. The layers should be made from the young shoots, and be laid down in the autumn or early spring, the straggling tops being removed, when, by the following autumn, they will have taken root, and should be cut off from the plants, being either planted where they are to remain, or into a nursery to be trained for standards, by fixing down stakes to the stem of each plant, to which the principal stalk should be fastened, all the others being cut off; train-

ing each of them to the intended height, when they should be shortened to force out lateral branches, and these be again stopped to prevent their growing too long. By constantly repeating this as the shoots are produced, they may be formed into a sort of standard; but if regard is had to their flowering, they cannot be formed into regular heads, as the constant shortening will destroy the flower-buds, and prevent the desired effect.

In respect to the cuttings, they should be taken from the strong shoots of the former summer, with three or four joints, and be placed in rows in a shady border, to the depth of two or three of them, a foot apart, and six inches from plant to plant. When they have taken good root in the autumn or spring following, they may be removed into the nursery, and be planted out in rows two feet distant, and a foot asunder in them, where they may be kept a year or two, till wanted for planting out where they are to remain.

The eighth sort may be raised from suckers, which it affords in plenty, by taking them off, and planting them as above in the autumn in a rather moist soil.

Several of the sorts may likewise be increased by sowing the seed or berry in a bed of light mould in the autumn, to the depth of an inch. The plants rise in the first or second spring; and afterwards require the same management as the others.

In regard to their management afterwards, the only culture which any of them require, is, in the upright sorts, to have their straggling shoots shortened, and the dead wood cut out; and those trained as climbers, to have their branches conducted in a proper manner upon their respective supports; and every year all rambling shoots reduced and trained as may be proper, so as to preserve them within due limits and order, except where they are designed to run wild in their own rural way, especially those intended to climb among the branches of trees, shrubs, and bushes; those also intended to cover arbours and seats, should be pruned and trained annually, laying the shoots along to their length, till they have covered the allotted space; shortening or clearing out all such stragglers as cannot be properly trained; also such of those sorts as are trained against walls, &c. must have an annual pruning and training, by going over them two or three times in summer, laying in some of the most convenient proper shoots, some at their length, shortening or retrenching others, as necessary, to preserve regularity, and the proper succession of flowers; being careful to train enough, at this time, of such as appear necessary to continue the bloom as long as possible; and in winter pruning, all those left in summer, which may appear superfluous or unnecessary, should be turned out, shortening all such as are too long for the space allotted for them, especially all those with weak straggling tops, nailing in the remaining proper branches and shoots close to the wall, or other support which they may have.

They may all be introduced with propriety in plantations, both from the variety of their different growths, and the ornament and fragrance of their flowers; though the flowers of the upright kind are not so showy as those of the trailers; but they exhibit an exceedingly agreeable variety. But the trailing species have the greatest merit, not only in their numbers, but size, elegance, and odour, as well as in their duration. The shrubs of all the sorts are, notwithstanding, proper to be introduced in shrubberies, the upright kinds to intermix as standards. The trailing kinds, whose branches are great ramblers, and, without support, trail along the ground, should generally be introduced as climbers, having stout stakes placed to each of them to climb upon, which they

they effect by ascending spirally round the support, to a considerable height; and also be placed to ascend round the stems of trees, and to climb among the boughs of the adjacent bushes, shrubs, and hedges, which they effect in a very agreeable manner, by interweaving their branches with them. The climbers are likewise proper for training against walls and arbours, &c. for the ornament and fragrance of their flowers, laying their branches in, four or five inches asunder; thinning out the superabundant shoots annually, and training in some of the most robust for succession wood, either at full length, or shortened, as most proper to fill the space or vacancy that may be wanted to be covered.

The evergreen kinds are principally of the climbing tribe, and have much effect in their evergreen foliage, and the elegance of their flowers, as well as their long continuance in blow.

The uncommon beauty, and exquisite fragrance of the flowers in the ninth species, entitle it to a place in most sorts of plantations of the ornamental kind. In climbing, it turns from east to west, in the manner of most of our climbing plants; and in common with them bears clipping and pruning well; as in a state of nature, those plants which cannot ascend without the aid of others, are often liable to lose great branches; they have consequently a proportionate vigour of growth given them, in order to restore such accidental damages. It is however subject, when planted near building, to be injured and disfigured by *aphides*, which are vulgarly termed *blights*; these insects are not very numerous in the spring season; but as the summer advances, they increase in a very rapid manner; their first attacks should, of course, be carefully attended to, and the branches on which they first fix be cut off and destroyed, as when they have once gained ground they are defended by their numbers. Small plants may however be cleared of them by the use of tobacco dust, or Spanish snuff, but this method is not practicable for large trees. The leaves of the plants are likewise liable to be punctured and curled up by a small caterpillar, which produces a beautiful little moth, the *phalæna tortrix*. About the evening also, some species of sphinges or hawk-moths are often seen to hover over the blossoms, and with their long tongues extract the honey from the very bottoms of the flowers.

LONICERUS, or **LONICER**, **JOHN**, in *Biography*, a learned German, was born in 1499: after having received a good education, he became himself a professor at Marburg, where he died about the year 160. He was author of a Greek and Latin Lexicon, and published an edition of Dioscorides. Moreri.

LONIGO, or **LEONICO**, in *Geography*, a town of Italy, in the Vicentin, seated on a river called Fiume Novo, and containing several churches and monasteries; 14 miles S.S.W. of Vicenza.

LONKA, a town of Poland, in the palatinate of Podolia; 44 miles N. of Kaminiac.

LONSCHAKOVA, a town of Russia, in the government of Irkutsk; 40 miles N.N.E. of Stretensk.

LONSCHIN, a town of Prussia, in the palatinate of Culm; 10 miles S. of Culm.

LONS-LE-SAULNIER, a town of France, and principal place of a district, in the department of the Jura, formerly celebrated for its salt-works, but now discontinued. The place contains 6041, and the canton 14,999 inhabitants, on a territory of 112½ kilometres, in 23 communes. N. lat. 46° 40'. E. long. 5° 38'.

LONTARUS, in *Botany*, Rumph. Amboin. v. 1. 45. t. 10. Juss. 39. Gært. t. 8, a barbarous name of Rum-

phus for the *Borassus flabelliformis* of Linnæus. See BORASSUS.

LONT-CHOUDESONG, in *Geography*, a town of Thibet; 35 miles N.N.E. of Laffa. N. lat. 29° 58'. E. long. 92° 14'.

LONTHOIR, a town of the island of Banda, in the East Indian sea.

LONTOU, a town of Africa, in Galam, on the Senegal; 60 miles S.E. of Galam.

LOO, a town of France, in the department of the Lys; six miles S.S.E. of Dixmude.

LOOBOE, or **LOEBOE**. See **LOEBOE**.

LOOCALLA, a town of Congo, on the Zaire; 90 miles W. of St. Salvador.

LOOCHRISTI, a town of France, in the department of the Scheldt, and chief place of a canton, in the district of Ghent. The place contains 3056, and the canton 14,432 inhabitants, on a territory of 140 kilometres, in 7 communes.

LOODUERA, a town of Bengal; 11 miles S. of Rongatpour.

LOOE, a small island near the coast of Cornwall; two miles S.E. of Looe.

LOOE, *East*, a borough and market town in the parish of St. Martin, hundred of West, and county of Cornwall, England, is situated at the mouth of the river Looe, 12 miles from Plymouth, and 233 west from London. It is mostly built on a flat piece of ground, having the river on the west, and the sea on the south. The streets are narrow, and the houses built with slate. The port is protected by a small battery and breast-work. The town was incorporated by queen Elizabeth in 1587; the government is vested in a mayor and nine burgesses, who jointly elect a recorder. Two members have been returned to parliament ever since 13 Elizabeth; the right of election is in the mayor, burgesses, and freemen; in number about fifty. In the survey taken in 1801, East Looe was found to contain 126 houses, and 467 inhabitants, who were chiefly supported by the pilchard fishery, and the trade connected with the port. Four annual fairs are held, and a weekly market on Saturdays. Beauties of England and Wales, vol. ii.

LOOE, *West*, originally named *Portpigham*, a borough and market town in the parish of Talland, hundred of West, and county of Cornwall, England, is also situated at the mouth of the river Looe, and is connected with East Looe by a stone bridge of fifteen arches. West Looe formerly was much more considerable in point of trade, &c. than East Looe; it now presents a long street of mean irregular houses, with a small town-hall, anciently a chapel, and a few other buildings on the brink of the river. This borough, as well as the adjoining one, received its first charter of incorporation from queen Elizabeth, vesting the government in a mayor, and twelve burgesses, who with the freemen, in the whole about 50, elect two members of parliament. In the population return for 1801, West Looe was stated to consist of 82 houses, and 376 inhabitants. A fair is held annually, and a market every Saturday. Beauties of England and Wales, vol. ii.

LOOF, or as it is usually pronounced, *Luff*, a term used in conding of a ship. Thus,

Loof up, is to bid the steersman keep nearer to the wind.

Loof into a harbour, is to sail into it close by the wind.

Loof, to spring the, or luff, is when a ship that was going large before the wind is brought close by the wind.

When a ship sails on a wind, that is, on a quarter-wind, they say to the steersman, *keep your luff! veer no more! keep her*

her to! touch the wind! have a care of the be-latch! All which words signify much the same thing, and bid the man at the helm to keep the ship near the wind.

Loof of a ship, denotes the after-part of a ship's bow; or that part of her side forward where the planks begin to be incurvated into an arch, as they approach the stem. Hence, the guns which lie here are called *loof-pieces*.

Loof-hook, in a *Ship*, a tackle with two hooks to it, one of which is to hitch into the crengle of the main and fore-fail, and the other is to hitch into a certain strap, which is spliced into the chiefs-tree, and so down the fail. Its use is to succour the tackles in a large fail, that all the strefs may not bear upon the tack. Sometimes also it is used when the tack is to be seized the surer.

Loof-tackle, or *Luff-tackle*, a large tackle, larger than the jigger-tackle, but smaller than those which hoist the heavier materials into and out of the vessel, such as the main and fore tackles, the stay and quarter tackles, &c. serving to lift all the small weights in or out of the ship, and otherwise variously employed as occasion requires.

Loof, or *Loop*, a corn-measure at Riga, equal to 3078 cubic inches; of which 4324 are equal to ten English quarters.

LOOHOGGO, in *Geography*, one of the smaller Friendly islands, surrounded by a reef of rocks. S. lat. $19^{\circ} 41'$. E. long. $185^{\circ} 36'$.

LOOJAMA, a town on the E. coast of the island of Timor. S. lat. $8^{\circ} 27'$. E. long. $126^{\circ} 18'$.

LOOKING GLASS, a plain polished glass speculum, or mirror, to one side of which a plate of tin-foil is made to adhere by means of quicksilver; which being impervious to the light, reflects its rays, and so exhibits the images of objects placed before it.

In consequence of this construction, the looking-glass makes a double reflection of every object, *viz.* one from the upper surface, which is the weakest, and another from the under surface, which is contiguous to the tin-foil. When a person stands just before the glass, the two reflections coincide, and he perceives one image; but if he stands oblique, as at A, (*Plate IX. Optics, fig. 10.*) and views the reflection D, of an object B C, situated on the other side, he will then perceive two images, *viz.* one caused by the upper, and the other caused by the lower surface of the glass E F. If the object B C be very luminous, such as a lighted candle, then the eye at A will perceive a great succession of candles at D, gradually decreasing in splendour; the cause of which phenomenon is, that the strong reflection from the under surface of the glass is again reflected from the upper surface, and this again by the lower, &c.

The theory of looking-glasses, and the laws whereby they give the appearance of bodies, see under *MIRROR*.

Looking-glasses, the manner of grinding and preparing, is as follows:—a plate of glass is fixed to a horizontal table of free-stone or wood, of about the same size, and cemented to it by Paris plaster; and to another lesser table is fixed in the same manner another plate. Over the first plate is sprinkled fine sand and water, in a sufficient quantity for the grinding, and the second or less plate is laid on it; and thus worked this way and that way, till each has planed the other's surface. These plates are made to rub against each other evenly and steadily by a kind of hand-mill, the wheel of which is wrought by a man, or if the plates be large by two men, who regulate the pressure as they think proper. As they begin to become smoother, finer sand is successively used. When one side of the plate is finished, the plaster that cemented it is picked off, and the plate turned, so

that the other side may be ground in the same manner. Towards the close of the operation of grinding, the pressure is increased by loading the upper plates with flat stones of different thicknesses. This process lasts about three days, and it is of great importance that the surfaces should be perfectly flat and parallel, which is determined by the ruler and plumb-line. In order to complete this process, emery of different finenesses is used, and great care is taken in separating and sorting them. This is done by putting into a vessel of water a quantity of rough emery, and well stirring it: the coarsest particles will sink to the bottom, and the finer will be held suspended for some time by the supernatant liquor. This liquor is poured off, and after some time, about 20 minutes, the finer particles will subside. More water is then added to the vessel, and the emery stirred again; and after remaining at rest about 15 minutes, the supernatant liquor is poured off; and this by rest furnishes an emery of the second degree of fineness. The same operation is repeated twice more at the different intervals of about five minutes and half a minute; by which two other sorts are obtained. The wet emery obtained from all these liquors is separably heated over a stove to evaporate the water, and when nearly dry, is made up into balls for the further operation. The plates are then ground on both sides with two or three emerys, beginning with the coarsest, and finished with great care. They are now perfectly even, and the scratches, which after the first operation remained and rendered them almost opaque, disappear. (See *GRINDING*.) For the method of polishing looking-glasses and mirrors, we refer to the article *POLISHING*.

The plates being polished, a thin blotting paper is spread on a table or marble slab; and sprinkled with fine powdered chalk; and this done, over the paper is laid a thin lamina or leaf of tin, on which is poured mercury, which is to be equally distributed over the leaf, with a hare's foot or cotton. Over the leaf is laid a very thin smooth paper, of which the kind called fan-paper is best, and over that the glass plate. With the left hand the glass-plate is pressed down, and with the right the paper is gently drawn out; which done, the plate is covered with a thicker paper, and loaded with a greater weight, that the superfluous mercury may be driven out, and the tin adhere more closely to the glass. When it is dried, the weight is removed, and the looking-glass is complete.

Some use an ounce of mercury with half an ounce of marcasite or bismuth, melted by the fire; and lest the mercury evaporate in smoke, pour it into cold water; and when cold, squeeze it through a cloth or leather. Some also add a quarter of an ounce of lead and tin to the marcasite, that the glass may dry the sooner. For more particular directions in the conduct of this operation, see *SILVERING*.

In the *Phil. Trans.* N. 245, we have a method of *foliating* (see *FOLIATING*) globe looking-glasses, communicated by sir R. Southwell. The mixture is of quicksilver and bismuth, of each three ounces, and tin and lead, of each half an ounce; to the last throw in the marcasite, and afterwards the quicksilver; stir them well together over the fire; but they must be taken off, and be towards cooling before the quicksilver be put to them. When the mixture is used, the glass should be well heated, and very dry; but it will do also when it is cold, though best when the glass is heated.

Mr. Boyle's method, which he prefers to any which he ever met with in print, is this: take tin and lead, of each one part, melt them together, and immediately add of good

good tin-glass, or bismuth, two parts; carefully skim off the dross; then take the crucible from the fire, and before the mixture grows cold, add to it 10 parts of clear quick-silver, and having stirred them well together, keep the fluid in a new clean glass. When you are going to use it, first purge it by straining it through linen, and gently pour some ounces into the glass to be soliated through a narrow paper funnel, reaching almost to the glass, to prevent the liquor from flying to the sides. After this, by dextrously inclining the glass every way, endeavour to flatten it to the internal surface; which done, let it rest for some hours; then repeat the same operation, and so continue at times, till the liquor is slowly passed over, and equally fixed to the whole superficies; which may be discerned by exposing the glass to the eye between that and the light. Boyle's works abr. vol. i. p. 129.

For the method of blowing and eaking glass, and the choice of the materials for looking-glasses, see GLASS.

LOOKING-GLASS, *Venus's*, in Botany. See CAMPANELLA.

LOOKNAPOUR, in Geography, a town of Hindoostan, in Oude: 15 miles S.W. of Kairabad.

LOOK-OUT, CAPE, a cape on the coast of North Carolina, being the southern part of a long, insulated, and narrow strip of land. E. of Core Sound. Its N. point forms the S. side of Ocrecochi inlet, which leads into Pamlico Sound; N.E. of Cape Fear, and S. of Cape Hatteras, in about N. lat. 34° 50'. Its excellent harbour has been filled up with sand since the year 1777.—Another cape, of the same name, lies on the southern coast of Hudson's bay, in New South Wales, E.S.E. of the mouth of Severn river. N. lat. 56°. W. long. 84°.

LOOK-OUT, in Sea Language, denotes a watchful attention to some important object, or event, which is expected to arise from the present situation of a ship, &c. It is principally used when there is a probability of danger from the real or supposed proximity of land, rocks, enemies, &c. There is always a look-out kept on a ship's forecattle at sea, to watch for any dangerous objects lying near her track; the mate of the watch accordingly calls often from the quarter deck, *look out afore there!* to the persons appointed to this service. Falconer.

LOOKSEENGAR, in Geography, a town of Bengal; 35 miles N.W. of Rangur.

LOOL, in Metallurgy, a vessel made to receive the washings of ores of metals. The heavier or more metalline parts of the ores remain in the trough to which they are washed; the lighter, and more earthy, run off with the water, but settle in the lool.

LOOM, in Geography, a town of Norway; 60 miles S.E. of Rindal.

LOOM, the weaver's frame: a machine whereby several distinct threads are woven into one piece.

Looms are of various structures, accommodated to the various kinds of materials to be woven, and the various manners of weaving them; viz. for woollens, silks, linsens, cottons, cloths of gold; and other works, as tapestry, ribbands, stockings, &c. divers of which will be found under their proper heads. See WEAVING.

The weaver's loom-engine, otherwise called the Dutch loom-engine, was brought into use from Holland to London, in or about the year 1676.

LOOM, *Hair*, in Law. See HEIR-LOOM.

LOOM, at Sea. If a ship appears big, when at a distance, they say she looms, or appears a great sail; the term is also used to denote the indistinct appearance of any other distant objects.

The most remarkable phenomena of this kind, depend on

the accidental variations of the temperature of the air at different parts, producing great irregularities in its refraction, especially near the horizon. Accordingly the rarefaction of the air in the neighbourhood of the surface of water, of a building, or of the earth itself, occasions a distant object to appear depressed instead of being elevated, and to be sometimes seen at once both depressed and elevated, so as to appear double, one of the images being generally in an inverted position, as if the surface possessed a reflective power; and there seems to be a considerable analogy between this kind of refraction and the total reflection which happens within a denser medium. See FATA MERGANA.

Loom-Gale, a gentle, easy gale of wind, in which a ship can carry her top-sails a-trip.

LOOMAKA, in Geography, a town of Bootan; 28 miles S. of Tassafadon.

LOON, in Ornithology. See COLYMBUS *glacialis*, and COLYMBUS *fluvialis*.

LOONENBURG, in Geography, a town of Green county, New York, near the city of Hudson.

LOONGHEE, a town of the Birman empire, on the Irawaddy, which has a celebrated temple; 55 miles N. of Prome. N. lat. 19° 42'.

LOONPOUR, a town of Hindoostan, in Guzerat; 40 miles E. of Junagar.

LOOP, in the Iron Works, is a part of a sower or block of cast iron broken or melted off from the rest, and prepared for the forge or hammer. The usual method is, to break off the loop of about three quarters of a hundred weight. This loop they take up with their slinging-tongs, and beat it with iron sledges upon an iron-plate near the fire, that so it may not fall to pieces, but be in a condition to be carried under the hammer. It is then placed under the hammer, and a little water being drawn to make the hammer move but softly, it is beat very gently, and by this means the dross and foulness are freed off; and after this they draw more and more water by degrees, and beat it more and more till they bring it to a four square mass, of about two feet long, which they call a bloom.

Loop, in Rural Economy, the hinge of a door or gate. See GATE.

Loop-Holes, in Sea Language, are holes made in the coamings of the hatches of a ship, to fire muskets through in a close fight.

LOOPHEAD, in Geography, a cape of Ireland, in the county of Clare, being the north point of the mouth of the Shannon. On this headland is a lighthouse. N. lat. 52° 30'. W. long. 9° 50'.

LOOPING, in Metallurgy, a word used by the miners of some counties of England, to express the running together of the matter of an ore into a mass, in the roasting, or first burning, intended only to calcine it so far as to make it fit for powdering. This accident, which gives the miners some trouble, is generally owing to the continuing of the fire too long in this process.

LOOSA, in Botany, a name which originated with Adanson, but of whose meaning or derivation we find no account, except that it has been supposed intended to commemorate some Spanish botanist, of whose merits or name nothing else is known. Adanson writes it *L. sp.*, and he is followed by Jacquin and the French botanists. Linnæus, Murray and Schreber use the above orthography, which we have retained, though we much suspect it to have been originally an error of the press; but having nothing better to guide us, we leave matters as we find them. It is pity so fine a genus should not have a certain or intelligible appellation.

tion. Linn. Syst. Nat. ed. 12. v. 2. 364. Syst. Veg. ed. 14. 494. Schreb. 360. (Loafa; Adarf. v. 2. 501. Jacq. Obl. fasc. 2. 15. t. 38. Willd. Sp. Pl. v. 2. 1176. Mart. Mill. Dict. v. 3. Juss. 322. Lamarck Dict. v. 3. 758. Loaza; Lamarck Illustr. t. 426.)—Class and order, *Polyandria Monogynia*. Nat. Ord. *Onagris affine*, Juss.

Gen. Ch. Cal. Perianth almost entirely superior, of five lanceolate, spreading, permanent, equal leaves. Cor. Petals five, large, obovate, hooded, spreading, equal, attenuated at their base into slender claws. Nectary of five leaves, alternate with the petals, approximated in the form of an acute cone, each rather shorter than the petals, lanceolate, corrugated, awned with a double bristle. Stam. Filaments numerous, capillary, in parcels of from 15 to 17 opposite to each petal, longer than the nectary; anthers incumbent, roundish. Pist. Germen somewhat ovate, more than half inferior; style thread-shaped, erect, the length of the stamens; stigma simple, obtuse. Peric. Capsule turbinate, of one cell, opening with three valves at the top, which are half-ovate, acute, finally spreading. Seeds numerous, ovate, small. Receptacles three, linear, longitudinal.

Eff. Ch. Calyx of five leaves. Petals five. Nectary of five leaves alternate with the petals. Capsule half-inferior, of one cell, three valves at the top, and many seeds.

Obs. This genus is, as Jacquin observes, nearly akin to *Mentzelia*.

1. *L. hispida*. Lamarck t. 426. fig. 1. (*L. urens*; Jacq. Obl. fasc. 2. 15. t. 38.)—Very bristly. Leaves alternate, doubly pinnatifid. Edges of the calyx-leaves revolute.—Gathered by Dombey, in sandy ground in Lima. The root is annual, fibrous. Stem erect, from one to three feet, or more, in height, slightly subdivided, leafy, round, beset with innumerable, horizontal, tawny, bristles, which are observable, more or less, in all the species. Lamarck has found each of these bristles to be furnished with a slight bag at its base, and thence he reasonably concludes that the plant stings like a nettle, whose venom is lodged in similar bags. These stings are, in the plant we are describing, intermixed with fine down. Leaves alternate; the lower ones stalked; the rest sessile; all doubly pinnatifid, more or less deeply, two or three inches long, somewhat bristly, downy beneath; their divisions and teeth irregular and obtuse. Flower-stalks scattered, generally opposite to the leaves, foliary, simple, single-flowered, bristly, above an inch long, destitute of bracteas. Flowers large, handsome and very remarkable, above an inch wide. Petals yellow, bristly on the outside, concave. Nectaries white, dotted with red and green. Stamens at first erect, then lying in five tufts upon the petals, conspicuous for their dark anthers. This plant dries remarkably well, and has the appearance of being very showy when growing. We never heard of this or any other species being cultivated in Europe, but they would doubtless succeed with the same treatment as the *Calceolaria pinnata*.

2. *L. contorta*. Lamarck n. 2. t. 426. fig. 2—Stem twining. Leaves opposite, stalked, somewhat runcinate, toothed. Capsule twisted.—Gathered by Joseph de Jussieu in Peru. One of his specimens is figured and described by Lamarck, with a weak twining stem, two feet or (probably) much more in height, moderately bristly. Leaves opposite, stalked, about three or four inches in length, pinnatifid, bristly, sharply toothed or cut, their lowest pair of lobes longest and most reflexed. Flowers on long axillary simple stalks, yellow.

3. *L. acanthifolia*. Lamarck n. 3. (Ortiga chilienfis urens, acanthi folio; Feuill. Peruv. v. 2. 757. t. 43.)—

Leaves opposite, pinnatifid, sharply toothed; the upper ones sessile. Calyx reflexed. Petals with two terminal teeth. Gathered by Feuillée in a valley in Chili. Stem six feet high, bristly, branched, hollow. Leaves opposite, resembling those of *Argemone mexicana*, nine or ten inches long, and six broad, deeply pinnatifid, with numerous, sharp, bristly teeth; the lowermost stalked, the rest sessile. Flowers large, stalked as in the foregoing; their petals dark-green and bristly at the outside, bright red within; nectary yellow, striped with red. No one but Feuillée seems to have known this remarkable species.

4. *L. grandiflora*. Lamarck n. 4.—“Leaves opposite or alternate, ovate, somewhat heart-shaped, lobed; hoary beneath. Petals flattish.”—Gathered by Joseph de Jussieu in Peru. We have never seen a specimen of this. Lamarck describes it as remarkable at first sight for the glaucous hoariness of the under-side of its leaves, and the great size of its flowers, which, when expanded, are at least three inches broad. The herb is very bristly. Leaves about three and a half inches long, two and a half wide.

5. *L. chenopodiifolia*. Lamarck n. 5.—Leaves scattered, stalked, ovate, cut and toothed. Flowers drooping, in terminal, simple, somewhat leafy, clusters. Fruit oblong, very bristly. Gathered in Peru, by Joseph de Jussieu, whose specimens were described by Lamarck. We have one gathered in moist situations in Lima, by Dombey. The root is fibrous and annual, as, probably, in the whole genus. Stem 12 to 15 inches high, erect, slightly branched, roughish with deflexed hairs. Leaves an inch or two long, one broad, few, ovate, bluntly pointed, variously toothed, rough with small dense bristles. Flowers drooping, in a long, loose, terminal cluster, with a few small leaves about its lower part, rather small, yellow; the nectary apparently reddish. Fruit oblong, pendulous, beset with long, prominent, dense, rigid bristles.

6. *L. nitida*. Lamarck n. 6.—Stem procumbent. Leaves opposite, palmate, cut and toothed; shining above; downy beneath. Fruit turbinate, bristly. Gathered by Dombey in stony ground in Lima. The stem appears to be weak and procumbent, forked, leafy, downy, less bristly than in some of the former. Leaves palmate, heart-shaped and three-ribbed at the base, variously jagged and toothed; nearly smooth and shining above, finely downy beneath; with a few scattered bristles on both sides. The lower leaves stand on downy stalks; the upper are nearly or quite sessile. Flower-stalks from the forks of the stem, rather long, downy. Germen turbinate, downy, clothed with reflexed bristles, but far less densely than the last-described. Calyx-leaves broad and large. Dombey says, “the nectaries are very small, three-cleft and white, with three purple bristly-pointed appendages, on the outside, at their base.”

Specimens of these two last, gathered by him, are preserved in the Linnean herbarium.

LOOSE, To, in Sea Language, is to unfurl or cast loose any sail, in order to be set, or dried, after rainy weather.

LOOSE-Strife, in Botany. See *LYSIMACHIA*.

LOOSE-Strife, Padded. See *WILLOW-herb*.

LOOSE-Strife, Purple and Spiked. See *LYTHRUM*.

LOOSE-Strife, Virginian. See *GAURA*.

LOOSE Style. See *STYLE*.

LOOSEDRECHT, in Geography, a town of Holland; 8 miles S. of Naarden.

LOOSEMORE, HENRY, in Biography, a bachelor of music in the university of Cambridge, 1640, and organist, first of King's college, and afterwards of the cathedral of Exeter. He composed several services and anthems, ex

officio,

Opis, for these choirs; but we believe they were never printed, or adopted elsewhere. A person of the same name, a lay singer or organist of Exeter cathedral, is said to have built the organ, which was erected in that church at the restoration; of which instrument, the largest pipe of the open diapason was 32 feet; which exceeded in magnitude that of any other organ in the kingdom.

LOOSEBONE, GEORGE, bachelor in music, of Trinity college, Cambridge. Great musicians are but few in every part of Europe, except Italy and Germany, where the courts and capitals are so numerous; but *mediocrity* produces many musicians everywhere.

LOOSENED. See *HOOP-loosened*.

LOOT, a weight in Holland, 32 of which are equal to 1lb. of commercial weight, and 24 = 1lb. of apothecaries' weight = 3lb. troy.

LOP, in *Rural Economy*, a term signifying to prune or cut away.

LOP KENT-HILL, in *Geography*, a mountain of Thibet. N. lat. 30° 14'. E. long. 85° 54'.

LOPARY, a town of Hindoostan, in Benares; 10 miles S. of Founhor.

LOPES, FERNAM, in *Biography*, the most ancient of the Portuguese chroniclers, and said to be one of the best writers of chronicles that any country can boast. He was private secretary to the infant D. Fernando, who died in captivity at Fez, afterwards became chief chronicler, and keeper of the archives. He died in 1449. He was author of the chronicles of Pedro I., of Fernando, and of Joam I. to the conclusion of peace with Castile. The chronicles of the earlier kings are variously attributed to him, or to Ruy de Pina, in whose name they are published. The chronicle of Pedro was edited in 1734 by P. J. P. Bayam, and was reprinted in 1760. That of Fernando, which is longer and more valuable, has never been published. A manuscript copy of the work is in the hands of Mr. Southey. The most important of all his writings is his chronicle of Joam, which is the history of the grand struggle between Portugal and Castile, towards the close of the fourteenth century. "No pains," says the biographer, "were spared to render it as complete as possible, neither on the part of the historian himself, nor of the king Duarte, by whose command this history of his father was written. The monarch sent into Castile to collect documents, and the chronicler, independently of the information which he had received at court from persons who had borne a part in the councils and actions of those times, went over the whole kingdom to collect testimony from all the actors in the wars, which he recorded. This was first published in 1644, soon after the Braganza revolution; never was a publication better timed; never was any book better calculated to rouse a nation by the example of their fathers, and encourage them to resist those enemies whom their fathers, under like circumstances, had conquered. It is a truly excellent and admirable work. With the great advantage of singleness and uniformity of subject, it has all the manners, painting, and dramatic reality of Froissart, conveyed in a nobler language, and vivified by a more patriotic and more poetical mind." Gen. Biog.

LOPESCO, in *Geography*, a town of Naples, in Abruzzo Ultra; 19 miles S.W. of Aquila.

LOPEZ, GREGORIO, in *Biography*, a celebrated Spanish lawyer, was born at Guadaloupe, towards the close of the fifteenth, or commencement of the sixteenth century. He edited the laws of Alonso the Wise, known by the title of "Las Siete Partidas," and added a commentary, which has been retained in most of the subsequent editions, and is included in the last. Lopez studied at Salamanca, and was

one of the royal council of the Indies. The time of his death is not known: his epitaph is in St. Anne's chapel, in the monastery of Guadaloupe, says, in the Portuguese language:

"Here lies the licentiate Gregorio Lopez, a native of this place. Pray to God for him." G. L. P.

LOPEZIA, in *Botany*, dedicated by Cavanilles to the memory of the licentiate Thomas Lopez, a native of Burgos, who had an honourable appointment in America in the reign of the emperor Charles V., and is said to have written a compendium of natural history, after his return; which still remains in manuscript, under the title of a Treatise on the three elements of air, water and earth. Cavan. Ic. v. 1. 12. Vahl. Enum. v. 1. 3. Willd. Sp. Pl. v. 1. 18. Aut. Hort. Kew. ed. 2. v. 1. 15. Lamarck Dict. v. 3. 504.—Class and order, *Monardella Monardella*. Nat. Ord. *Onagraceae*. Juss. See Sims and Koenig's Annals of Botany, v. 1. 532.

Gen. Ch. Cal. Perianth superior, of four oblong, concave, coloured deciduous leaves; three of them ascending; the fourth, rather the largest, pointing downwards. Cor. irregular. Petals four, spreading, longer than the calyx; the two uppermost oblong, erect, parallel, with a gland at the base, and supported by cylindrical claws; two lateral ones spatulate, widely spreading. Nectary obovate, folded, on a bent elastic stalk, parallel to the lower leaf of the calyx. Stam. Filament one, awl-shaped, ascending, opposite to the nectary half as long as the upper petals; anther terminal, ovate, simple, of two cells, embraced in an early date, by the folded limb of the nectary. Pist. Germen inferior, nearly globose, smooth; style thread-shaped, somewhat declining, as long as the stamen; stigma capitate, downy. Peric. Capsule globular, of four cells, opening at the top by four valves. Seeds minute, ovate, numerous. Receptacle square.

Eff. Ch. Calyx superior, of four unequal leaves. Corolla irregular, of four petals. Nectary stalked, folded, opposite to the stamen. Capsule of four cells and four valves. Seeds numerous.

1. *L. hirsuta*. Hairy Lopezia. Dryandr. in Aut. Hort. Kew. n. 1. Jacq. Coll. Suppl. v. 5. t. 15. f. 4. (L. mexicana; Willd. Sp. Pl. n. 1.)—Leaves ovate, downy. Stem round, hairy.—Native of Mexico. Mr. John Hummelmann obtained seeds from Germany, for Kew garden, in 1796. The plant is annual, kept in the stove, and flowers from September to November. We procured specimens in 1797 from the Cambridge garden. The stem is two or three feet high, branched, pale green, clothed with length soft hairs. Leaves alternate, stalked, ovate, pointed, minutely toothed, an inch or an inch and half long, of a bright light green, clothed on both sides with short soft hairs; those near the flowers small and sessile. Cylinders solitary at the end of every little branch, somewhat corymbose, leafy; their partial stalks capillary, simple, spreading, coloured, smooth. Flowers spreading, prettily variegated with pink, deep red, and white, in shape not unlike some sort of little flies. When touched, they exhibit a striking elasticity, if not irritability, in the manner in which the nectary on one hand, and the stamen on the other, fly from the pistil.

2. *L. racemosa*. Smooth Lopezia. Cavan. Ic. v. 1. 12. t. 18. Curt. Mag. t. 254. (L. mexicana; Willd. Sp. Pl. n. 1.)—Stem square, smooth, as well as the leaves. Floral leaves minute.—Native of Mexico. The first seeds that arrived in this country, were sent in a letter from Madrid in 1791, by the Abbé Cavanilles to the writer of the present article, and produced plants at Kew and Chelsea the follow-

ing year, which bloomed abundantly in the autumn, and were much admired. This species differs from the former chiefly in its smoothness, and the squareness of its stem. In other respects they are very much alike, especially in the flowers and inflorescence, so as to have been generally thought varieties. We are induced by no means certain, that the stem of the *blafia* is not frequently angular, in some degree.

3. *L. coronata*. Coronet-flowered *Lopezia*. Andr. Repol. t. 551. Dryandra. in Ant. Hort. Kew. n. 3.—Leaves smooth and shining. Stem angular, from the decurrent footstalks. Floral leaves mostly longer than the flower-stalks.—Native of Mexico. Messrs. Lee and Kennedy are said to have introduced this species in 1805, which is marked as a hardy annual in Hort. Kew. It differs from the last in being of more luxuriant growth, with larger floral leaves, the whole foliage being of a deeper more shining green. We are much inclined to suspect these differences to have arisen from differences of treatment, and that the fading of the lateral petals, as they advance in age, may be attributed to the action of strong sunshine. S.

LOPHANTHUS, from *λοφος*, a crest, and *ανθος*, a flower, is the specific name of a species of *Hyssopus*; see that article. Forster has used it to designate a genus of his own, in his *Genera Plantarum*, of the native country of which, or of its form, habit, or duration, he has said nothing, except that it is next akin to *Waltheria*; neither does any mention of it occur, as far as we can find, in his subsequent works. We presume therefore he found he had made a mistake, but we subjoin his characters of the genus. Forst. Gen. t. 14. Juss. 427. Lamarck Dict. v. 3. 594. Illustr. t. 143.—Class and order, *Pentandria Monogylia*. Nat. Ord. *Columbifera*, Linn.? *Incerta sedis*, Juss.

Gen. Ch. Cal. Perianth inferior, of one leaf, tubular, in five small, equal, acute segments, permanent. Cor. Petals five, spatulate, spreading, roundish, with slender upright claws the length of the calyx. Stam. Filaments five, awl-shaped, the length of the corolla; anthers somewhat incumbent. Pyl. Germen superior, oblong, conical, hairy; style short, cylindrical, nipple-like, slightly club-shaped; stigma slightly cloven. Peric. of one cell, clothed with long hairs. Seed solitary, ovate, covered, smooth, in the bottom of the calyx.

1. *L. tomentosus*. The only species mentioned.

LOPHIA, in *Anatomy*, a term for the upper part of the cervix, or back part of the human neck.

LOPHIUS, in *Natural History*, a genus of fishes of the order Branchiostegi: the generic character is as follows: head depressed; many sharp-pointed teeth; tongue broad and armed with teeth; eyes on the upper part of the head; nostrils small; gills three; one lateral aperture; pectoral fins placed on the long branchiæ; dorsal and anal fins opposite, and near the tail; body scaleless, covered with a thin lax skin; vent in the middle; no lateral line. The fishes of this genus are of a singularly uncouth appearance; the body being thick and shapless; the head excessively large, and the fins short and broad.

Species.

PISCATORIUS. This has various English names, as the European or common angler, frog-fish, toad-fish, fishing-frog, sea-devil, &c. Body depressed; head rounded. The usual length of this species is from two to four feet, though it is sometimes found six or even seven feet long. In its form it has a resemblance to that of a tadpole. The skin of the trunk is smooth, but that of the upper parts marked by various inequalities. The eyes are large and whitish;

the lower jaw is considerably longer than the upper. There are some thread-like processes that proceed from the upper part of the head, and some shorter ones from the back, but the edges of the body are fringed at intervals with shorter appendages of a somewhat similar nature. The upper surface is brown, with deeper or paler variegation; and the under surface is whitish. The frog-fish inhabits the European seas; swims slowly; lies in ambush, in shallows, half-concealed by sea-plants or mud, and decoying its prey by moving its worm-like processes. According to the description given by Baffon the two long beards or filaments placed immediately above the nose are small in the beginning, but thicker at the end, and answer the very singular purpose of a fishing-line, to which use the animal converts them. This property of those filaments is referred to by Pliny and other naturalists, who say, "with these extended, the fishing-frog hides in muddy waters, and leaves nothing but the beards to be seen: the curiosity of the smaller fish brings them to view these filaments, and their hunger induces them to seize the bait; upon which the animal in ambush instantly draws in its filaments with the little fish that had taken the bait, and devours them without mercy." It is said if the bowels of the fishing-frog are taken out the body will appear transparent; and if a lighted candle be substituted for the intestines, as in a lantern, the whole has a very formidable appearance. This species feeds on dog-fish and other smaller fishes. The "cornubiensis," or cornish, or long-angler, or fishing-frog of Mount's bay, which has been taken as a separate species, may be regarded only as a variety.

BARBATUS. Body depressed; lower jaw bearded. It inhabits the seas of Northern Europe; is between three and four feet long, and is a very voracious fish.

VESPERTILIO. Body depressed; head rostrate: an inhabitant of the American ocean; the body is reddish, broad before, narrowed behind, and covered with radiate, sharp, patelliform tubercles; beneath with small prickles; in its mode of catching its prey it resembles the *L. piscatorius*.

HISTRIO: Harlequin angler, or American toad-fish; is of a compressed form; of a yellowish-brown colour, with irregular blackish spots, and beards on the head and body. This, which is one of the most grotesque and singular of fishes, is found in the American and Indian seas, and is a most curious and remarkable fish. It is about a foot long, and its ventral fins resemble short arms. It has been asserted, though on very doubtful authority we suspect, that instances have been known of these fishes living three days without water.

STRIATUS. Body compressed, brown; marked all over with numerous black streaks; is found on the coast of New Holland.

PICTUS. Body compressed, brown, with yellowish blotches edged with red; inhabits the southern ocean; tendrils on the nose forked at the end.

MARMORATUS. Body subcompressed, livid, varied with whitish and ferruginous spots, dorsal fin single; tendrils at the nose three-cleft at the end. Native of the Pacific ocean; observed about the coast of Otaheite, &c.

MONOPTERIGIUS. Body depressed, blackish, beneath whitish; fin above the tail almost erect, ramose. It inhabits the seas of Australasia. It is not quite agreed where to place this very singular fish; it has no fin except the lobate one just above the tail; the eyes are vertical, approximate, and far behind the snout: the body is roundish, a little tapering to both ends, and the tail at the end of the body rounded.

MURICATUS; Depressed angler: described first by La Cèpe,

Cope, under the name "*Lophie faijas*:" body flat, orbicular, and covered with numerous small tubercles, tipped with divided or radiated spines; hind part contracting suddenly, covered with similar spines, and terminated by the tail fin, which is of a moderate size, and slightly rounded; pectoral fins large, and situated lower than those in the common angler. It is about four inches in length.

LOPO, in *Geography*, a lake of Thibet, about 18 miles long and nine broad. N. lat. 42° 20'. E. long. 89° 52'.

LOPPED MILK, in *Rural Economy*, such as has stood till it becomes sour and curdled.

LOPPEN, in *Geography*, a small island in the North sea, near the coast of Lapland. N. lat. 69° 43'.

LOPPING, in *Rural Economy*, the operation of cutting off the lateral or other branches of trees. Most old trees are found hollow within, which frequently proceeds from the fault of those who have the management of them, by suffering the tops to grow too large before they are lopped; and this is common in the ash, elm, hornbeam, &c. It is done in order to have more great wood; but the cutting off great tops often endangers the life of the trees, or wounds them, so that they yearly decay more in their bodies than the annual value of the tops; hence it is to the loss of the owner to have them so managed; and though the hornbeam and elm will bear great tops, when the body is little more than a shell, the ash, when it comes to take wet at the head, and decays, rarely bears any more top. When timber trees of this kind begin to decay, they should be cut down as soon as possible.

But the lopping of trees at ten or twelve years old, in general, preserves them much longer, and occasions the shoots to grow more into wood in one year than they do in old tops in two or three. As great boughs, ill taken off, spoil trees, they should always be taken off close and smooth, and not in a slanting manner, as is a common practice. The wood should be covered with loam and horse-dung mixed, or some of Mr. Forsyth's composition, to prevent the wet from entering the bodies of the trees, and destroying them by bringing on the rot.

When trees are at full growth, the signs of their decay are the withering or dying of many of their top branches, and the wet entering at some knots, or their being otherwise hollow or discoloured; also by their making but poor shoots, and the woodpeckers making holes in them.

The above method of lopping of trees is only, however, proper for pollard-trees; nothing being more injurious to the growth of timber trees than lopping or cutting off great branches from them. Miller observes, that whoever will be at the trouble of trying the experiment upon two trees of equal age and size, growing near each other, by lopping or cutting off the side branches from one of them, and suffering all the branches to grow upon the other, will in a few years find the latter to exceed the former in growth in every way, and not decay nearly so soon.

It is generally recommended not to prune timber trees at all; and, where they naturally grow straight and regular, they are much better let alone. But all common faults in shape may be regulated by lopping them while young, without any ill consequences to the timber.

The very large forest trees should not be lopped at all, except in cases of great necessity, and then only the side branches should be removed, which must be done as close to the trunk as possible. The most proper seasons for the performance of this sort of business are those of the very early autumn and spring months, in most instances.

It may be observed that most sorts of resinous trees, or such

as abound with a milky juice, should be lopped very sparingly, as they are subject to decay when often lopped, or cut over in their branches. The best season for lopping those kinds of trees is the latter end of summer, or beginning of autumn; they then seldom bleed much, and the wounds are commonly healed over before the weather sets in to be bad and severe.

But very few sorts of ornamental trees should be much lopped, as it greatly injures their beauty and appearance. The only thing necessary is to take off such straggling branches as may grow out in an awkward or improper direction, and render them less ornamental. See *Pruning of trees*.

LOPPIS, in *Geography*, a town of Sweden, in the province of Nyland; 36 miles N.N.W. of Helsingfors.

LOPSCHENSKOI, a town of Russia, in the government of Archangel, on the coast of the White sea; 60 miles W. of Archangel.

LORA, a town of Spain, in the province of Seville; eight miles N. of Carmona.—Also, a town of Chili, on a river of the same name, which runs into the Pacific ocean; S. lat. 34° 46'; 105 miles S. of Valparaiso.

LORAH, a town of Hindoostan, in Bahar; 25 miles W.S.W. of Rangoon.

LORANCA, a town of Spain, in New Castile; eight miles S. of Hueta.

LORANGA, a river of Africa, which runs into the straits of Mozambique; S. lat. 17° 30'.

LORANTHUS, in *Botany*, from *lora*, a strap or the rib, and *anthos*, a flower, alluding to the long linear shape, and leathery substance, of the petals. Linn. Gen. 175. Schreb. 233. Willd. Sp. Pl. v. 2. 232. Mart. Mill. Dict. v. 3. Jufl. 212. Lamarck Dict. v. 3. 594. Illustr. t. 258. Jacq. Amer. 97. (Lonicera; Gärtn. t. 27.)—Class and order, *Hexandria Monogynia*. Nat. Ord. *Aggregata*, Linn. *Caprifolia*, Jufl.

Gen. Ch. Cal. Perianth superior, a small, concave, entire rim. Cor. Petals six, oblong, revolute, equal. Stam. Filaments six, awl-shaped, growing at the base of the petals, the length of the corolla; anthers oblong. Pist. Germen inferior, oblong, crowned with the permanent calyx; style simple, as long as the stamens; stigma obtuse. Peric. Berry oblong, of one cell. Seed oblong.

Eff. Ch. Germen inferior. Corolla six-lobed, revolute. Stamens at the tips of the petals. Berry single-seeded.

Obf. *L. europæus* differs from the other species in having dioecious flowers, and *L. paniculatus* in having its flowers five-cleft half way down, with five stamens.

Loranthus consists of paradoxical shrubs, which are chiefly tropical, and many of them extremely beautiful. Linnæus enumerates eleven, in his fourteenth edition of the *Syst. Veg.* and Willdenow has twenty-six, some of which are also noted from Swartz. Lamarck also, as he himself justly asserts, has made us acquainted with several new species not before known, and many have been found since in New Holland, which will doubtless be described by Mr. Brown.—The leaves in the whole genus are opposite, coriaceous or fleshy, and entire, rarely viny. Inflorescence lateral, corymbose, mostly racemose or somewhat corymbose. Petals 6, appearing in an early state, for a long time, and of a pale colour generally red, orange or yellow. The following may serve to illustrate the genus.

L. europæus. Linn. Sp. Pl. 1671. Jacq. Austr. t. 30.—Clusters simple, terminal. Flowers drooping.—Found as a parasite upon oaks, in Austria, Hungary, and Moravia, also, according to Pallas, in Siberia. It bears flowers in April and May, and perfect its fruit in October. See *Syst. Veg.*

very much branched and forked, often four feet long, smooth. Bark brown, thick, tubercled, slightly atrugent, and turning water red in which it has been macerated. Wood whitish and brittle. Leaves oblong, obtuse, entire or emarginate, deciduous when the fruit is ripe. Flowers delicately fragrant, yellowish-green, in some plants altogether barren, in others all of them fertile. Berry of a yellow colour. This plant has much the habit and appearance of our Mistletoe, *Viscum album*, and is very remarkable in its genus for being found in cold climates.

L. tunicoides. Linn. Sp. Pl. 473. (Itti Canni; Rheed. Mal. v. 7. 55. t. 29.)—Flowers in an aggregated head, often pentandrous.—This is a native of groves in Asia.—A very handsome species, whose branches are long and flexuose. Leaves ovate-lanceolate, thickish, entire, smooth, veined, bluntish. Flowers about five in a cluster, sessile, tubular, yellow, downy withinside. Stamens generally five. Fruit round, greenish-yellow, containing a small, white nut, which has a bitter flavour.

L. corymbosus Lamarek Dict. v. 3. 599. (*Lonicera corymbosa*; Linn. Sp. Pl. 249. *Periclymenum foliis acutis, floribus profundè dissectis*; Feuillée Peruv. v. 2. 765. t. 45.)—Corymbs axillary, opposite. Leaves ovate, acute. Flowers quadrangular, with four petals, and four stamens.—Native of Chili, from whence we have a specimen, by favour of Mr. Menzies, which enables us better than Feuillée's figure to understand the species.—The flowers are of a blood red, with yellow stamens. By the last mentioned author's account this seems not to be parasitical. It is used for dyeing a fine black colour.

LORANTHUS, in *Gardening*, comprises a plant of the exotic kind for the stove, of which the species cultivated is, the American loranthus (*L. Americanus*.) Its branches are subdivided, leafy, smooth, pale green, brittle, and the leaves pale with red flowers.

This plant ramps over the highest trees in Jamaica, &c. especially the coccoloba grandifolia, with the root adhering firmly to the bark like mistletoe.

Method of Culture.—This plant may be increased by sowing the seeds, as soon as they are fully ripened, in pots of light rich earth, being kept in a mild hot-bed until the beginning of the autumn, when they must be plunged in the bark hot-bed of the stove, being afterwards treated as other tender plants of the same kind.

It affords variety in stove collections.

LORARI, among the *Romans*, officers whose business it was, with whips and scourges, to compel the gladiators to engage. The lorarii also punished slaves who disobeyed their masters.

LORBUS, or **LERBA**, in *Geography*, a town of Africa, in the country of Tunis, anciently called "Laribus Calonia;" 10 miles W. S. W. of Tubelak.

LORCA, anciently called *Glicrata*, a town of Spain, of considerable size, in Murcia, situated very near the confines of the kingdom of Granada, at the foot of a steep mountain, consisting almost wholly of schist, and denominated the Sierra del Cano, on the right bank of the Guadalentin. It lies at the entrance of a fine rich country, abounding with trees, particularly olive and mulberry, fertilized by the above-mentioned river. The town had formerly a castle advantageously situated on the top of the mountain, which was strong under the Moors and under the kings of Castile; but it is now in ruins. Lorca is now much larger than it was under the Moors, by whom it was taken in 714; it is divided into the upper and lower town, the former being the old part on the declivity of the hill formerly occupied by the Moors, and the latter, which is more modern and

better built, stands altogether on level ground; it has four gates and several squares, and two suburbs, and its extent is sufficient to accommodate 12,000 persons. The population of Lorca is computed at about 30,000 inhabitants, partly noble of ancient families, and devoted to agriculture, and partly very poor: intermixed with the other inhabitants are several wandering vagabonds, called Gitanos or gypsies. Lorca has at present a collegiate chapter, eight parish churches, seven monasteries, two nunneries, two hospitals, one for men and the other for women, and a college for the instruction of youth. It is governed by a corregidor, and twenty-four regidores, who form the principality; it has a manufacture of salt-petre, but has no kind of commerce. Some of the produce of the country is taken from it, particularly silk and kali; but this trade is carried on by foreigners, especially the French, who are settled here. The town suffered much in 1802 by an inundation from a large basin or reservoir, which had been constructed of an immense size in order to water the whole of its adjacent territory. This basin being undermined, the water rushed from it with such impetuosity, that it wholly destroyed one of its suburbs, consisting of about 600 houses, and several public buildings, and extended its destructive ravages to an extent of 16 leagues, so that the number of people who perished was estimated at 6000 and the animals at 24,000. The whole loss was estimated at 200 millions of reals, or about 2,083,333*l*. sterling. Lorca is distant 42 miles W. from Carthagena. N. lat. 37° 38'. W. long. 2°.

LORCH, a town of Germany, the inhabitants of which chiefly subsist by cultivating vineyards and making wine; 24 miles W. N. W. of Mentz.

LORCHAUSEN, a town of Germany, seated on the Rhine; 27 miles W. of Mentz.

LORD, a title of honour attributed to those who are noble, either by birth, or creation; and vested with the dignity of a baron.

The word is of Saxon origin, and primarily denotes a bread-giver, alluding to the hospitality of our ancient nobles: it is formed, according to Camden, from *blaford*, afterwards written *lford*; a compound of *blaf*, bread, and *furd*, to supply, afford.

In this sense, lord amounts to the same with peer of the realm, lord of parliament.

LORD is also applied to those so called by the courtesy of England; as all sons of a duke or marquis, and the eldest son of an earl.

LORD is also an appellation given to divers persons honourable by office; as lord chief justice, lord chancellor, lord of the treasury, admiralty, &c.

LORD is also a title sometimes given to an inferior person who has a fee, and consequently the homage of tenants within his manor.

For by his tenants he is called *lord*, and in some places, for distinction sake, *land-lord*.

It is in this last signification that the word lord is principally used in our law-books, where it is divided into *lord paramount*, and *lord mesne*.

LORD MESNE, is he that is owner of a manor, and by virtue thereof hath tenants holding of him in fee, and by copy of court-roll; and yet holds himself of a superior lord called *lord paramount*.

We also read of *very lord*, and *very tenant*.

LORD IN GRASS, he who is lord, not by reason of any manor, as the king in respect of his crown, &c.

VERY LORD, is he who is immediate lord to his tenants; and **VERY TENANT**, he who holds immediately of that lord.

So that where there is lord paramount, lord mesne, and tenant; the lord paramount is not very lord to the tenant.

LORD High-Admiral of England, is one of the great officers of the crown, whose trust and honour is so great, that it was formerly seldom given, except to some of the king's youngest sons or near kinsmen.

To him is, by the king, entrusted the management of all maritime affairs, as well in respect to jurisdiction as protection; with the government of the British navy; and a power to decide all controversies and causes maritime, as well civil as criminal; such as happen either on our coasts, or beyond sea, among his majesty's subjects.

To him also belong such wrecks and prizes, as are called *lagon, jeyson, and flishon*; that is, goods lying in the sea, floating, or cast ashore, excepting in such royalties as are granted to other lords of manors, &c. with all great fishes, called *royal fish*, except whales and sturgeon; a share of prizes in the time of war, and the goods of pirates and felons condemned.

The lord high-admiral has under him many officers of high and low condition; some at sea, others at land; some of a military, others of a civil capacity; some judicial, others ministerial.

This great office is now usually executed by seven commissioners, who are styled *lords of the admiralty*: one is called the first lord, with a salary of 3000*l.* a-year, the others have 1000*l.* a-year each. Under these there are a secretary and deputy-secretary, and several inferior clerks. See *Lord High Admiral of England*.

In the court, called the *court of admiralty*, all processes issue in his name, not the king's, as they do in all other courts; so that the dominion and jurisdiction of the sea may justly be styled another commonwealth or kingdom apart, and the lord high admiral the viceroy of the maritime kingdom.

He hath under him a lieutenant, or deputy, who is judge of the admiralty, commonly a doctor of the civil law. See *Court of Admiralty*.

LORD Privy-seal has his office by patent: before the 30th of Henry VIII. he was generally an ecclesiastic; since which, the office has been usually conferred on temporal peers, above the degree of barons.

The lord privy-seal, receiving a warrant from the signet-office, issues the privy-seal, which is an authority to the lord chancellor to pass the great seal where the nature of the grant requires the *Seal*; which see. But the privy-seals for money begin in the treasury, from whence the first warrant issues, counter-signed by the lord treasurer. On the lord privy-seal are attendant four clerks, who have two deputies to act for them.

LORD Steward of the King's Household, is the principal officer for the civil government of the king's servants below stairs; over the officers of which he has jurisdiction. See *Household*.

He is constituted by the delivery of the white staff, which is emblem of his commission. By virtue of his office, without any other commission, he judges of all offences committed within the court, or the verge thereof; and he is empowered according to their several delinquencies. See *Court of Chivalry*.

At the death of the sovereign he presides in the Tower, the place in which the royal corpse is deposited, and thence carries off all the officers under his power.

See *Advocate*.

LORD High-Treasurer. See *TREASURER* and *TREASURY*.

LORD Chamberlain of the Household. See *CHAMBERLAIN*.
LORD Great Chamberlain of England. See *CHAMBERLAIN* and *HOUSEHOLD*.

LORD High Chancellor of England. See *CHANCELLOR*, and *COURT of Chancery*.

LORDS of the Bedchamber, are fourteen in number, under the lord chamberlain. See *BED-CHAMBERLAIN*, and *HOT-SHOLD*.

LORDS of the Seal. See *PEERS*.

LORDS of Session. See *SESSION*.

LORDS of the Treasury. See *TREASURY*.

LORDS Lieutenants of Counties, are officers of great distinction appointed by the king for the management of the military militia of the county, and all military matters therein. They are supposed to have been introduced about the reign of king Henry VIII., for they are mentioned as known officers in the statute 4 and 5 Ph. & M. c. 3, though they had not been then long in use; for Camden speaks of them, in the time of queen Elizabeth, as extraordinary magistrates constituted only in times of difficulty and danger.

They are generally of the principal gentry, and of the best interest in the county: they are to command militia in case of a rebellion, &c. and march at the head of them, as the king shall direct.

They have the power of commissioning colonels, majors, captains, and subaltern officers; also to present the king with the names of deputy-lieutenants, who are to be selected from the best gentry in the county, and act in the absence of the lord-lieutenants.

Subservient to the lord lieutenants and deputy-lieutenants, are the justices of peace: who, according to the order they receive from them, are to issue out warrants to the high and petty-constables, &c. for military service, &c.

LORD'S DAY. See *SUNDAY*.

LORD Howe's Group, in *Geography*, a cluster of islands in the Pacific ocean, discovered by captain Hunter in the year 1791. Thirty-two of these islands were distinctly counted from the mast-head, and they lay at such a distance, as to afford reason for supposing that they were more numerous. Some of the natives, who appeared in a boat, were clean, stout, well-formed persons of a burly appearance; their hair was tied in a knot at the back of the head, and they seemed to have some method of taking on their beads, of which they were debilitate; but they were inconstant, consisting of a number of rings, like a tooth in the beard, which was taken on between the nose and mouth, to which hung a row of teeth, so that they appeared as if they had a fictitious mouth lower than their natural one; they had a complexion of red, or bone, thrust forth in the fleshy of the face, and passing through the features; their persons were clothed in some tattooed, and some were painted with red and white clay; and their middle was covered with a net-work of scars, which was fully extended, and had many scars, and was about forty feet in length. The islands were covered with a very thickly covered with wood, among which the cocopal was very distinguishable. S. lat. 5° 30' N. long. 159° 20'.

LORDONIS, from *London*, a town of the kingdom of England, in the province of Kent, situated on the N.E. of London.

LORD, in *Geography*, a term of the rank quality of *Gen.*, in the province of England, and the N.E. of London.

LORDO, or *Londra*, a city of Italy, in the Venetian Dominions, and one of the principal places of a dukedom, and

and contains about 2300 inhabitants; 25 miles S. of Venice.

LOREMBERG, a town of the county of Goritz; 7 miles E. of Goritz.

LORENTE, ANDRES, in *Biography*, a Spanish writer in music, and author of a book, now become very scarce, intitled "El porque del la Musica," in which are contained the four arts of plain-song, figurative music, or proportion of time or measure, plain counterpoint, and compositions. Printed at Alcalá in 4to. 1672.

This is truly a very ancient treatise, which defines and explains the whole art of music, as far as it was known at the time it was written. See WORGAN, *Dr.*

LORENTZ, in *Geography*, a town of Prussia, in Samland, near the Baltic; 24 miles N.W. of Königsberg.

LORENTZEN, ST., a town of the duchy of Stiria; 8 miles N.E. of Windisch Gratz.

LORENZAGO, a town of Italy, in the Cadurin; 7 miles N.E. of Cadore.

LORENZINI, FRANCIS MARIA, in *Biography*, an eminent Italian poet, was born at Rome in 1680. He was educated among the Jesuits, and in his twenty-second year was received into their society, but quitted it again within a few months, on account of ill-health. He was much attached to literature; but he was obliged, by the scantiness of his means, to apply to some profession for his necessary maintenance. He engaged in that of the law, which he practised with success for a short period, after which he devoted himself entirely to letters. He entered into the academy of the Arcadi, the chief object of which was the reformation of the bad taste which had infected Italian poetry. The founders of this society proposed the style of Petrarch as a model, in opposition to the affected and contrained diction of Marino and others. Lorenzini did not quite approve the method of Petrarch, but borrowed some of the force of freedom of Dante, and thus excelled his contemporaries. He is said also to have excelled in melodramas, or pieces on religious subjects, adapted to being sung, written in the Latin language. In the contest between Crescimbeni and Gravina, which divided the members into two parties, Lorenzini adhered to that of Gravina, which was the minority; he would not, however, agree to the proposal to found a new academy, and after a succession of three years, he was admitted among the old Arcadi. He was now, from an inattention to his domestic concerns, fallen into a state of indigence, and, as evils rarely come singly, he had suffered much from some calumnious reports. Being obliged, on this latter account, to appear before the prefect of the city, he so completely justified himself, that this magistrate, Falconeri, to shew the estimation in which the poet was held by himself, gave him a place in his household. He now felt himself elevated above the misfortunes of life, and with a fine flow of spirits spent a part of every day in writing verses. In these he displayed an enthusiasm of conception, and a loftiness of language, which distinguished him among his contemporaries. He has been denominated the Michael Angelo of Italian poets, on account of the boldness and energy of his expressions. To excite wonder and admiration, he considered as the peculiar office of poetry, whence he became an enthusiastic admirer, and almost perpetual reader of the Hebrew poets, which never failed to inspire him with rapture. He had a great passion for the science of anatomy, and had made, in conjunction with an eminent surgeon at Rome, some new observations, which they meant to have published as the result of their united labours, but which were surreptitiously stolen from them. In 1728,

Lorenzini was chosen president of the academy, and shewed his fitness for the office by several remarkable acts. He founded five academical colonies in the neighbouring towns, and instituted a private weekly meeting of the Arcadi, at which the plays of Plautus or Terence, in the original language, were performed by youths trained for the purpose. These exhibitions were frequented by several persons of rank, and were favoured by Pope Clement XII., who often sent considerable sums to Lorenzini to defray his expences. Being deprived by death of his friend Falconeri, his circumstances were again deranged, and he was relieved, in this instance, by cardinal Borghese, who enrolled him among his noble domestics, and paid him liberally without requiring any service. In 1741, he discontinued his theatrical exhibitions, retired to apartments in the Borghese palace, where he applied to letters with more assiduity than ever. He wrote much Latin and Italian poetry; but his chief studies were directed to the sacred writings. In the midst of his employments, he died in June 1743. He was faithful and liberal, and his house was open to young men who were desirous of improvement. His Italian poems are few, but of great excellence. He published the lives of two of the Falconeri family. Gen. Biog.

LORENZO, in *Geography*, a small island in the Pacific ocean, near the coast of Peru. S. lat. 12° 4'.

LORENZO, ST., a town of Istria, and capital of a district; 9 miles N.N.E. of Rovigno. N. lat. 45° 16'. E. long. 13° 52'.

Lorenzo de Borucas, a town of Mexico, in the province of Colla Rica; 65 miles S. of Carthago. N. lat. 9° 15'. W. long. 84° 6'.

LORENZO, ST., a town of South America, in Brazil, and government of Pernambuco.—Also, a town of Naples, in Basilicata; 9 miles N.E. of Venosa.—Also, a town of Naples, in Capitanata; 3 miles S.E. of Lefina.—Also, a town of Naples, in Calabria Ultra; 8 miles W. of Bova.—Also, a town of Campagna di Roma, near the sea-coast; 8 miles E.S.E. of Ostia.—Also, a town of Paraguay; 270 miles S.E. of Assumption.—Also, a river of Sicily, which runs into the sea, on the W. coast, N. lat. 38°. E. long. 12° 40'.—Also, a town of Mexico, in the province of New Biscay; 85 miles N.W. of Parral.—Also, a town of Italy, in the Polesine di Rovigo; 2 miles S.W. of Rovigo.

LORENZO de Pecurios, ST., a town of New Mexico, on the Bravo; 45 miles N. of Santa Fé.

LORENZO el Real, ST., a town of Spain, in Old Castile; 26 miles S. of Segovia.

LORENZO, Cape ST., a cape on the coast of Peru, in the province of Quito, W. of the city of that name. S. lat. 0° 20'. W. long. 80° 20'.

LORETI, IL CAVALIER VITTORIO, in *Biography*, according to Adami, was a soprano singer in the papal chapel, 1622; one of the first evirati employed in musical dramas on the stage, at the beginning of operas; and a celebrated composer of *ARIB a Cantate da Camera*; which see.

LORETTO, in *Geography*, a small, indifferently built, walled town and bishop's see, in the marquisate of Ancona, in Italy, consisting chiefly of one street within the walls, and another without as a suburb, containing 7000 inhabitants, pleasantly situated on an eminence, 3 miles from the sea-shore, 17 S. of Ancona, and 160½ N.E. of Rome. It is principally famous for the holy house, or *CASA Santa*; which see.

LORETTO, a small village of Christian Indians, 3 leagues N.E. of Quebec, in Lower Canada; deriving its name from a chapel,

a chapel, built according to the model of the Santa Casa at Loretto in Italy; from whence a image of the holy Virgin has been sent to the converts here, similar to that in the famous Italian sanctuary. These converts are of the Huron tribe.

LORETTO, *Lady of*, a place in the district of St. Dennis, on the isthmus of California, called by the Indians "Cancho;" in which is a small fort, erected by the missionaries, consisting of 10 or 12 bastions, and surrounded by a deep ditch. In this jurisdiction are fifteen parishes, including 4000 professing Indian, under the instruction of Dominican friars.

LORETTO, or *Loreto*, a town of the island of Corfica; 7 miles N.E. of Porto.—Also, a town of New Mexico, in the province of Mayo; 105 miles E.N.E. of Santa Cruz.—Also, a town of South America, in the province of Buenos Ayres; 200 miles E. of Corrientes.—Also, a town of South America, in the government of Majos, on the Mar-mara; 50 miles S. of Trinidad.

LORETTO, *Order of*, in *Heraldry*, an order of knight-hood, instituted by pope Sixtus V. in 1587, confirmed by pope Paul III., and abolished by pope Gregory XIII. The knights wore, pendent to a ribbon at their button-hole, a small gold medalion, enamelled with the image of the virgin of Loretto.

LOGUES, in *Geography*, a town of France, in the department of the Var, and chief place of a canton, in the district of Draguignan; 6 miles S.W. of Draguignan. The place contains 4023, and the canton 10 520 inhabitants, on a territory of 502, kilometres, in 6 communes.

LORI, in *Ornithology*. See *Psittacus Amboinensis*.

LORICARIA, in *Natural History*, a genus of fishes of the order abdominalis. The generic character is, head smooth, depressed; mouth without teeth, retractile; gill-membrane six-rayed; body mailed, hence its name. According to Gmelin, there are but two species; but Dr. Shaw describes seven, which we shall enumerate in their order.

Species.

COSTATA: Ribbed loricaria. Yellowish-brown, mailed by a single row of shields on each side, with a *forked* tail. This fish, in its general habit, resembles a species of the silurus, the mouth being furnished with long cirri, and the first rays of the dorsal and pectoral fins serrated: the head is large, depressed, covered with a rough bony shield, projecting on each side the thorax into an exceedingly strong and obtusely pointed spine of considerable length: the whole body, from the thorax, is strongly mailed along each side by a continued series of very broad bony plates or scales, each of which projects in the middle into a short hooked spine or curved process: the upper and under parts of the body, from the small dorsal fin to the tail, are mailed in the same manner, but with smaller plates than on the sides; the tail is large and sharply forked. It is a native of the Indian and American seas; is a fish of great boldness, and is dreaded by fishermen; the strength and sharpness of its spines enabling it to inflict very painful, and even dangerous wounds.

CATAPHRACTA: Armed loricaria. Brown, mailed by a single row of shields on each side, with a *rounded* tail. This species is nearly allied to the preceding, but differs in having a rounded tail, and in some other particulars. It is about ten inches long, and is found in the American seas.

CALlichthys: Soldier loricaria. Brown, with depressed, rounded head, double row of scales on each side, and rounded tail. This remarkable species grows to the length of ten or twelve inches, and is of a dusky brown

colour throughout, with a tinge of reddish or yellowish-brown on the fins and under parts. It is highly esteemed as an article of food by the inhabitants of Surinam. It has been asserted, and Dr. Shaw has given currency to the report, probably without attaching any credit to it, that this fish, when distressed for want of water, by the streams which it inhabits being too shallow for it, contrives to make its way over land, in order to discover some deep stream; and occasionally perforates the ground for the same purpose.

PUNCTATA: Speckled loricaria. Yellow, with brownish back; double row of scales on each side; fins speckled with black, and forked tail. A small, but elegant species. Length five or six inches; shape like the generality of fishes. Native of the rivers of Surinam.

ACCIPENSER: Sturgeon loricaria. Yellowish-brown, with toothless mouth, rounded front, and spotted fins. This, as its name imports, is something like a sturgeon, and long and slender. It is a native of the Indian seas, and grows to the length of twelve or fifteen inches. This species is described by Bloch as *L. dentibus carens*.

DENTATA: Toothed loricaria. Yellowish-brown, with toothed, serrated mouth, and slightly pointed front. This differs from the last, in having the mouth furnished with teeth, and in having a slightly pointed snout. It is a native of the Indian seas.

FLAVA: Yellow loricaria. Yellow, spotted with brown, with two dorsal fins and tail marked by transverse bands. This is an elegant species, in length about ten inches; habit much more slender than in the two preceding. Inhabits the Indian seas.

LORICATION, or **COATING**, in *Chemistry*, is the covering of a glass or earthen vessel with a coat or crust of a matter able to resist the fire, to prevent its breaking in the performing of an operation that requires great violence of fire.

When vessels are exposed to a fire too strong for their structure, or to the corrosive quality contained in them, or on the throwing on of fresh cold fuel into the fire where they stand, it frequently happens that they crack and burst; for the preventing of which, the operator has recourse to this method of coating or lorication his vessels. It is performed in the following manner: take a quantity of washed clay, with an admixture of pure sand, powder of calcined flints, or broken crucibles; and instead of pure water, moisten it with fresh blood that has not yet been coagulated, diluted with twice or three times its quantity of water; make the clay with this into a thin paste, and work into it some cow's hair, or other hair not too long nor too stiff, and a little powdered and sifted glass, if you have it at hand; smear over the vessel intended to be used with this paste, by means of a pencil, and let it to dry; when dry, besmear it again, and repeat the operation till the vessel have a crust of a third, or a quarter of an inch, at least, thick of this matter, and let it be thoroughly dry before it is used.

To keep blood in a proper state for this use, it must, when just let out from the animal, be well stirred about with a stick for some time, at least till it is quite cold; and being thus prepared, it will keep for some days without coagulating, and fit for use.

This composition, with an admixture of bole, worked into a paste with the whites of eggs, diluted with water, makes also the proper lute for closing the junctures of other chemical vessels, in the distilling strong spirits. See **LUTE**.

LORIMERS, one of the companies of London, that make bits for bridles, spurs, and such like small iron ware. They

They are mentioned Bar. 1 Rich. II. cap. 12. See COMBANY.

The word seems derived from the Latin, *lerron*, a thong.

LORIOLE, in *Geography*, a town of France, in the department of the Drôme, capital of a canton, in the district of Valence; 12 m. S. of Valence. The place contains 2272, and there are 1000 inhabitants, on a territory of 177 km. sq. (177,000 a.)

LORION, in *Ornithology*, see OULES *Gallinule*.

LORIPES, the name used by the author for the himantopus, a bird of the water-fowl, remarkable for the length and weakness of its legs. See CHARADRIUS *Himantopus*.

LORIS, in *Zoology*, a species of lemur in the Linnæan system, being the Lemur tachiro of Buffon, described by Buffon. See LEMUR *Tachiro*.

LORRAINE, PIERRE DE, in *Biography*, an eminent French architect, was born at Lyons in the early part of the sixteenth century. He went to Italy, when he was but fourteen years of age, to study the art for which he seemed to have a fort of natural taste. His talents attracted the notice of cardinal Cervino, afterwards pope Marcellus II., who took him into his palace, and assisted him in his pursuits. He returned to France in 1570, and was the means of banishing the Gothic taste in buildings, and substituting in its place the Grecian. He was employed by Henry II., for whom he planned the herculean at Fontainebleau, and the chateau of Anet and London. After the death of the king, he was made inspector of the royal buildings by Catherine de Medici; and under her direction he repaired and augmented several of the royal edifices, and began the building of the Thuilleries. In 1577 he was created counsellor and chamberlain ordinary to the king; and as a recompence for his services, he was presented with two abbacies. These honours, it is said, made him arrogant, which occasioned the poet Ronfard to satirize him in a piece, entitled "La Truelle Croisée," or "The croziered Trowel." De Lorraine took his revenge, and shut the garden of the Thuilleries against him; but the queen took part with the poet, and severely reprimanded the reverend architect. De Lorraine died in 1577. He published "Dix Livres d'Architecture," and "Nouvelles Inventions pour bien bâtir et peindre l'Edifice." Merisi.

LORRAINE, in *Geography*, a town of France, and seat of a bailliage, in the department of the Nièvre; 33 miles N.E. of Nevers.

LORNA, a district of Scotland, in the north part of the county of Angus, where the residence of the duke of Argyll, who is lord of the marquis of Lorna.

LOROMUS, a river, and seat of a parish, in the state of Ohio, within the border of Kentucky, and near a fort of a branch of the great Miami river, which falls into the Ohio. At this fort, born & lived by the Indian line, the Indians called a tract of land to the United States, six miles square, being now called Argosy, 1804. Here the postage came from between the Mouth of the Ohio and St. Mary's river, and was called like this.

LORON, a town of Tunis, anciently called "Larion," in the S.W. of Tunis.

LORON, in *Geography*, a town of France, in the department of the Maine and Loire; 13 miles W.N.W. of Angers.

LORON, in *Geography*, a town of France, in the department of the Maine and Loire, capital of a canton, remarkable for its situation, 15 miles S. of Angers. The place contains 1772, and there are 8700 inhabitants, on a territory of 177 km. sq. (177,000 a.)

LORQUI, a town of Spain, in Murcia; 12 mil S.W. of Murcia.

LORRACH, or LARACH, a town of the duchy of Baden; 6 miles N.E. of Bâle.

LORRAIN, ROBERT DE, in *Biography*, an eminent sculptor, was born at Paris in 1666. He was pupil of Goussier, who confided to him, at the age of eighteen, the instruction of his own children, and the correction of the designs of his other pupils. Having distinguished himself by several works, and carried away the first prize at the académie, he went to Rome for improvement. In 1693 he returned; but owing to the misfortunes of the times, he found scarcely any employment. In 1701 he was admitted into the academy of painting and sculpture, on account of his great merits as an artist. He was perfectly unanimous in his manner, and took a head of putting himself forward; so that his works, which always attracted notice, were much more known than his person. In 1710 he was nominated a joint professor in the academy; and in 1717 he filled the office of professor. The duties of these offices he fulfilled with great attention; and he could boast of having instructed in his art several pupils of extraordinary merit. He executed much of the exterior sculpture of the palace of Savoy near Strasbourg, for the cardinal de Rohan; but in the midst of his labours, and of an increasing reputation, he was attacked by a stroke of apoplexy in 1728, which obliged him to return to Paris, where he lingered several years, till death terminated his afflictions in 1743. Lorrain was distinguished by his character-heads; of which, those of young persons, particularly of the female sex, are often exquisitely beautiful, with airs of singular grace and elegance. Gen. Biog.

LORRAINE, *Duchy of*, in *Geography*, united to France, and, together with the duchy of Bar, now divided into the departments of the Meuse, the Meurthe, the Moselle, and the Vosges; which see respectively. This country forms only a small part of a kingdom, which bore that name, and which extended from Vienna on the Rhône to Cologne. Separated from Bar, it is about 99 miles in length, and 60 in breadth. The principal rivers are the Meuse, the Moselle, the Meurthe, and the Saar.

According to Chaucer, we know not on what foundation, Lorrain abounded in singers superior to those of France:

"There mightest thou see these flowers,
Nicolles, and eke fullars,
That well to fingring did their pain,
Some fongers fonge of Lorraine;
For in Lorraine their notes be
Put sweeter than in this countree."

LORRAINE, CHARLES DE, in *Biography*, cardinal and archbishop of Rheims, younger son of Charles de Guise, first duke of Guise, was born in 1545. He was created archbishop of Rheims, at the age of nineteen, in 1564, and cardinal by pope Paul III. in 1567. At the death of his uncle, the cardinal John of Guise, in 1572, he succeeded to a rich course of benefices, which, altogether, amounted in the whole to two archbishoprics, six bishoprics, and several rich abbeys. In addition to this, he possessed a fine person, quick perceptions, and a fluency of language, and no inconsiderable share of learning. Through the interest of Diane de Poitiers, mistress of Henry II., he was sent out as his ambassador to the pope. He soon entered into the views of the holy party, and persuaded the king his master to undertake a war for the conquest of Naples, in which his brother, the duke of Guise, had the

principal command. He was a bitter enemy to the reformers of the age, and promoted several severe and cruel edicts against them. He made the utmost efforts in his power to introduce into his own country the infernal inquisition; a point which he would probably have carried, but for the opposition of the excellent chancellor de l'Hopital, seconded by the good sense and temper of the people. During the short reign of Francis II. the cardinal usurped and maintained a most despotic authority: but he was equally zealous for his own fame as he was for the honour of the Catholic religion. At the conference of Poissy between the two religious parties, he gained some reputation, at least with those who felt it their interest to flatter him, by his eloquence in refuting the learned Beza; but it was not very difficult to confound the antagonist, who had truth and not power on his side, and whose reasoning was treated as blasphemy. The cardinal was likewise ambitious of the praise of pulpit eloquence, and preached several times at Paris before large audiences; and the violence of his discourses against the Protestants led the people to regard him as one of the principal authors of the furious civil wars under Charles IX., crowned by the horrid massacre of St. Bartholomew's. He was remarkably fond of show, and appeared with splendour at the council of Trent; at which, it is reported, Pius V., who denominated him "the little pope beyond the mountains," did not wish for his presence. The death of his brother, the duke, diminished his consequence; and he found it necessary to relax in the vigour with which he began in maintaining the interests of the Gallican church. During the reign of Charles IX. he was the minister of state, and also ambassador to the court of Spain. On the accession of Henry III. he went to meet that prince at Avignon, on his way from Poland; and, in a religious procession, placed himself at the head of the "blue penitents." This was the last show in which he figured, being at the time seized with a fever, which terminated his life in December 1754, in the fiftieth year of his age. It is difficult to draw the character of this cardinal. His enmity to the Protestants caused him to be the object of much party satire and reproach. They probably exaggerated his failings and immoralities: but making due allowance for the effect of private enmities, still it must be admitted he was a man of exceedingly licentious habits, and who expected, perhaps, to bury his faults by his zeal for the church, or by an excess of ostentatious alms-giving. "He was accustomed," says one of his biographers, "to carry a great leathern purse, which his valet-de-chambre took care to fill every morning with three or four hundred crowns; and as many poor as he met, he put his hand into his purse, and gave them a handful of money without counting. But if he were prodigal in his alms, he was not less so in gifts to other persons, and especially to the ladies, whose favours he readily procured by this bait; and it was asserted that there were very few, married or single, frequenting the court at that time, who were not debauched by the largesses of the cardinal." By Maimbourg it is asserted, that the cardinal was the boldest of men in forming mighty schemes in his closet, but the weakest and most timid when they were put into execution. He was venerated by the clergy as the guardian of their immunities; by the Catholics in general, as the champion of their faith. Versed in the wiles of courts, fruitful in expedients, and eloquent in debate, he was too readily elated by success, and too easily depressed by defeat. His personal courage was ever a subject of doubt; his vindictive temper was at all times dreaded; and the dissolute pleasures of his private vied with the presumption of his public conduct.

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tion of his public conduct. Some of his literary compositions have been printed: they consist chiefly of harangues on public occasions. History of France, London, 1790. Bayle. Moreri.

LORRES, in *Geography*, a town of France, in the department of the Seine and Marne, and chief place of a canton, in the district of Fontainebleau. The place contains 610, and the canton 9193 inhabitants, on a territory of 257½ kilometres, in 18 communes.

LORRIS, WILLIAM DE, in *Biography*, a French poet, who flourished about the middle of the thirteenth century, is known as the author of the "Roman de la Rose," a poem much in request in the middle ages. Under the allegory of a rose-tree, planted in a delicious garden, and protected by bulwarks, it describes a lover's pursuit, and final acquisition of the object of his passion. He did not live to finish his work: it was completed in the next century by John de Meun. The part by Lorris, though the shortest, is by much the most poetical, abounding in rich and elegant description, and in lively portraiture of allegorical personages. The best edition of this poem is that of the Abbé de Lenglet, three vols. 12mo. 1735. Chaucer translated that part which belonged to Lorris. Gen. Biog.

LORRIS, in *Geography*, a town of France, in the department of the Loiret, and chief place of a canton, in the district of Montargis; 12 miles S.W. of Montargis. The place contains 1526, and the canton 6528 inhabitants, on a territory of 205 kilometres, in 13 communes.

LORRY, ANNE-CHARLES, in *Biography*, a learned physician, was born at Croissy, near Paris, in 1725. He studied and practised his profession with unremitting zeal and peculiar modesty, and obtained a high reputation. In 1748 he was admitted doctor of the faculty of medicine at Paris, and subsequently became doctor-regent of the faculty. He was author of several works, some of which still maintain their value. His first publication was entitled "Essai sur l'Usage des Alimens, pour servir de Commentaire aux livres diététiques d'Hippocrate," Paris, 1753, 12mo.; the second part of which appeared in 1757. His next publication was an edition of the Aphorisms of Hippocrates, Greek and Latin, in 1759. Afterwards he produced a treatise "De Melancholia et Morbis Melancholicis," ibid. 1765, in two volumes 8vo. and edited Dr. Astruc's "Memoires pour servir à l'Histoire de la Faculté de Médecine de Montpellier," ibid. 1767, 4to.; and "Sanctorii de Medicina Statica," with a commentary, 1770, in 12mo. His last work, which combined the merits of much erudition and accurate observation, with great clearness of arrangement and perspicuity of language, was "Tractatus de Morbis Cutaneis," Paris, 1777, in 4to. Dr. Lorry also edited a Latin edition of the works of Mead, and a French one of Barker's dissertation on the conformity of the doctrines of ancient and modern medicine. He died at the baths of Bourbonne, in 1783. Eloy Dict. Hist. de la Med. Gen. Biog.

LORSQUEN, in *Geography*, a town of France, in the department of the Meurthe, and chief place of a canton, in the district of Sarrebourg; four miles S.S.E. of Sarrebourg. The place contains 1164, and the canton 13,680 inhabitants, on a territory of 390 kilometres, in 29 communes.

LORUNGAH, a pass in the mountains of Bengal; 18 miles W. of Ramgur.

LORY, in *Ornithology*. See PSITTACUS *Garrulus*, &c.

LOS REYES. See LIMA.—Also, the chief town of the province of Uragua, in the east division of Paraguay, in South America.

Los Charcos, a province in the southern division of Peru, the chief cities of which are Put si and Porco.

LOSARI, a town of the island of Corsica; 15 miles N. of Calvi.

LOSDORF, a town of Bohemia, in the circle of Leitmeritz; six miles W.S.W. of Kamnitz.

LOSENITZA, a town of European Turkey, in Servia; 30 miles S.S.W. of Sabacz.

LOSER, a town of the electorate of Salzburg, on the Stampach; 21 miles S.W. of Salzburg.

LOSTIZ, a town of Naples, in the province of Bari; six miles E. of Bitetto.

LOSORCA, Sr., a town of the island of Sardinia; 11 miles S. of Basti.

LOSQUET, a small island in the English channel, near the coast of France. N. lat. $43^{\circ} 49'$. W. long. $3^{\circ} 31'$.

LOSS, *Islands of*, a cluster of small islands in the Atlantic, near the coast of Africa. N. lat. $9^{\circ} 16'$. W. long. 13° .

LOSSA, a town of Silesia, in the principality of Brieg; five miles S.E. of Brieg.

LOSSAU, a town of Germany, in the principality of Bayreuth; nine miles S.E. of Bayreuth.

LOSSIEMOUTH, a seaport town of Scotland, in the county of Murray, at the mouth of the river Lossie, famous for its trout. A few fishing vessels belong to the place; but its harbour is convenient for vessels of 50 tons; six, miles N. of Elgin.

LOSSIN, or **LASSIN**, *Great*, a town in the S. part of the island of Cherbo, containing about 1800 inhabitants.

LOSSIN, *Little*, a town of the same island, containing about 1600 inhabitants; one mile S. of Great Lossin.

LOSSIUS, **LUCAS**, in *Biography*, of Lunenburg, a Lutheran divine and school-master, well skilled in music, who published at Nuremberg, in 1553, "*Erotomata Musicæ practicæ*," and Lutheran psalmodia. At the time of the Reformation the Lutherans preserved more music in their liturgy than the Calvinists, or the church of England.

LOSSNITZ, in *Geography*, a town of Saxony, in the lordship of Schönbürg; 50 miles E. of Dresden. N. lat. $50^{\circ} 32'$. E. long. $12^{\circ} 37'$.

LOSTORFF, a town of Austria; nine miles W. of St. Pölten.

LOSTWITHIEL, a borough, market-town, and parish in the hundred of Powder, and county of Cornwall, England, is situated in a narrow valley on the western side of the river Fawy, 25 miles distant from Launceston, and 234 from London. The houses are principally disposed in two streets, running parallel from the river to the bottom of a steep hill, which rises to a great height on the west. The buildings are chiefly of stone, and covered with slate, which is obtained in great abundance in the vicinity of the town. The church consists of one large and two small aisles, with a tower at the west end, terminating in a singular open spire. The font is constructed of a large octangular block of free-stone, supported by five clustered columns, charged with rude and ill-executed sculptures. In the south aisle is an ancient monument of the time of Elizabeth, with eight small figures, in basso-relievo, kneeling, erected in memory of Temperance, wife of William Kendall, esq. who died in 1579. At a small distance to the south of the church are the external walls of an old building called the palace, which was anciently a residence of the dukes of Cornwall, but is now converted into the stannary prison. This fabric was once very extensive; but great part of its site is occupied by timber yards. The walls are extremely thick, and, like

many ancient castles, seem to have been constructed with small stones, fixed by a liquid cement, now become harder than the stone itself. Lostwithiel was incorporated at a very early period; numerous privileges were conferred on it by Richard, king of the Romans, who, by charter, made it a free burg, and granted to its burgesses the liberty of a guild mercatory. They also possess the anchorage due of Fawy harbour, and various duties on coal, salt, corn, malt, and other commodities brought into that port. The corporation consists of a mayor, six burgesses, and seventeen assistants, or common councilmen, who are chosen annually by the mayor and burgesses. The borough has returned two members to parliament ever since the 23d of Edward I.: the right of election is confined to the corporation. This was anciently the shire town; and the county members are still elected here, and the county weights and measures kept here. According to the enumeration made in the year 1801, this town contained 125 houses, and 743 inhabitants. A market is held on Friday, and three fairs annually.

About one mile north of Lostwithiel, on the summit of a very high hill, are the mouldering remains of Restormel castle, a fortress magnificent in ruin, and proudly exalting its ivy-clad walls above the contiguous narrow winding vallies. This was one of the principal residences of the earls of Cornwall: Richard, king of the Romans, kept his court here; his son Edmund also made this castle his abode; and though now in decay, yet the grandeur of its ruins, and the importance they communicate to the surrounding scenery, render it peculiarly interesting. The castle and its honour were part of the inheritance of the dukes and earls of Cornwall; and were annexed by Edward III. to the duchy; but the mansion formerly connected with the estate, and named the Trinity-house, is now the property of the earl of Mount Edgecumbe, and called Restormel. *Beauties of England and Wales*, vol. ii.

LOSZLAU, or **WODISLAU**, a town of Silesia, and chief place of a lordship, in the principality of Ratibor; 11 miles S.E. of Ratibor. N. lat. $49^{\circ} 57'$. E. long. $18^{\circ} 18'$.

LOT, so called from the river, which rises in the department of the Lozère, and joins the Garonne, near Aiguillon, formerly *Quercy*, one of the nine departments of the southern region of France, lying in $44^{\circ} 30'$ N. lat., N.N.W. of Tarn, and equidistant from both seas; bounded on the N. by the department of the Corrèze, on the E. by the Cantal, on the S.E. by the Aveyron, on the S. by the Tarn and the Upper Garonne, on the W. by the Lot and Garonne, and on the N.W. by the Dordogne; 34 French leagues in length and 50 in breadth, containing 74321 kilio-metres, or 302 square leagues, and 383,083 inhabitants. It is divided into four circles or districts. 41 cantons, and 440 communes. The circles are Montauban, including 115 954, Figeac, 80,372, Gourdon, 75,861, and Cahors, 111,406 inhabitants. The capital of the department is Cahors. Its contributions amount to 3,235 544 fr. and its expences to 272,533 fr. 33 cents. This department is, in general, hilly, but contains some fruitful plains and vallies. Its products are grain, wine of an excellent quality, fruits, silk, hemp, flax, tobacco, and pastures. It has iron mines, coal, and mineral springs.

LOT and Garonne, formerly *Agénais*, one of the nine departments of the fourth-west, or Garonne region of France, lying in $44^{\circ} 30'$ N. lat. and bounded on the N. by the department of the Dordogne, on the E. by the Lot, on the S. by the Gers, and on the W. by the Landes and Gironde, 23 French leagues in length and 18 in breadth, containing

6100 kilometres, or 36,308 square leagues, and 352 008 inhabitants. It is divided into four circles, 38 cantons, and 459 communes. The circles are Agen, including 107,840, Marmande, 112,091, Nerac, 43,119, and Villeneuve d'Agen, 89 858 inhabitants. Its contributions amount to 3,807,413 fr. and its expenses to 202,739 fr. 33 cents. Its capital is Agen. The surface of this department is diversified by fruitful eminences; but two-thirds of the soil are of a very inferior quality. It has several marshy tracts; the Landes consists of moveable sands; some parts near the Lot have a rugged and barren aspect; but the circle of Villeneuve d'Agen is distinguished by its fertility. The products are grain, fruits, few trees, and indifferent pastures. It has iron mines.

Lot's *Wife*, a stupendous rock in the sea, encompassing the Ladrone, which rises in the form of a pyramid, and is thus described by Mr. Meares in his voyage, cited by Mr. Pinkerton. "The latitude was 29 50' N., the longitude 142° 23' E. of Greenwich. The waves broke against its rugged front, with a fury proportioned to the immense distance they had to roll before they were interrupted by it. It rose almost perpendicular to the height of near 350 feet. A small black rock appeared just above the water, at about 40 or 50 yards from the western edge. There was a cavern on its south-eastern side, into which the waters rolled with an awful and tremendous noise. In regarding this stupendous rock, which stood alone in an immense ocean, we could not but consider it as an object which had been able to resist one of those great convulsions of nature that change the very form of those parts of the globe which they are permitted to desolate."

Lot, in a legal sense. See SCOT.

Lot, or *Loth*, in *Mining*, is the thirteenth dish, measure, or part of the miner's ore, which the bar-master takes up for the king, or the farmer.

Lot, or *Pot*, a liquid measure in French Flanders, each equal at Lille to 126 cubic inches, and 183.33 = 100 English gallons.

LOTA, in *Ichthyology*, the name of a species of the *Mustela fluviatilis*. See *GADUS Lota*.

LO-TCHEOU, in *Geography*, a town of Corea; 22 miles W.S.W. of Koang-tcheou.

LOTE TREE, in *Botany*. See *CELTIS*.

LOTH, in *Geography*, a town of Scotland, in the county of Sutherland, on the E. coast; 16 miles N.N.E. of Dornoch.

LOTH, or *Lod*, a weight in Germany; 2 loths being = 1 oz. and 16 oz. = 2 marks = 1 pfund or pound. In estimating the fineness of silver, the mark fine is divided into 16 loths, and the loth into 18 grains.

LOTHAIRE I., in *Biography*, emperor of the West, and king of Italy, eldest son of Lewis I., surnamed le Debonnaire, was born in 795. He was associated with his father in the imperial dignity in 817, and was crowned king of Lombardy in 821. (See LEWIS I.) On the death of his father he succeeded to the imperial dignity. Being confirmed in the title of emperor, he aimed at the possession of the whole of his father's territories, and endeavoured to deprive, of their inheritance, his brothers Lewis and Charles, who assembled all their forces to vindicate their rights. This great family quarrel was decided on the plains of Fontenoy. The conflict was terrible, and the ground disputed with an obstinacy, of which few examples are left on record in the sanguinary horrors of war. Historians agree in stating that a hundred thousand men fell on this occasion, and have in this in-

stance applied the remark, "that whole generations may be swept away by the madness of kings in the space of a single hour." Lothaire was completely defeated, and obliged to betake himself to flight. He went to Aix-la-Chapelle, where he diligently exerted himself to repair his losses. The vicissitudes of three successive years of discord exhausted at length the powers, without impairing the animosity, of the kindred princes, and they consented to divide those dominions for which they were no longer able to contend. By this division the French monarchy was divided into three shares, of which Lothaire, with the imperial dignity, retained Italy, with all the provinces situated between the Rhone, Rhine, Saone, Meuse, and Scheldt. After this partition, Lothaire passed some years, disquieted by the inroads of the Saracens upon Italy, and by differences with his half-brother Charles, till disgust with the cares of the world, and declining health induced him to abdicate his crown. The part of Gaul which Lothaire retained, he had distinguished by his own name, Lotharingia, which, by the insensible corruption of time, has sunk into that of Lorraine, which is still annexed to the district. But the empire which he had pursued at the expense of every filial duty, and which he had established by torrents of the best blood of his subjects, afforded him but a transient satisfaction. From the summit of grandeur which he had attained, the recollection of the past was melancholy and frightful, the prospect of the future was dreary and comfortless, and fifteen years after the death of his father he assumed the habit of a monk; the short space of a few days only, however, was allowed to the prayers of the royal penitent, when he died in the sixtieth year of his age. He left three sons, viz. Lewis, Lothaire, and Charles; of whom the first inherited Italy, with the title of emperor; the second, the kingdom of Lorraine; and the third that of Provence. Univer. Hist.

LOTHAIRE II., or LOTHARIUS, duke of Saxe-Supplemburg, was raised to the imperial throne, after the death of Henry V., in 1126, notwithstanding the opposition of two powerful competitors, who made very vigorous exertions for the support of their pretensions. But after a sanguinary and unavailing contest, they took the oath of allegiance, and were honoured with particular marks of their sovereign's friendship. Lothaire was crowned at Aix-la-Chapelle, in presence of the pope's nuncio. After he was quietly seated on his throne, he espoused the cause of pope Innocent II. against the anti-pope Anacletus, and undertook an expedition into Italy, to re-establish him in the papal chair. Lothaire was successful, and the event fully answered his expectations. Innocent remunerated his services by performing the ceremony of his coronation with great magnificence, but he had the art, at the same time, to make the emperor do homage to the holy see, of which the court of Rome availed itself to maintain that the empire was a fief of that see. Some time after these transactions, his holiness was exposed to imminent danger by an hostile incursion of Roger, king of Sicily, but Lothaire advanced to his assistance, and Roger's insult was punished by the loss of all his Italian possessions, and he himself was forced to retire into Sicily. These provinces Lothaire formed into a principality, which he conferred upon Renaud, a German, one of his relations. On his return into Germany, Lothaire was seized with a dangerous disemper, which terminated his life in the twelfth year of his reign. By command of this emperor, the Justinian code of laws, which had been in disuse for more than five centuries, was revived in the empire. This reign was rendered remarkable by excessive heat and a great drought in Germany, which actually withered the corn and blasted the fruits of the earth, dried up the most considerable rivers,

ivers, and occasioned a dreadful mortality among the cattle.

LOTHAIRE, king of France, succeeded his father, Lewis d'Outremer, in 954, being only in the 14th year of his age. He was at first under the protection of Hugh, duke of France, but on the death of that prince, in the following year, he assumed the reins of government. In 959, he was persuaded to enter into a treacherous plot for seizing the person of Richard, duke of Normandy, which failing of success an open war broke out, and the duke, pressed by the superior forces of his antagonist, invited the Danes to his support. France was accordingly afflicted by their indefatigable rapacity: independent and uncontrolled in their depredations, they refused to subscribe the peace which Richard concluded, and their retreat was with difficulty purchased by the treasures of France and Normandy. Lothaire had no sooner disengaged himself from this distress, than he attempted to oppress his vassal, the young count of Flanders, who was preserved by the interposition of the Normans; and the king, baffled in his endeavours to aggrandize himself by arms, flattered himself, with the hope of restoring the grandeur of the house of Charlemagne, by advantageous alliances. He accordingly espoused Emma, the daughter of Lothaire, king of Italy, and bestowed his sister on Conrad, king of Burgundy, but the short respite allowed by a peace was followed by years of desolating war, and the possession of Lorrain was disputed during four successive campaigns, by the kings of Germany and France. At length Lothaire thought it advisable to make peace, and leave the emperor in possession of Lorrain. This treaty gave great disgust to the French nobles; but the king found means to pacify or controul them; and on the death of Otho, the emperor, he re-entered Lorrain, took the town of Verdun, and assailed Cambray. When his affairs abroad were returning to a state of great prosperity, and when his authority at home was acquiring strength, he was suddenly surprized by the approach of death, whose power he was unable to resist. He died at Rheims in the forty-sixth year of his age, leaving his crown to his son Lewis V. Lothaire was unquestionably possessed of vigour and abilities, but he was insincere, and almost always engaged in contests with his neighbours and vassals. *Univer. Hist. Hist. of France, London, 1790.*

LOTHAU, in *Geography*, a town of Germany, in the principality of Culmbach; 9 miles S. of Culmbach.

LOTHIAN, an extensive district of Scotland, divided into three parts; viz. East-Lothian, or Haddingtonshire. Mid-Lothian, or Edinburghshire, and West-Lothian, or Liddisburghshire.

LOTHINGLAND, once an island, and part of the county of Suffolk, towards the German ocean, on the N.E. part of the county, and the most eastern part of Great Britain; now a peninsula, joined to the mainland by a narrow neck near Lowestoft, formed, as it has been supposed, about the year 1722. It is bounded on the N. by the river Yare, on the E. by the sea, by a lake, called Lothing, on the S., and by the river Waveny on the W. From N. to S. it is in length more than ten miles, and six in breadth; and contains sixteen parishes, of which Lowestoft is the principal and only market-town.

LOTICH, PETER, in *Biography*, surnamed *Secundus*, a distinguished modern Latin poet, was born, in 1528, in the county of Hama, in Germany. He received the early part of his education at a convent in his native place, and pursued his maturer studies at Frankfurt, Marburg, and Wittenberg, at which last place he contracted an intimacy with Melancthon and Camerarius. During the war in

Saxony he served a campaign in the army. In 1550 he visited France with some young persons to whom he was governor, and he continued there nearly four years. He afterwards went to Italy, where he had nearly been destroyed by poison prepared for another purpose: he recovered from the effects of it, but was subject to frequent relapses, one of which carried him off in the year 1560. He had taken his degree of doctor of physic at Padua, and three years previously to his death was chosen professor in that science at Heidelberg. In that situation he was honoured with the friendship of the elector-palatine, and by the excellence of his disposition, and the singular frankness and sincerity of his character, rendered himself universally beloved. A collection of his Latin poems was published the year after his decease, with a dedicatory epistle by Joachim Camerarius, who praises him as the best poet of his age: it has been very frequently reprinted. He had a younger brother Christian, likewise a poet. A collection of his poems, with those of his relation John Peter Lotich, was published in 1620. John Peter Lotich was a physician of eminence, who maintained the literary character of his family by a variety of writings. He was grandson of the above-mentioned Christian. He exercised his profession at Minden and at Hesse, and became professor of medicine at Rintlen in Westphalia. He died very much regretted in 1652. His principal works are, "Conciliorum et Observationum Medicinarum;" "Latin Poems;" "A Commentary on Petronius;" and "A History of the Emperors Ferdinand II. and III." in four volumes, is attributed to him.

LOTIERO, Sr., in *Geography*, a town of Naples, in Principato Ultra; 15 miles E.N.E. of Benevento.

LOTINE, in the *Ancient Mus.* Athenæus relates, in his *Deipnos.* that the flute entitled lotina was the same instrument as that which the Alexandrians termed *Photinga*, adding, that it was made of the wood of the lotos tree, which grew in Africa.

LOTION, *LOTIO*, popularly called *wash*, denotes a form of medicine, made up of liquid matters, chiefly used for beautifying the skin, and cleaning it from those deformities which a disordered blood sometimes throws on it: or rather, which are occasioned by a preternatural secretion.

LOTION also denotes a remedy, possessing a medium between a fomentation and a bath.

There are refreshing and fomentiferous lotions for feverish persons, made of leaves, flowers, and roots boiled, with which the feet and hands of the patient are washed; and after washing, wrapped up in linen, steeped in the same decoction till dry.

There are lotions also for the head and hair.

LOTION, in *Pharmacy*, denotes a preparation of medicines, by washing them in some liquid, either made very light, so as to take away only the dregs; or sharp, so as to penetrate them, in order to clear them of some salt, or corrosive spirit, as is done to antimony, precipitates, magisteries, &c. &c.; or intended to take away some foulness, or ill quality; or to communicate some good one.

LOTION, *Saponaceous, Lotio saponacea*, the name of a form of medicine prescribed in the late London pharmacopœia, being properly soap in a liquid form. It is ordered to be made thus: Take damask rose-water, three quarters of a pint; oil of olives, a quarter of a pint; ley of tartar, half an ounce in measure: rub the ley and oil together till they are mixed, and then gradually add the water.

LOTOMETRA, in *Botany*, a name given by many of the ancients to the *nymphaea Indica*, or *Ægyptiaca*, called also the *fabæ Ægyptiaca*, and originally the *nihyar*, an abbreviation of *nihufar*; *nufar* signifying a water-lily, and the prefix

prefix *nil* expressing its growing particularly in the river Nile.

Neophytus tells us, that this lotometra has leaves of a middle form between those of the common nymphæa, which are roundish, and those of the arum, which are oblong and pointed, and are cordated at the base; and this is the very figure of the leaves of the faba *Ægyptiaca*, as we see it in all paintings, &c.

LOTOS (see LOTUS) is held in the highest veneration in India, inclusive of Thibet and Nepal. Among the Brahmins and enthusiastic Hindoos, no object in nature is looked on with more superstition; and their books abound with mystical allusions to this lovely aquatic. Being esteemed the most beautiful of vegetables, it not unappropriately furnishes a name for the Hindoo queen of beauty, and *Kamal* or *Kamala* is, as noticed under that article, a name of Lakshmi; as is Padma or Padma, another Sanscrit appellation for both. (See LAKSHMI.) Under the form of Kamala, Lakshmi is usually represented with a lotos in her hand, and in most pictures and statues of her consort Vishnu, he is furnished with the Padma, or lotos bud, in one of his four hands, as a distinguishing attribute. Accordingly, as it is represented in different stages of efflorescence, it varies, in the eye of mystics, its emblematical allusions. As an aquatic, the lotos is a symbol also of Vishnu, he being a personification of water or humidity, and he is often represented seated on it. Brahma, the creative power, is also sometimes seated on the lotos, and is borne on its calyx in the whimsical representation of the renovation of the world, when this mythical plant issued out of the navel of Vishnu from the bottom of the sea, where he was reposing on the serpent Sesha. (See SESHA.) The following extract from the curious and learned dissertation of Major Wilford, "On the sacred Isles of the West," will serve to shew the wild extravagance of Hindoo mythologists. "The nymphæa, or lotos, floating on the water, is an emblem of the world; the whole plant signifies both the earth and its two principles of fecundation. The stalk originates from the navel of Vishnu, sleeping at the bottom of the ocean; and the flower is the cradle of Brahma, or mankind. The germ is both Meru and the Linga; the petals and filaments are the mountains which encircle Meru, and are also the type of the Yoni." (Asiatic Researches, vol. viii.) This may suffice as to the extravaganzas of Hindoo myths. The reader may see farther hereon under our articles LINGA, MERU, and YONI. Hindoo poetry also superabounds in allusions to the lotos. One allusion, connected with an interesting fact in natural history, we will notice. In the northern parts of India the petals of the lotos are blue, as well as red and white; while in the southern provinces the blue flower is not seen; the poets have hence feigned that the crimson hue was imparted to it by the blood of Siva issuing from the wound made by the arrow of Kama, when the god of love daringly endeavoured to inspire the "king of dread" with an amorous passion, for which presumption he was reduced to ashes, or, as some say, to a mental essence, by the fire which issued from the forehead of the "three-eyed god." (See KAMA and SIVA.) In the Hindoo Pantheon, necessarily comprising a great mass of mythology in its mythological details, the reader will find many particulars and plates connected with the subjects of this article.

LOTTERY, a kind of game of hazard, wherein several lots of merchandize, or sums of money, are deposited as prizes, for the benefit of the fortunate.

The design of lotteries, and the manner of drawing them, are too well known among us to need a description: they are very frequent in England and Holland, where they cannot

be set on foot without the permission of the magistrate.—In France too, there have been several lotteries in favour of their hospitals.

M. Le Clerc has composed a treatise of lotteries, wherein is shewn what is laudable, and what blameable in them.—Gregorio Leti has also a book on the subject of lotteries. Father Menestrier has a treatise on the same, published in 1700, where he shews their origin and use among the Romans. He distinguishes several kinds of lotteries, and takes occasion to speak of chances, and resolves several cases of conscience relating thereto. See several statutes relating to lotteries under the article GAMING.

An act passed in 1778, for regulating the conduct of the lottery, restrains any person from keeping an office for the sale of tickets, shares, or chances, or for buying, selling, insuring, or registering, without a licence; for which licence each office-keeper must pay 50*l.*, if it be in, or within twenty miles of London, Edinburgh, or Dublin, and 10*l.* for every licence for every other office, to continue in force for one year, and the produce to be applied towards defraying the expences of the lottery. And no person is allowed to sell any share or chance less than a sixteenth, on the penalty of 50*l.* All tickets divided into shares or chances are to be deposited in an office, to be established in London by the commissioners of the treasury, who are to appoint a person to conduct the business thereof; and all shares are to be stamped by the said officer, who is to give a receipt for every ticket deposited with him. The numbers of all tickets so deposited are to be entered in a book, with the names of the owners, and the number of shares in to which they are divided; and two-pence for each share is to be paid to the officer on depositing such tickets, who is then to pay all expences incident to the office. All tickets deposited in the office are to remain there three days after the drawing. And any person keeping an office, or selling shares, or who shall publish any scheme for receiving money in consideration of any interest to be granted in any ticket in the said lottery, &c. without being in possession of such ticket, shall forfeit 500*l.* and suffer three months imprisonment. And no business is to be transacted at any of the offices after eight in the evening, except on the evening of the Saturday preceding the drawing. No person is to keep any office for the sale of tickets, &c. in Oxford or Cambridge, on penalty of 25*l.* Before this regulating statute took place, there were upwards of 400 lottery offices in and about London only; but the whole number afterwards, for all England, as appeared by the list published by authority, amounted to no more than 51. They were, however, at this time much more numerous.

By 42 Geo. III. c. 119, all games or lotteries called little-goes are declared public nuisances, and all persons keeping an office or place for any game or lottery not authorized by law, shall forfeit 500*l.* and be deemed vagabonds and vagabonds. The proprietor of a whole ticket may nevertheless insure it for its value only, with any ticket office, for the whole time of drawing, from the time of insuring, under a *bona fide* agreement, without a stamp. The last state lottery act enacting various new regulations was 49 Geo. III. c. 94.

The proposals for the first public lottery of which we have any account were published in 1567 and 1568, and it was drawn in 1569, at the west door of St. Paul's cathedral. The tickets were sold at ten shillings each, and there were no blanks. The prizes consisted chiefly of plate, and the profits of it were intended for repairing the heavens of the kingdom, and other public works. In 1612, James I. granted permission for a lottery to be held also at the west end of St.

Paul's,

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Paul's, of which the highest prize was of the value of 4000 crowns, in fair plate; this was for the assistance of the Virginia company, who were licensed to open lottery offices in any part of England, by which means they raised 20,000*l.* At length these lotteries became to be considered as public evils, and at last the attention of parliament: they were represented by the commons as a grievance, and were suppressed by an order of council. In 1630, however, Charles I. granted a special licence for a lottery or lotteries, according to the course of other lotteries hitherto used or practised, for defraying the expence of a project for conveying water to London. Soon after the revolution, lotteries were resorted to, among other expedients, for raising part of the extraordinary sums necessary for the public service, by which means the disposition for this species of gambling was greatly encouraged and extended; and private lotteries, formed on the most delusive and fraudulent principles, became so general, not only in London, but in all the other principal towns in England, that parliament found it necessary, in 1693, to pass an act for suppressing them, by which a penalty of 500*l.* was laid on the proprietors of any such lotteries, and 20*l.* upon every adventurer in them; notwithstanding which, the disposition to fraud on the one hand, and for adventure on the other, continued to prevail, and small lotteries were carried on under the denomination of sales of gloves, fans, cards, plate, &c. This was attempted to be checked by a clause in an act passed 1712, which only gave rise to a new mode of carrying on this kind of gambling. Government lotteries were still practised, and the adventure was now made to depend upon the drawing of the former; and the buying and selling of chances and parts of chances of tickets in the state lotteries became a general practice, till it was prohibited by an act passed in 1718, by which all the undertakings resembling lotteries, or being dependent on the state lottery, were strictly prohibited, under the penalty of 100*l.*, over and above all penalties enjoined by former acts of parliament against private lotteries.

During the reign of queen Anne, the lotteries were generally for terminable annuities, to which both blanks and prizes were entitled at different rates; thus in 1710, the lottery consisted of 150,000 tickets, valued at 10*l.* each, every ticket being entitled to an annuity for 32 years, the blanks at 1*l.* per annum, and the prizes to greater annuities, from 5*l.* to 1000*l.* per annum. This was the first lottery for which the bank of England received the subscriptions for government. In the following year the whole of the money advanced for the tickets was to be repaid, both in blanks and prizes, in 32 years, with interest at 6*per cent.* and an additional sum of nearly half a million to be divided, in order to form prizes, which additional capital was to be paid with the like interest within the same period as the original sum. In this manner they were conducted for several years, and a very considerable premium was given for the money advanced, in addition to a high rate of interest.

According to the lottery plans which prevailed from fir Robert Walpole's administration to that of the duke of Grafton, the tickets were issued at 10*l.* each; and occasionally the subscription was open to the public at large. The highest prize was generally 10,000*l.* and the lowest 20*l.* There were from four to six blanks to a prize, and the blanks entitled the bearers to 5*l.* or 6*l.* stock in the three or four *per cent.* bank annuities, the value of the blanks and prizes being generally funded. The lottery-office keepers divided the tickets into shares and chances, the former entitling the holders to the proportion they had purchased of blanks and prizes, the chances to prizes only; that is, they had no return if the ticket was drawn a blank.

The tickets, according to the advantage or disadvantage of the scheme, in respect of the number of blanks to a prize, and the number of high prizes, generally sold at from 11*l.* to 12*l.* before the drawing. When the tickets sold for 11*l.* and the blanks were entitled to 6*l.* in the three *per cent.* bank annuities, as the blank might be sold for 5*l.* 8*s.* ready money when the three *per cents.* were at 90, the adventurer only gambled at a risk of 5*l.* 12*s.*; and at the highest calculation, when tickets were worth 13*l.*, he never staked more than 7*l.* 12*s.* for a ticket before the drawing.

In 1759, the scheme of the lottery included two prizes of 20,000*l.* each, which had not been the case in any preceding lottery since the time of queen Anne. The scheme for the year 1767 contained one prize of 20,000*l.*, and this was many years after the usual amount of the highest prize. About this time a material alteration was made in the plan of the lotteries; the allowance to blanks was discontinued, the whole sum being divided into prizes, the number of which was of course considerably increased, particularly as the proportion of small prizes was much greater than it has since been, and in several of the following years was less than two blanks to a prize. All the lotteries during the time lord North was chancellor of the exchequer were formed on this principle, with some variation in the schemes, which favoured the holders of tickets and the lottery-office keepers, and greatly increased the spirit of gaming, such as paying the prizes in money instead of stock, and making the first drawn ticket for several successive days a prize of 1000*l.* or more, which enhanced the price of the tickets, and encouraged persons who had blanks drawn to buy again. Some judicious regulations were, however, adopted for the security of persons purchasing shares of tickets, by limiting the shares into which tickets may be divided into halves, quarters, eighths, and sixteenths; and obliging all lottery-office keepers to deposit the tickets they divided into shares in the bank, and to have the said shares examined and stamped. The practice of insuring tickets and shares was likewise restrained, by enacting, that "no person shall sell the chance or chances of any ticket or any share, for any time less than the whole time of drawing from the day of sale; nor shall receive any sum of money whatsoever in consideration for the repayment of any sum, in case any ticket shall prove fortunate, or in any case of any chance or event relating to the drawing, either as to time, or its being fortunate, nor shall publish proposals for the same, under the penalty of 500*l.*, one-half to be paid to the person suing for the same, and the other moiety to his majesty."

During Mr. Pitt's administration the lotteries were contracted for entirely distinct from the loans of the respective years; and as it became necessary to endeavour to augment every source of the revenue as much as possible, various alterations were made in the lottery schemes, chiefly with a view of raising the price of tickets, and of keeping up the price during the time of drawing. The number and amount of the highest prizes were increased, some schemes containing four prizes of 2,000*l.* each, others of two 30,000*l.* prizes, while, for the purpose of disposing of a greater number of tickets in the course of the year, the lottery was divided into two or three smaller ones, drawn at different times; the amount of the principal prize was still farther augmented; the lottery drawn in October 1807 containing a prize of 40,000*l.*, and that drawn in June 1808 six prizes of 20,000*l.* each.

But notwithstanding the temptations which these schemes held out to the inconsiderate, the contractors found, either from the greater frequency of lotteries, or the increased number of tickets, that it became impossible to get the

the tickets off their hands, without resorting to a variety of expedients for attracting the public attention, which were carried to such a length as to become a public nuisance.

This and many serious evils which were known to exist relating to lotteries, particularly that of illegal insurances, gave rise, in 1808, to a committee of the house of commons, which was appointed in order to enquire "how far the evil attending lotteries had been remedied by the laws passed respecting the same." In the report of this committee, various instances were adduced of the most serious evils, attested by the most respectable witnesses, some of which are so striking, that we cannot resist the mention of them in the present article. One case, which was attested by the Rev. Mr. Gurney, is particularly interesting, as it shews to what an amazing extent this kind of gambling will carry persons, who, had it not been for the temptations held out by lotteries, might have lived with comfort and respectability, but who, from these kinds of speculations, have been reduced to the most abject state of poverty and distress. "I knew," says Mr. Gurney, "a widow in a good line of business, as a silk dyer, which, I suppose, brought her in about 400*l.* a-year clear. She kept a very good house, and I was in habits of intimacy with the family. The foreman she had was in the habit of insuring in the lottery; he was led astray by an acquaintance, and he and his mistress insured to the amount of from 300*l.* to 400*l.* in a night, although the foreman had only 30*l.* a-year wages. It appeared, on his decease, he had insured immense sums of money within the last year of his life. I found that he had expended upwards of 100 guineas in the lottery, purchasing one ticket at 16*l.* and insuring away the rest. It came up a blank at last, and I verily believe the disappointment was the cause of his death. He died insolvent, and I acted as his executor, and paid three or four shillings in the pound to his creditors. He had received a great many bills for his mistresses, which he had never accounted for, and was the ruin of her also; she was not able to pay three shillings in the pound. She was obliged to go to an alms-house, and died there in four or five months. They would send all the plate she possessed to raise money to carry on an insurance, which had begun perhaps at a low rate. The gentleman who drew the foreman into this practice was himself also ruined by it. His wife had an annuity of 400*l.* *per annum* settled upon her, he sold her life interest, and she was obliged to live afterwards upon charity, while her husband, who had formerly kept his carriage, and lived in a good house in Queen-square, spent the last hours of his miserable existence within the walls of the Fleet prison." Various other instances of a similar kind were mentioned in the appendix to the report of the committee, where the parties formerly in respectable circumstances were reduced to misery and distress. But what serves to mark the evils of lotteries the stronger is, that it is not only the unsuccessful adventurer that is ruined by the failure of his speculation, but there are as many cases where a successful speculator has had equal reason to deplore his first connection with this species of gambling. Robert Baker, esq. deposed, that "he remembered one very strong instance of distress arising out of the transactions in the lottery four or five years ago. It was the case of a journeyman who belonged to a club, which club purchased a ticket that came up the great prize. The share of this man was 100*l.* or thereabouts; he had been an industrious working man before, and he was persuaded by his friends to invest the money in the stocks, in the joint name of himself and wife, in order to prevent his making away with it. He did so, but soon got into habits of idleness after he was possessed of the money; and he wanted his wife to join in

the transfer of it. This occasioned quarrels, which proceeded to assaults; he changed his habits of industry to those of drunkenness and idleness, he destroyed all his domestic comforts, and was the ruin of his family." Many other cases of a similar description are given in the appendix to this report; in some of them mothers have neglected their children, and left them destitute of the common necessities of life, while the money by which those necessities should have been purchased has been gambled away in the insurance of certain numbers in the lottery. In other cases the wife has robbed an industrious and careful husband and father of the small and hard-earned savings of many months, and even of many years; and who, instead of finding his little treasure in the drawer, in which it was deposited, and which he was about to increase by another small addition, found that the whole had been gambled away in lottery speculations, and every article of his clothes, which were not likely to be immediately wanted, had been pawned in order to recover the former loss.

In other cases, children have robbed their parents; servants their masters; suicides have been committed, and almost every crime that can be imagined has been occasioned, either directly or indirectly, through the baneful influence of lotteries. These evils are the more to be regretted, as they receive a sort of sanction from the government itself, and whatever laws may be enacted to check them they will always exist, in a greater or less degree, while lotteries are employed as a means of increasing the revenue of the country, and certainly in no other case would they be permitted to exist. The object of government is the happiness of the people, and every means that can be employed to attain this object it is the duty of government to employ; but this can never be accomplished without strict and constant attention to morals as well private as public; but how little are lotteries calculated to produce this effect, which, instead of improving the morals, hold out the most delusive schemes to attract the attention of the ignorant and unwary, and draw them aside from the paths of industry and contentment, to embark in a gambling concern, which generally terminates in poverty and wretchedness.

The committee before which the above mentioned facts were disclosed, were fully aware of all the evils we have recounted, and in the course of their report, declared, that "the foundation of the lottery system is so radically vicious, that your committee feel convinced, that under no system of regulations which can be devised, will it be possible for parliament to adopt it as an efficacious source of revenue, and at the same time divest it of all the evils of which it has hitherto proved so baneful a source.

"But, (in case it should be thought expedient to continue state lotteries,) the number, therefore, in each year, should be limited to two lotteries, of not more than 30,000 tickets each; that the number of days allowed for drawing, instead of ten, should be brought down to eight for each lottery, the number fixed in 1802; that the number of tickets to be drawn each day should be uncertain, and left to the direction of the commissioners of stamp-duties, and kept secret till the close of the drawing each day; care being taken, as the lottery proceeds, not to leave too great a number undrawn on the latter days of drawing; but that one moiety, or upwards, be drawn on the four first days thereof; that every lottery-office keeper should, in addition to his own licence, take out a limited number of licences for his agents; that the limitation of hours during which lottery-offices may be open for the transaction of business, *viz.* from eight o'clock in the morning till eight o'clock in the evening, enacted by

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22 Geo. III. c. 47, and renewed in the lottery acts in 1802, and the three following years, but omitted in those of 1806 and 1807, ought in future to be re-enacted, without the exception therein made, to Saturday evenings."

These suggestions have been attended to in the lotteries of the last two or three years, which have been several of them drawn in one day, and consequently a considerable check has been given to illegal insurances. Still, however, many evils remain, which are so blended with the nature of lotteries, that it is impossible to separate them, and it may fairly be questioned, whether, for the sake of a sort of voluntary tax, which is thus imposed upon ignorance and folly, the morals of many industrious and honest members of society ought to be exposed to the danger of being enfeebled by the delusive hopes of gain, which the lottery schemes are calculated to inspire. With regard to the advantage that the revenue derive from the lottery system, it may likewise be collected from the reported account above alluded to. Mr. Shewell informed the committee, that the general advance put upon tickets by the contractor, was about 3*l.* per ticket, not varying much under or over. This is in consideration of the certain loss on such tickets as the contractor is not able to sell, the expence he must necessarily be put to in the sale of his lottery, and the profit that he naturally expects on such a concern. The lottery is considered as sold pretty well, of which four-fifths of the tickets are disposed of: the contractors of the lottery in hand, at the time of this enquiry, expected not to sell more than 17,000 tickets out of the 25,000, of which it consisted. The tickets in this lottery were sold by the chancellor of the exchequer at 17*l.* and a fraction, the tickets of which were not worth quite 1*cl.* each; the contractor sold it again to the licensed lottery-office keepers at 20*l.* 19*s.* per ticket, between three and four pounds more than they gave for it. The lottery-office keeper puts on another profit, which, in those numbers divided in eighths, sixteenths, &c. amounts to about 1*l.* per ticket; whence it is obvious, that the adventurer in this lottery (and this may be considered as an average of lotteries in general), gamble at a disadvantage of 100 per cent. Government is a gainer of about 70 per cent, besides about 20 per cent. farther, which is supposed to be added to the revenue by the postage of letters, stamps, duties on advertisements, excise duty, on candles, paper, &c. On the face of the concern there appears, therefore, a considerable profit to government, which, at a mean, may be estimated at about 750,000*l.* per annum; but it was the opinion of those who are best qualified to judge of these subjects, that this increase of revenue was rather apparent than real; that the extra parochial taxes, brought on by the distress they occasion; the decreased consumption of exciseable articles, just before, and during the time the lottery is drawing, and for a few weeks afterwards, which decrease was actually ascertained from competent witnesses, fully counterbalance the apparent gain. Should this be the true state of the case, what can induce the ministers to continue to give their sanction to such delusive and dangerous species of gambling? At all events, if the above profit were real, no revenue is obtained by the state at half the expence, in point of pecuniary sacrifice to the public, independent of the excessive injury to the morals of the people. We have already seen, that the purchasers of legal shares gamble at the disadvantage of 100 per cent.; and the insurances are carried on, to the disadvantage of the public, at about 4 per cent.; but still it is not easy to estimate the annual expence which lotteries cost the public; the following statement, however, is hazarded by P. Colquhoun, esq. and submitted to the above-mentioned committee.

Suppose three annual lotteries, each of 25,000 tickets, the public receives	£. 600,000
Contractors profit at 1 <i>l.</i> per ticket	75,000
Lottery-office keeper's profit	100,000
Insurer's profit 33½ per cent. on 1,000,000 <i>l.</i>	333,000
Total	£. 1,108,000

The public are supposed to pay for 75,000 tickets, including the additional advance on halves, quarters, &c.	1,275,000
The lower class who insure are supposed to pay	1,000,000
	£. 2,275,000

Deduct prizes	750,000
Deduct prizes obtained by insurers	250,000
	1,000,000

Loss to the public to gain 600,000 <i>l.</i> to the revenue yearly	1,275,000
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This estimate seems to have been made upon the most favourable suppositions, and probably falls considerably short of the real loss sustained by the public.

The following is an account of the prices of tickets, and immediate profit derived from them by the state, during the six years from 1802 to 1807.

Year.	No. of tickets.	Price.	Profit.
1802	100,000	£. 14 11 0	£. 555,000
1803	80,000	13 13 1	352,333
1804	1	25,000	14 15 6
—	2	25,000	15 16 0
—	3	30,000	15 13 6
			£. 434,625
1805	1	25,000	17 2 9
—	2	25,000	18 3 0
—	3	25,000	17 18 9
			£. 580,660
1806	1	20,000	16 12 0
—	2	25,000	16 14 3
—	3	25,000	16 10 0
—	4	20,000	16 19 0
			£. 601,312
1807	1	20,000	17 13 6
—	2	25,000	17 4 0
—	3	25,000	16 10 6
			£. 496,125

To these sums are to be added the advantages derived from postages, stamps, &c. which are generally estimated at 2*l.* per ticket, making the mean annual profit about 750,000*l.* But after deductions are made for the losses sustained

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tained from causes connected with the lottery system, it is doubtful whether any real advantage is derived from this source; and if even the whole of the above was a real saving, the evils attending it are such as to lead us to hope, that ministers will find some other means of raising an equivalent, founded upon more liberal principles, and less dangerous to the morals and happiness of the people.

Having said thus much with regard to the general policy of lotteries, we shall conclude the present article by an investigation of the theory of lotteries, as it is connected with the doctrine of chances.

PROB. I.

Any number of things being given, as a, b, c, d, e, f ; to find the probability that in taking three of them, as they happen, they shall be any three proposed, as a, b, c .

First, the probability of taking either a or b , or c , will be $\frac{3}{6}$ ths, and supposing one of them, as a , to be taken, then the probability of taking either b or c will be $\frac{2}{5}$ ths. Again, let either of them be taken, suppose b ; the probability of taking c in the third place will be $\frac{1}{4}$ th; wherefore the probability of taking the three things proposed, viz a, b, c , will be

$$\frac{3}{6} \times \frac{2}{5} \times \frac{1}{4} = \frac{1}{20}.$$

Otherwise, we might consider what number of combinations of six things can be formed by taking three at a time; and out of this number there is obviously only one combination that answers the conditions of the problem proposed; and there are, therefore, so many chances to one against the success of the trial.

Now, the number of such combinations is expressed by

$$\frac{6 \times 5 \times 4}{3 \times 2 \times 1} = 20.$$

And, consequently, the chance of drawing the specified things a, b, c , is $\frac{1}{20}$ th, as before.

Corollary.—Universally, the number of combinations that can be formed, of n things taking p , at a time, is expressed by

$$\frac{n \cdot (n-1) \cdot (n-2) \cdot (n-3) \cdot \dots \cdot (n-p)}{p \cdot (p-1) \cdot (p-2) \cdot (p-3) \cdot \dots \cdot 1}$$

and consequently, the reciprocal of this fraction will be the probability of success in any case that may arise.

PROB. II.

Let the same six things be proposed as above, to determine the probability, that in drawing four of them, the three specified ones, as a, b, c , shall be taken.

First, the number of combinations that can be formed of six things, taking three at a time, is $\frac{6 \times 5 \times 4}{3 \cdot 2 \cdot 1} = 20$;

and the number of combinations that can be formed out of

four things, taking three at a time, is $\frac{4 \times 3 \times 2}{3 \times 2 \times 1} = 4$.

Whence it follows that out of the twenty combinations of threes which may happen, four of them will be in hand; and, therefore, the probability of taking the three specified

things under the condition of the problem, is $\frac{4}{20} = \frac{1}{5}$.

And hence, generally, to determine the probability, that in drawing out of a given number of tickets n , any proposed number p , there shall be found amongst them any number of

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specified ones q , we must divide the first of the following series by the second, viz.

$$\begin{aligned} 1. & \frac{p \cdot (p-1) \cdot (p-2) \cdot (p-3) \cdot \dots \cdot (p-q)}{q \cdot (q-1) \cdot (q-2) \cdot (q-3) \cdot \dots \cdot 1} \\ 2. & \frac{n \cdot (n-1) \cdot (n-2) \cdot (n-3) \cdot \dots \cdot (n-q)}{q \cdot (q-1) \cdot (q-2) \cdot (q-3) \cdot \dots \cdot 1} \end{aligned}$$

that is, the proposed chance will be expressed by the fraction

$$\frac{p \cdot (p-1) \cdot (p-2) \cdot (p-3) \cdot \dots \cdot (p-q)}{n \cdot (n-1) \cdot (n-2) \cdot (n-3) \cdot \dots \cdot (n-q)}.$$

PROB. III.

To find what probability there is, that in taking at random seven counters out of twelve, whereof four are white, and eight black, there shall be at least three white ones.

1. Find the chance for taking three white out of four, which will be

$$\frac{4 \times 3 \times 2}{3 \times 2 \times 1} = 4.$$

2. The number of chances for taking four black out of eight is, on the same principle, found to be

$$\frac{8 \times 7 \times 6 \times 5}{4 \times 3 \times 2 \times 1} = 70.$$

And, therefore, the chances of both succeeding is $4 \times 70 = 280$.

But by the question, he may hold four white and three black, because it is only limited that three white be taken, and not that there should be three white and no more.

3. How the number of chances for taking four white out of four is one.

4. The number of chances for taking three black out of eight is

$$\frac{8 \times 7 \times 6}{3 \times 2 \times 1} = 56.$$

And the product of these two is $56 \times 1 = 56$, therefore the whole number by which the event may succeed, is $280 + 56 = 336$.

5. But the whole number of combinations that can be formed out of twelve things, taking seven at a time, is

$$\frac{12 \cdot 11 \cdot 10 \cdot 9 \cdot 8 \cdot 7 \cdot 6}{7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1} = 792;$$

therefore $\frac{336}{792} = \frac{14}{33}$, will express the probability that

the event will happen, and consequently $1 - \frac{14}{33} = \frac{19}{33}$, is the probability of its failing: that is, the odds against three white counters being drawn, are as 19 to 14.

Corollary.—Let a be the number of white counters, b the number of black, n the whole number $= a + b$; c the number of counters to be taken out of the number n : also, let p represent the number of white counters that are to be found precisely in c . Then the number of chances for taking none of the white, or one of the white, or two of the white, and no more; or three of the white and no more; or four of the white and no more, &c. will be expressed as follows:

$$\left\{ \frac{a}{1} \times \frac{a-1}{2} \times \frac{a-2}{3} \times \frac{a-3}{4} \text{ \&c. } \right\} \times \left\{ \frac{b}{1} \times \frac{b-1}{2} \times \frac{b-2}{3} \times \frac{b-3}{4} \text{ \&c. } \right\}$$

The number of terms in which a enters being equal to the number

LOTTERY.

number p ; and the number of terms in which b enters being equal to the number $c - p$.

But the number of all the chances for taking a certain number c , of counters out of the number n , is expressed by

$$\frac{n}{1} \times \frac{n-1}{2} \times \frac{n-2}{3} \times \frac{n-3}{4} \&c.$$

to be continued to as many terms as there are units in c .

If the numbers n and c were large, such as $n = 40000$, and $c = 8000$, the foregoing method would seem impracticable, on account of the great number of terms to be taken in both series, whereof the first is to be divided by the second; though if those terms were actually set down, a great many of them being common divisors might be expunged out of both series; for which reason it will be convenient to use the following theorem, which is a contraction of that method, and which will be chiefly of use when the white counters are but few. Let, therefore, n be the number of all the counters, a the number of white, b the number of black, c the number of counters to be taken out of the number n , p the number of white that are to be taken precisely, then making $n - c = d$. The probability of taking precisely the number p of white counters will be as follows: *viz.* making

$$c \cdot (c-1) \cdot (c-2) \cdot (c-3) \&c. = C$$

$$d \cdot (d-1) \cdot (d-2) \cdot (d-3) \&c. = D$$

$$\frac{a}{1} \times \frac{a-1}{2} \times \frac{a-2}{3} \times \frac{a-3}{4} \&c. = A$$

$$n(n-1)(n-2)(n-3)\&c. = N$$

$$\text{the probability} = \frac{C \times D \times A}{N}$$

where it is to be observed, that the first and third series contain as many terms as there are units in p ; the second as many as there are in $a - p$; the fourth as many as there are in a .

Let us now apply these results in the solution of the following problems.

PROB. IV.

In a lottery consisting of 40000 tickets, among which are three particular benefits, what is the probability that taking 8000 of them, one or more of the particular benefits shall be among them. Substitute 8000, 40000, 32000, 3, and 1 respectively for c, n, d, a , and p , in that problem; and the probability of taking precisely one of the three particular benefits will appear to be

$$\frac{8000 \times 32000 \times 31999 \times 3}{40000 \times 39999 \times 39998} = \frac{48}{125} \text{ nearly.}$$

$$\text{If } p = 2, \text{ the probability of taking precisely two of the particular benefits will be } \frac{8000 \times 7999 \times 32000 \times 3}{40000 \times 39999 \times 39998}$$

$$= \frac{12}{125} \text{ nearly. If } p = 3, \text{ the probability of taking all the}$$

$$\text{three particular benefits will be } \frac{8000 \times 7999 \times 7998}{40000 \times 39999 \times 39998} =$$

$$\frac{1}{125}. \text{ And the probability of taking one or more of the}$$

$$\text{three particular benefits will be } \frac{48 + 12 + 1}{125} = \frac{61}{125} \text{ very}$$

nearly. These three operations might have been contracted into one by inquiring the probability of not taking any of

the three particular benefits, which will be found to be $\frac{32000 \times 31999 \times 31998}{40000 \times 39999 \times 39998} = \frac{64}{125}$ nearly, which being sub-

tracted from unity, gives a remainder, $1 - \frac{64}{125} = \frac{61}{125}$,

shewing the probability required; and therefore the odds against taking any of three particular benefits will be 64 to 61 nearly.

PROB. V.

To find how many tickets ought to be taken in a lottery consisting of 40000, among which are three particular benefits, to make it as probable that one or more of these three may be taken as not. Let the number of tickets requisite to be taken be x , and the probability of not

taking any of the particular benefits will be $\frac{n-x}{n} \times$

$$\frac{n-x-1}{n-1} \times \frac{n-x-2}{n-2}; \text{ but this probability is equal to}$$

$\frac{1}{2}$, since by hypothesis, the probability of taking one or more of them is equal to $\frac{1}{2}$; whence we shall have the equation

$$\frac{n-x}{n} \times \frac{n-x-1}{n-1} \times \frac{n-x-2}{n-2} = \frac{1}{2}, \text{ from the solu-}$$

tion of which x will be found nearly equal to 8252. The terms of this equation, M. De Moivre observes, may be considered as being in geometric progression; since the factors both of the numerator and denominator are few and in arithmetic progression, and their difference very small in respect of n ; and, therefore, the cube of the middle term may be supposed equal to the product of the multiplication

$$\text{of these terms; whence will arise the equation, } \left[\frac{n-x-1}{n-1} \right]^3 =$$

$\frac{1}{2}$; or, neglecting the unit both in the numerator and denomi-

$$\text{nator, } \left[\frac{n-x}{n} \right]^3 = \frac{1}{2}, \text{ and } x, \text{ consequently, } = n \left(1 - \sqrt[3]{\frac{1}{2}} \right),$$

or $n \left(1 - \frac{1}{2} \sqrt[3]{4} \right)$; but $n = 40000$, and $1 - \frac{1}{2} \sqrt[3]{4} = 0.2063$; therefore $x = 8252$.

PROB. VI.

To determine accurately, in a lottery of 100000 tickets, whereof 90000 are blanks, and 10000 are benefits, what the odds are of taking or not taking a benefit, in any number of tickets assigned. Let the number be 6; and it will appear, by the above cited problem, that the number of chances for taking no prize in 6 tickets, making $a = 10000, b = 90000,$

$$c = 6, p = 0, n = 100000, \text{ will be } \frac{90000}{1} \times \frac{89999}{2} \times$$

$$\frac{89998}{3} \times \frac{89997}{4} \times \frac{89996}{5} \times \frac{89995}{6}; \text{ and that the}$$

$$\text{whole number of chances will be } \frac{100000}{1} \times \frac{99999}{2} \times$$

$$\frac{99998}{3} \times \frac{99997}{4} \times \frac{99996}{5} \times \frac{99995}{6}; \text{ then dividing the}$$

first number of chances by the second, by means of logarithms, the quotient will be 0.53143, the probability required: this decimal fraction being subtracted from unity, the remainder 0.46857 shews the probability of taking one prize or more in six tickets; wherefore the odds against taking any prize in six tickets will be 53143 to 46857. If the number of tickets be seven, then carrying each number of

of chances above written one step farther, we shall find that the probability of taking no prize in seven tickets is 0.47828, which subtracted from unit leaves a remainder 0.52172, which shews the odds of taking one prize or more in seven tickets to be 52172 to 47828.

PROB. VII.

With the same data, to find the value of the chance of a prize, supposing each ticket to be 10*l.*, and that after the lottery is drawn 7*l.* 10*s.* be returned to the blanks. There being 90000 blanks, to each of which is returned 7*l.* 10*s.* the total value of the blanks is 675,000*l.* and consequently the total value of the benefits is 325,000*l.* which being divided by 10000, the number of benefits, gives a quotient 32*l.* 10*s.* and, therefore, one might for the sum of 32*l.* 10*s.* be entitled to have a benefit certain, taken at random out of the whole number of benefits: the purchaser of a chance has, therefore, one chance in ten for the sum of 32*l.* 10*s.* and nine chances in ten for losing his money; from whence it follows, that the value of his chance is the tenth part of 32*l.* 10*s.* viz. 3*l.* 5*s.* And consequently the purchaser of a chance, by giving the feller 3*l.* 5*s.*, is intitled to the chance of a benefit, and ought not to return any thing to the feller, although he should have a prize; for the feller having 3*l.* 5*s.* sure, and nine chances in ten for 7*l.* 10*s.* the value of which chance is 6*l.* 15*s.* it follows that he has his 10*l.* 5*s.*

PROB. VIII.

In the same kind of lottery, let A engage to furnish B with a chance, on condition that whenever the ticket on which the chance depends shall happen to be drawn, whether it proves a blank or prize, A shall furnish B with a new chance, and so on, as often as there is occasion, till the whole is drawn; it is proposed to find what consideration B ought to give A before the lottery begins to be drawn, for the chance or chances of one or more prizes, admitting that the lottery will be forty days in drawing.

Let the absolute value of a chance, or 3*l.* 5*s.*, be called *s.* First A, who is the feller, ought to consider, that on the first day he furnishes necessarily a chance whose value is *s.*

2dly. That on the second day, he does not necessarily furnish a chance, but conditionally, viz. if it so happen that the ticket on which the chance depends should be drawn on the first day; but the probability of its being drawn on the first day is $\frac{1}{40}$; and therefore he ought to take $\frac{1}{40}s.$ for the consideration of the second day.

3dly. That in the same manner he does not necessarily furnish a chance on the third day, but conditionally, in case the only ticket depending (for there can be but one) should happen to be drawn on the second; of which the probability being $\frac{1}{39}$, by reason of the remaining 39 days from the second inclusive to the last, it follows, that the value of that chance is $\frac{1}{39}s.$

4thly. And for the same reason the value of the next is $\frac{1}{38}s.$ &c. the purchaser ought, therefore, to give the feller $1 + \frac{1}{40}s. + \frac{1}{39}s. + \frac{1}{38}s. + \frac{1}{37}s. + \frac{1}{36}s. + \frac{1}{35}s. + \frac{1}{34}s. + \frac{1}{33}s. + \frac{1}{32}s. + \frac{1}{31}s. + \frac{1}{30}s. + \frac{1}{29}s. + \frac{1}{28}s. + \frac{1}{27}s. + \frac{1}{26}s. + \frac{1}{25}s. + \frac{1}{24}s. + \frac{1}{23}s. + \frac{1}{22}s. + \frac{1}{21}s. + \frac{1}{20}s. + \frac{1}{19}s. + \frac{1}{18}s. + \frac{1}{17}s. + \frac{1}{16}s. + \frac{1}{15}s. + \frac{1}{14}s. + \frac{1}{13}s. + \frac{1}{12}s. + \frac{1}{11}s. + \frac{1}{10}s. + \frac{1}{9}s. + \frac{1}{8}s. + \frac{1}{7}s. + \frac{1}{6}s. + \frac{1}{5}s. + \frac{1}{4}s. + \frac{1}{3}s. + \frac{1}{2}s. + \frac{1}{1}s. \times s.$ or $1 + \frac{1}{40}s. + \frac{1}{39}s. + \frac{1}{38}s. + \frac{1}{37}s. + \frac{1}{36}s. + \frac{1}{35}s. + \frac{1}{34}s. + \frac{1}{33}s. + \frac{1}{32}s. + \frac{1}{31}s. + \frac{1}{30}s. + \frac{1}{29}s. + \frac{1}{28}s. + \frac{1}{27}s. + \frac{1}{26}s. + \frac{1}{25}s. + \frac{1}{24}s. + \frac{1}{23}s. + \frac{1}{22}s. + \frac{1}{21}s. + \frac{1}{20}s. + \frac{1}{19}s. + \frac{1}{18}s. + \frac{1}{17}s. + \frac{1}{16}s. + \frac{1}{15}s. + \frac{1}{14}s. + \frac{1}{13}s. + \frac{1}{12}s. + \frac{1}{11}s. + \frac{1}{10}s. + \frac{1}{9}s. + \frac{1}{8}s. + \frac{1}{7}s. + \frac{1}{6}s. + \frac{1}{5}s. + \frac{1}{4}s. + \frac{1}{3}s. + \frac{1}{2}s. + \frac{1}{1}s. \times s.$ The sum of these forty terms, being 4.2785 nearly, multiplied by *s.* or 3.25, will give a product 13.9, shewing that the purchaser ought to give the feller about 13*l.* 18*s.*

From what has been said it appears, that the value of the chance *s.* for one single day that shall be fixed upon is the

value of that chance divided by the number of days intercepted between that day inclusive and the number of days remaining to the end of the lottery; which, however, must be understood with this restriction, that the day fixed upon must be chosen before the lottery begins; or if it be done on any other day, the state of the lottery must be known, and a new calculation made accordingly for the value of *s.* De Moivre's Doctrine of Chances, 1756. See also the article CHANCES.

LOTTERY is also the name of a well-known game at cards.

LOTTI, ANTONIO, of Venice, in *Biography*, principal organist of St. Mark, and afterwards maestro di cappella of the same cathedral, was one of the greatest men of his profession. The celebrated Haffé, his disciple and intimate friend, and the best able to judge of his abilities, thought that none of the great masters ever united in their works so great a share of expression and science. In his compositions, he combined with the learning of the old school all the grace, rich harmony, and brilliancy of the new. He was the hero of Haffé, who never spoke of him but with rapture. "What expression" (he used to say), "what variety, were in that expression, and what truth in the ideas!" How pleasing it was to hear a man at his time of life, of a merit and reputation above all envy, speak with such enthusiasm of a great master. Lotti was long at the head of the Venetian school. His ecclesiastical compositions were only used at St. Mark's on great and solemn occasions. They are truly sublime. The kind of pathos in his style elevates the soul, and expresses all the grandeur and reverence of devotion. (*Essais sur la Mus. tom. iii.*) This animated and feeling character of Lotti does not seem to come from an author who in general speaks of the Italians with contempt, and of Rameau as the only musician who ever knew harmony and how to use it. We can, however, answer for the truth of the above character. For though we have never heard or seen any of his dramatic music, yet, in 1770, we heard at Venice, in the church of San Giovanni e Paolo, on a day that the doge went in procession to that church, a mass by Lotti, in four parts, without any other instrument than the organ, which was so well sung and accompanied, that we do not remember ever to have received more pleasure from choral music; all was correct, clear, and distinct; no confusion or unnecessary notes; it was even capable of expression, particularly one of the movements into which the performers entered so well as to render it affecting even to tears. The organist, very judiciously, suffered the voices to be heard in all their purity, with which our attention was so occupied, that we frequently forgot that they were accompanied. This kind of music, à cappella, though exploded as unfit for theatrical purposes, must be allowed to have its merit. Lotti was the disciple of Legrenzi, the model of Haffé, one of the masters of Marcellò, Galuppi, and Pavesetti. His name is chiefly known in England by the dispute in the Academy of Ancient Music, at the Crown and Anchor, in 1732, concerning a madrigal which Bononcini was accused of having stolen from him. See BONONCINI.

Lotti composed for the Venetian theatres, between the years 1698 and 1717, fifteen operas. His cantatas furnish specimens of recitative that do honour to his sensibility. He was opera composer at the court of Dresden when the Santa Stelli, his wife, performed the part of first woman then, in 1718; and in 1720 he returned to Venice, where he was living in 1733.

LOTUL, in *Geography*, a town of Bengal; 16 miles W. of Torea.

LOTUS, in *Botany*, a name which has been more variously

usually applied, and of which perhaps more has been written, than of any other plant. Those who have sought for its origin in the Greek language, have found nothing nearer than *λωτός*, to *will* or *desire*, alluding, as they suppose, to the plant being greatly esteemed. Others have thought, with more probability, that *λωτός* of the Greeks, and *Lotus* of the Latins, had one common Egyptian origin, its etymology being therefore, of course, inscrutable to us. All that can be said of the application of this name, at various times, and in various languages and nations, is, that it has always been used for some plant eminently useful as food, for man or beast. Thus it has been appropriated to the *κνυμὸς*, or Sacred Bean of India (see *CYANTUS*); and to its Egyptian substitute, the *Nymphaea*; to some African fruit, on which certain people have chiefly depended for their support; and to several herbaceous plants, essential to the maintenance of domestic cattle, in countries sparingly furnished with grass. In this last sense it is finally retained, as a generic appellation, by modern botanists.—Linn. Gen. 388. Schreb. 509. Willd. Sp. Pl. v. 3. 1385. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 793. Ait Hort. Kew. ed. 1. v. 3. 90. Juss. 356. Lamarck. Illustr. t. 611. Gärtn. t. 153.—Class and order, *Diadelphia Decandria*. Nat. Ord. *Papilionaceae*, Linn. *Leguminosae*, Juss.

Gen. Ch. *Cal.* Perianth of one leaf, inferior, tubular, nearly cylindrical, cut half way down into five, acute, erect teeth, equal in length, but not quite uniform in position, permanent. *Cor* Papilionaceous. Standard roundish, bent backwards; its claw long, concave. Wings roundish, shorter than the standard, broad, slightly cohering by their upper margin. Keel gibbous beneath, closed above, pointed, ascending, short. *Stam.* Filaments in two sets, one simple, the other in nine segments, ascending, rather dilated at the tips; anthers small, simple. *Pist.* Germen oblong, straight, nearly cylindrical, rarely angular; style simple, ascending; stigma a small inflexed point. *Peric.* Legume cylindrical, straight, tardid, longer than the calyx, of one cell and two valves. *Seeds* several, somewhat cylindrical.

Ess. Ch. Legume cylindrical, straight. Wings cohering longitudinally above. Calyx tubular. Filaments dilated upwards.

The habit of this genus, mostly herbaceous, in some instances slightly shrubby, approaches that of *Medicago*, but their fructification differs essentially. The species chiefly abound in the more temperate climates of Europe, or part of Africa. Seventeen occur in the *Sp. Pl.* of Linnæus, 18 in *Syst. Veg.* ed. 14; 30 in Willdenow. Three are reckoned natives of Britain, all confounded till lately under *L. corniculatus*.

The whole are distributed into two sections.

SECT. 1. *Flowers, or Legumes, one or two on a stalk, rarely three.* Of these some of the principal are

L. filiquosus. Square-podded Bird's-foot Trefoil. Linn. Sp. Pl. t. 89. Jacq. Austr. t. 361. (*L. tetragonolobus*; Rivin Tetrap. Irr. t. 79. *L. trifolia corniculata*; Ger. em. 1198.)—Legumes solitary, with four membranous wings. Stems procumbent. Bractæas lanceolate, solitary or ternate.—Native of rather moist pastures, in various parts of the continent of Europe from Sweden to Italy, but not found in Britain. The roots are perennial, throwing up many weak decumbent stems, about a span long, branching, zigzag and leafy. Leaves alternate, stalked, ternate; leaflets obovate, equal in length, but the two lateral ones very unequally divided by their rib; all somewhat fleshy, more or less hairy, slightly glaucous beneath. *Stipulas* in pairs at the base of each footstalk, large, ovate or elliptical. *Flower-stalks* few, axillary, solitary, about the tops of the

stems, which they greatly overtop, being often three or four inches long, firm, hairy, single-flowered. *Flowers* large, lemon-coloured. *Legume* an inch and half long, with four narrow wings.—Linnæus's *L. maritimus* is not even a variety of this. He seems at one time not to have been clear in his ideas respecting *filiquosus* and *tetragonolobus*.

L. tetragonolobus. Crimson Winged-Pea. Linn. Sp. Pl. 1089. Curt. Mag. t. 151. (*L. filiquâ quadratâ*; Ger. em. 1198.)—Legumes solitary, with four membranous wavy wings. Stems spreading. Bractæas ovate, ternate.—Native of Sicily and Spain. Very commonly cultivated as a hardy annual, for the sake of its deep-crimson, velvety flowers, and sometimes for its pods, which when young are occasionally eaten boiled, as greens. It is also celebrated in botanic history, as having first called the attention of Linnæus to the sleep of plants. He observed that its flowers became invisible in the evening, by being enfolded in their bractæas, and re-appeared in the morning, which led him to consider this subject, and to write upon it.

We have some specimens, belonging to this section, which appear to be new species, or very remarkable varieties, gathered at Algiers by M. Durand.

L. diffusus perhaps should be removed hither; see the end of the genus.

SECT. 2. *Flowers many together in a head.*

L. hirsutus. Hairy Bird's-foot Trefoil. Linn. Sp. Pl. 1091. Curt. Mag. t. 336.—Heads roundish. Stem hairy. Legumes somewhat ovate.—Native of the south of Europe and the Levant; long known in our gardens, where it requires the shelter of a greenhouse. The stem is shrubby, often four or five feet high, hairy like the leaves and stipulas. *Flowers* white, or bluish-coloured, prettily contrasted with their red calyx. The legumes, though truly cylindrical, are so short as to become almost ovate. On the sea beach of the Genoese coast, this species grows prostrate, enlivening the stony ground with a profusion of blossoms; so that the Linnæan definition, "stem erect," is not in all cases exact.

L. corniculatus. Common Bird's-foot Trefoil. Linn. Sp. Pl. 1092. Curt. Lond. fasc. 2. t. 56. Mart. Rust. t. 53. Engl. Bot. t. 2090.—Heads depressed, of few flowers. Stems decumbent, solid. Legumes spreading, nearly cylindrical. Claw of the keel obovate. Filaments all dilated.—Native of most parts of Europe; very common with us in open grassy pastures, where it is conspicuous in autumn. The stems spread, from the perennial root, in every direction, various in length, simple or branched, angular, leafy, clothed with close-pressed hairs. *Flowers* of a golden yellow, more or less stained or striped with dark red, each head on a long stalk, with a small ternate bractæa at the top. *Legumes* of a shining brown, or copper-colour.—This has been recommended for fodder and hay, by the name of Milk-vetch.

L. major. Greater Bird's-foot Trefoil.—Scop. Carn. v. 2. 86. Engl. Bot. t. 2091. (*L. corniculatus* γ et δ; Fl. Brit. 794.)—Heads depressed, many-flowered. Stems erect, hollow. Legumes spreading, cylindrical. Claw of the keel linear. Shorter filaments not dilated. Found in wet boggy places, among bushes and reeds, flowering in summer and autumn, probably throughout Europe. Its more erect, hairy habit, and larger size, mark this plant sufficiently to a common observer, and the above characters are abundantly sufficient to distinguish it from the last, with which it has generally been confounded.

L. diffusus. Slender Bird's-foot Trefoil. Fl. Brit. 794. Engl. Bot. t. 925. (*L. pentaphyllos minor hirsutus*, filiquâ angustissimâ; Bauh. Pin. 332. *Trifolium corniculatum minus*, pilosum; Bauh. Prodr. 144.)—Flower-stalks mostly single-flowered. Stem much branched, prostrate. Leaves and

and calyx hairy. Legumes round, linear, very slender.— Native of Madeira, and of the south coast of England. It has an affinity to the two last, but is more delicate and slender, with smaller and paler flowers, one or two only together; for which reason it ought to be placed in the first section, though it proves such a division of the genus (by the number of its flowers) to be rather artificial than natural.

The lotus of Africa is rather a thorny shrub than a tree; and it abounds in all those parts of Africa through which Mr. Park travelled; but it flourishes most in a sandy soil. Its fruit is a small farinaceous berry, about the size of an olive; which being pounded in a wooden vessel, and afterward dried in the sun, is made into excellent cakes, resembling, in colour and flavour, the sweetest gingerbread. The natives of all descriptions esteem it highly, and some of them prepare from it a liquor deliciously sweet; the same perhaps which is fabled to have produced such extraordinary effects on the companions of Ulysses.

Lotus, in *Gardening*, comprizes plants of the herbaceous and under shrubby kind, of which the species cultivated are, the winged bird's-foot trefoil (*L. tetragonolobus*); the dark-flowered bird's-foot trefoil (*L. jacobaeus*); the silvery bird's-foot trefoil (*L. hirsutus*); and the shrubby bird's-foot trefoil (*L. Dorycnium*).

Method of Culture.—The first sort is raised by sowing the seed annually in the spring, in the open ground, in the places where the plants are to remain, in patches in different parts, of five or six seeds in each, half an inch deep. The plants soon come up, which remaining in the same place for flowering, require only occasional weeding, being either suffered to trail, according to their natural growth, or tied up to sticks.

The other sorts may be increased by seeds and cuttings. The seeds should be sown in pots of light earth or in a moderate hot-bed; and when the plants are about three inches high be planted out in separate small pots of light rich earth, giving water, and placing them in the shade till fresh rooted.

The cuttings of the young stalks and branches may be planted any time in the spring or summer, in beds or pots of rich mould, giving shade and water. They emit roots, and form plants in a few weeks, but may be greatly facilitated by covering them close with hand-glass till they begin to shoot at top; then they should be gradually inured to the air, and soon after be transplanted into separate pots.

The first of these plants is now chiefly cultivated in flower-gardens for ornament, but was formerly grown for the green-pods which were boiled and eaten.

The other kinds effect an agreeable variety in collections of green-house plants, both in their foliage and flowers. They all require shelter from frost, the two first in particular; the two last are somewhat hardier, and sometimes succeed in the full ground all the year, in warm dry situations. A few plants should however constantly be kept in the pots, to be protected in the winter season.

Lotus, *Bladder*. a name sometimes given to a species of *vulneraria*, or *anthyllis*.

Lotus Corniculatus: this is a plant that has a perennial tapering root which strikes deep; there are several trailing herbaceous stems, slender, bluntly four-cornered, procumbent except where supported, as in meadows or among bushes, from six or seven inches to a foot and a half in length; varying even more in different soils and situations. The leaves are ternate, petioled, one at each joint, the leaflets differing extremely in form, in the several varieties, from bluntly ovate to linear-lanceolate. The stipules resemble the leaves,

but they are more pointed, and are rather lanceolate than ovate. The flowers grow in flattened heads resembling umbels, on peduncles from two to three inches and a half in length, but on pedicles hardly a line long. There is a single sessile ternate leaf at the base of each head without any stipules; and sometimes there is only one leaflet or two; the number of flowers varies from three or four to twelve or thirteen.

This sort of lotus is found in meadows, pastures, and heaths, flowering in June. It is said to be cultivated in Hertfordshire as pasturage for sheep; and it makes extremely good hay; growing in moist meadows to a greater height than the trefoils, and seems to be of a quality equal, if not superior to most of them. In common with several other leguminous plants, it gives substance to the hay, and perhaps contributes to render it more palatable and wholesome for cattle. Dr. Anderson affirms, that every sort of domestic animal eats it in preference to every other plant: it seldom comes to flower in pasture grounds, unless where they have been fayed from cattle for some time. What first recommended it to his notice was, the having observed it to grow and flourish in poor ground; as in the midst of a barren moor, where the soil was so poor that even heath could hardly grow; upon bare obdurate clays; in dry and barren sands. It certainly flourishes not only in these, but also chalky soils; and on moors, heaths, and downs hard stocked with sheep, the surface may be seen to be yellow with the flowers of it; which is contrary to what has been asserted above, namely, that it seldom comes to flower in pastures. But a greater number of trials are still wanting to fully ascertain the utility of this plant for field purposes, though it certainly promises well.

Lotus Glycycalemus, a name given by the ancient Greeks to an Egyptian plant according to some, and according to others, to a rare plant, found only in few places, and only met with by accident, by the people who made long and uncommon voyages. The whole account given of it, by the earliest writers, is no more than that it was of a very sweet and pleasant taste. Myrepsus uses the term frequently, and his interpreters understand him to mean the cassia fistula by it. But we have accounts from Homer, that the followers of Ulysses were detained by eating the lotus glycycalemus; and it is not at all probable that the cassia fistula could be the thing meant by the word in this place; neither will the words of the author allow it to be any thing of this kind. The cassia fistula is the fruit of a tree: but this glycycalemus, we find in Homer himself, was an herbaceous plant. Quintilian calls it expressly a kind of grass, gramen; and from the other accounts of its growing in form of reeds, and in wet places, it seems very probable that it was the sugar-cane that they called by this name.

Lotus, in *Agriculture*, a sort of plants of the bird's-foot trefoil kind, of which there are several species, some of which may be cultivated for the purpose of cattle food with advantage.

LOTZEN, in *Geography*, a town, with a castle, of Prussia, in the province of Natangen, seated on a canal which joins the Angerburg and Leventin lakes: 56 miles S.E. of Königsberg. N. lat. 53 53. E. long. 21 57'.

LOVA, a town of Hungary; 20 miles W. of St. Crot.

LOVAGE, in *Botany and Gardening*. See **LIGUSTICUM**.

LOVAGE. *Bastard*. See **LASERPIITIUM filix**.

LOUAR, in *Geography*, a town of Hindoostan, in Dowlatabad; 10 miles W.N.W. of Kondur.

LOVAT, a town of European Turkey, in Bulgaria; 64 miles E. of Sofia.

LOVATINI, **GIOVANNI DI RAVENNA**, in *Biography*, a burletta

a burletta finger, with the sweetest tenor voice and style of singing we ever heard on any stage. He arrived in England in the autumn of 1766, with Morigi, Savoi, Micheli, La Guadagni, Piatti, and Gibetti.

This excellent troop appeared December 9th, for the first time, in our lyric theatre, in the admirable comic opera "La Buona Figliuola," written by Goldoni, and set by Piccini. The performance and success of this burletta were complete, and rendered the name of Piccini, which had hardly penetrated into this country before, dear to every lover of music in the nation. All the performers in this drama established a character which was of use to them during the rest of their lives.

Lovatini's mellifluous voice, manner of singing, and humour; La Guadagni's graceful figure, acting, and singing; Morigi's mimicry of the pronunciation, accent, and manner of a German soldier; Savoi's fine voice, the characteristic manners of the two prating female domestics, Piatti and Gibetti; and even the raven-like croak of Micheli, had its share of notice; but whoever remembers the elegant cantabile style in which Lovatini began the charming duet, "La Baronesse Amabile," must retain an exalted opinion of his captivating powers in *serious* singing.

Lovatini, when he quitted this country for his own in 1774, merely retired to die, as news of his death arrived here the next year, and we cannot discover that he performed in any other theatre after he left England.

LOVATOVA, in *Geography*, a town on the E. coast of the island of Flores. S. lat. 8° 30'. E. long. 122° 50'.

LOUBENS, a town of France, in the department of the Upper Garonne; 12 miles N.W. of Revel.

LOUBERE, SIMON DE LA, in *Biography*, was born at Toulouse in 1642. He studied at the Jesuits' college, and displayed a good poetical taste by a multitude of light compositions, though he was far from neglecting more serious pursuits, and particularly attended to politics and public law. He commenced his political career as secretary to M. de St. Romain, ambassador to Switzerland. In 1687, he was appointed by Lewis XV. his envoy extraordinary to the court of Siam, where he remained only about three months, during which he collected a large store of information concerning its natural and civil history, the religion, manners, &c. of the people. On his return, he published an account of what he had observed, in two vols. 12mo. which became a very popular work. He was afterwards sent without a public character into Spain, on a secret commission, but was arrested, and obtained his release only in consequence of reprisals on some Spaniards in France. In 1693 he was elected into the French academy, and soon afterwards retired to his native city, where he re-established the "Floral Games," which had sunk into decay. He died at the very advanced age of eighty-seven, in the year 1729. He was a man of very general knowledge, well acquainted with several languages ancient and modern, and excelled as a writer in various branches of literature. Moreri.

LOUBES, Sr., in *Geography*, a town of France, in the department of the Gironde; 12 miles N.E. of Bourdeaux.

LOUBIERE, a town of the island of Dominica, on the W. coast; 17 miles S. of Portsmouth.

LOUBO, a town of Benin, at the mouth of the river Tormosa; 60 miles S.W. of Benin.

LOUBOUEX, Sr., a town of France, in the department of the Landes; nine miles S.E. of St. Sever.

LOUBRESSAC, a town of France, in the department of the Upper Loire; six miles N.W. of Le Puy en Velay.

LOUCHOU, a town of Persia, in the province of Mazanderan; 45 miles N.E. of Casbin.

LOUDEAC, a town of France, and principal place of a district, in the department of the North Coasts; in which are an iron forge and a manufacture of thread; 20 miles S. of St. Brienc. The place contains 6096, and the canton 14,611 inhabitants, on a territory of 205 kilometres, in six communes. N. lat. 48° S. W. long. 2° 40'.

LOUDES, a town of France, in the department of the Upper Loire, and chief place of a canton, in the district of Le Puy; six miles N.W. of Le Puy. The place contains 800, and the canton 5377 inhabitants, on a territory of 175 kilometres, in nine communes.

LOUDON, a county of Virginia, in America, on the river Potomac, adjoining Fairfax, Berkley, and Fauquier counties; about 50 miles long and 20 broad, containing 15,533 free inhabitants, and 4090 slaves. Its chief town is Leesburg. Quarries of grey stone, white flint, and lime are found in this county. The climate is favourable to apples, pears, peaches, plums, cherries, and grapes. The county was first settled from Pennsylvania and New Jersey.—Also, a township in Rockingham county, New Hampshire, taken from Canterbury, and incorporated in 1773; situated E. of the Merrimack river, and containing 1279 inhabitants.—Also, a township in Berkshire county, Massachusetts; 21 miles S.E. of Lenox; incorporated in 1773, and containing 614 inhabitants, and 13,000 acres, of which 2944 are ponds.

LOUDUN, a town of France, and principal place of a district, in the department of the Vienne, situated on an eminence between the Creuse and the Dive; 12 miles E. of Thouars. The place contains 5138, and the canton 11,299 inhabitants, on a territory of 245 kilometres, in 18 communes. N. lat. 47°. E. long. 0° 10'.

LOVE, in *Ethics*, is one of the primitive passions; and may be generally defined to be the gravitation or tendency of the soul toward good. According to Dr. Hartley, who traces all our passions to the sources of pleasure and pain, they may be first and generally distributed into the two classes of love and hatred; *i. e.* we may have all those affections of the pleasurable kind, which objects and incidents raise in us, love, and all those of the painful kind, hatred. Thus we are said to love not only intelligent agents of morally good dispositions, but also personal pleasures, riches, and honours, and to hate poverty, disgrace, pain, bodily and mental. When our love and hatred are excited to a certain degree, they put us upon a variety of actions; and may be termed desire and aversion, by the latter of which Dr. Hartley understands active hatred.

If the affection of love be conceived separate from any alteration in the body, it is called intellectual or rational love; if it be attended with an agitation of blood and spirits, it is called sensitive or passionate love. It is observed by moral writers, that those passions in which love predominates, are more agreeable to the original intention of nature than those which are ranged under hatred; because they are found to have a more friendly influence upon the body, and tend, within proper bounds, to the preservation and happiness of life, which the others do not. See Cumberland de Leg. Nat. c. 2. § 19.

Love, regarding its object as absent, begets desire; as present, either immediately or in prospect, joy and hope. Love of desire, abstractedly considered, is a simple tendency towards good; when considered as wishing the good desired to some being or other, it is called *benevolence* and *self-love*. See PLEASURE and PAIN, and PASSION.

Love inspires music and poetry. This was a memorable maxim

maxim among the Greeks, and the subject of one of Plutarch's symposiasts. See SCOLTA and SONG.

LOVE, in its usual and more appropriate signification, denotes that affection, which, being compounded of intellectual and sensitive love, or of animal desire, esteem, and benevolence, becomes the bond of attachment and union between individuals of the different sexes; and makes them feel in the society of each other a kind of happiness which they experience no where else.

LOVE, *Family of*. See FAMILY.

LOVE, *Platonic*. See PLATONIC.

LOVE *Apple*, is the English name for the fruit of the lycopersicon, a plant cultivated in gardens with us, for the singularity of its appearance. The Portuguese call it tomato, and eat the fruit, either raw or stewed: as do the Jew families in England. See SOLANUM *Lycopersicum*.

LOVE-GRASS. See GRASS.

LOVE in a *Mist*. See PASSION Flower.

LOVE lies Bleeding. See AMARANTHUS.

LOVE, *Tree of*. See CERCIS.

LOUE', in *Geography*, a town of France, in the department of the Sarthe, and chief place of a canton, in the district of Le Mans; 15 miles W. of Le Mans. The place contains 1204, and the canton 12,563 inhabitants, on a territory of 245 kilometres, in 16 communes.

LOVELL, a town of America, in York county, Maine, N. of Great Offsee, 89 miles N. of York.

LOVENTINUM, or LUENTINUM, in *Ancient Geography*, a town of the Demetæ, in Britain, supposed by some, without sufficient reason, to have been swallowed up by an earthquake in the site of the present Llyn Savanathan, near Brecknock, but by others, with great probability, to have been situated at or near Llan-Dewi-Brevi, in Cardiganhire; where, in a field called Caer Castell, or Castlefield, Roman coins and bricks are sometimes found.

LOVERANO, in *Geography*, a town of Naples, in the province of Otranto; five miles N.N.E. of Nardo.

LOVESKAIA, a town of Russia, on the Caspian sea; 27 miles S.E. of Astrachan.

LOUGH, or LAKE, *Arrow*. See ARROW:—L. Barra. See BARRA:—L. Beg. See BEG:—L. Carra. See CARRA:—L. Cleam. See CLEAN:—L. Conn. See CONN:—L. Corrib. See CORRIB:—L. Contra. See CONTRA:—L. Curran. See CURRAN:—L. Derg. See DERG:—L. Derragh. See DERVERAGH:—L. Ennel. See ENNEL:—L. Erne. See ERNE:—L. Foyle. See FOYLE:—L. Gara. See GARA:—L. Gawnah. See GAWNAH:—L. Gilly. See GILLY:—L. Glin. See GLIN:—L. Gur. See GUR:—L. Hoyle. See HOYLE:—L. Hyne. See HYNNE:—L. Iron. See IRON:—L. Killarney. See KILLARNEY:—L. Larne. See LARNE:—L. Lend. See LENA:—L. Malar. See MALAR:—L. Mayk. See MASE:—L. Melvin. See MELVIN:—L. Nafay. See NAFAY:—L. Nallenroo. See NALLENROO:—L. Neagh. See NEAGH:—L. Ogram. See OGRAM:—L. Oughter. See OUGHTER:—L. Pallis. See PALLIS:—L. Ramar. See RAMAR:—L. Raphan. See RAPHAN:—L. Rea. See REA:—L. Rec. See REC:—L. Saleen. See SALEEN:—L. Sholan. See SHOLAN:—L. Strangford. See STRANGFORD:—L. Swilly. See SWILLY:—L. Ta. See TA:—L. Triorty. See TRIORTY:—L. Tra. See TRA.

LOUGHABER, or LOCHABER, a small settlement in Georgia, on a branch of Savannah river, above its confluence with the Tugalo.

LOUGHBOROUGH, a market town and parish in the hundred of West Gosport, and county of Leicester, England, is situated 12 miles distant from the

county town, and 108 miles from London, on the banks of the river Soar, over which it has a good stone bridge. According to its size and population, it may be esteemed the second town in the county. Leland says, "The town of Loughborow is yn largeness and good building next to Leycester, of all the markette townes yn the shire, and hath in it a four faire strates or mo, well paved. The paroch church is faire. Chapelles or churches besides, yn the towne, be none. The hole towne is builded of tymbre. At the southest end of the church is a faire house of tymbre, wher ons king Henry VII. did lye." Loughborough, which consists of one parish, to which belong the two hamlets of Woodthorpe and Knightthorne, both about a mile distant; each having its proper officers and maintaining its own poor. Great part of the town is the property of the earl of Moira, to whom it came from his uncle the late earl of Huntingdon, in whose family it has been since the time of queen Mary. The church is a large pile of building, consisting of a nave, side aisles, chancel, transept, and tower; the latter was built by subscription, towards the end of the sixteenth century. In the church-yard is a free grammar school, which was endowed with the rents of certain lands, &c. left by Thomas Burton for the maintenance of a chantry within the church. Here is also a charity school for eighty boys and twenty girls. Four meeting-houses are appropriated to the Presbyterians, Baptists, Quakers, and Wesleyan Methodists. On the site of an old cross, a modern market-house, or what is called the butter and hen cross, was erected in 1742; it is supported by eight round brick pillars. At the upper end of the market place stands a ruinous brick edifice, called the court chamber, where the lord of the manor's courtleet is annually held. The building appears to have been erected in 1688; it is sometimes used as a theatre and ball-room. The town suffered severely by the plague at various periods in the sixteenth and seventeenth centuries. Under the act of 1800, the population was returned as 4546, inhabiting 981 houses. The chief manufactures carried on here are hosiery, wool-combing, and frame work knitting.

Six annual fairs are held, and a weekly market on Thursdays. In the year 1776, the town contained 43 licensed inns and alehouses; in 1783, the number exceeded 50.

The Loughborough canal, which communicates with that called the Union canal, and with the river Soar, has proved very serviceable to this town, and an advantageous concern to the original proprietors; as 95l a-year dividend has been paid on a share of 125l; and one of these shares has been sold for 1800l. Nichol's History of Leicestershire.

LOUGHBOROUGH, a township of Upper Canada, in Frontenac county, N. of Kingston.

LOUGHBOROUGH Canal, an inlet on the W. coast of North America, in the gulf of Georgia, about 30 miles long, and one broad, between mountains nearly perpendicular. The entrance is in N. lat. 50° 27'. E. long. 234° 35'.

LOUGHBURCKLAND, a post-town of Ireland, in the county of Down, on the road to Belfast. It is 58 miles north from Dublin, and 22 from Belfast.

LOUGHGALL, a small post-town of Ireland, in the county of Armagh; it is 66 miles N. from Dublin, and three miles N.N.W. from Rickhill.

LOUGHREA, a post-town of Ireland, in the county of Galway. It is situated on a fine lake of the same name, and is 87 miles W. by S. from Dublin.

LOUHANS, a town of France, and principal place of a district, in the department of the Saône and Loire, situated at the conflux of the Seille and Sohan. The French

French and Swiss merchants have been accustomed to meet here for the purposes of commerce. The place contains 2840, and the canton 12,221 inhabitants, on a territory of 140 kilometres, in 10 communes; 15 miles S.E. of Châlons sur Saône. N. lat 46° 38'. E. long. 5° 18'.

LOUCHEA CERVINA, in *Botany*, so named by l'Heritier, in honour of his countryman M. René Louiche Desfontaines, M.D. Professor of Botany at Paris, in a monograph of which 12 copies only were printed; see **HERITIER**. The plant was afterwards discovered to be *Pteranthus* of Forskall; so that it appeared in l'Heritier's *Stirpes Novæ*, t. 65, under the appellation of *Louichea Pteranthus*. It is indeed the *Camphorospha Pteranthus* of Linnæus, *Plant* 41; see **CAMPHOROSMA**. If any future botanist should determine this plant to be a distinct genus, it must retain the name of *Pteranthus*; not only for the sake of its aptitude and priority, but because another genus is now consecrated to the honour of M. Desfontaines. See **FONTANESIA**.

LOVIGNANO, in *Geography*, a town of Naples, in the province of Otranto; 12 miles S.S.W. of Brindisi.

LOUIS XII. of France, in *Biography*. See **JOSQUIN DU PRÉS**.

LOUIS XIII. This prince (see **LEWIS**), who began his reign in 1610, at only six years old, is said to have been not only a lover and encourager of the art of music in riper years, but to have composed several airs with the assistance of Beauchamp, his first violin, who made the base. *Recueil d'airs de cour*.

Père Merfenne, Kircher, and later musical writers, have given, as a specimen of his invention, an air for a grand dance, in 1618, before he was fifteen years old. *Les vingt quatre violons du roi* subsisted in the time of Henry IV.; but these seem only to have been employed for dancing. The lute was more an instrument of parade in these times than any other; and in 1609, Mary de Medicis, Henry IVth's second queen, was followed in a grand dance by twelve lutes, led by Ballard, the principal lutenist of the court: and all the numerous collections of the court airs at this time were printed in the lute tablature, or notation, to which they were set by the authors of the tunes themselves. The most minute and satisfactory account of the state of music in France, during the reign of Louis XIII. is to be found in the writings of Père Merfenne, particularly in his "Harmonie Universelle," published at Paris in 1636, in folio, a work which he afterwards compressed, and translated into Latin, and published in 1648, the year of his death, under the title "De Sonorum Natura, Causis et Effectibus." A work in which, through all the partiality to his country, want of taste and method, there are such innumerable curious researches, and ingenious and philosophical experiments, of which subsequent writers on music have availed themselves, particularly Kircher, as render the book extremely valuable. In his twenty-third proposition, liv. i. this author explains and describes twelve different kinds of music and movement used in France during his time: these were motets, songs or airs, passacailles, pavans, allemandes, gaillards, voltes, courantes, farabandes, canaries, branles, and balets, of all which he gives examples in notes. But though most of these movements were the specific names of the dances then in vogue, the minuet, which, during the last century, was in such general use and favour all over Europe, is never mentioned.

LOUIS XIV. This magnificent prince (see **LEWIS**), whose ambition was not confined to extension of empire, seems to have patronised music, and to have established an opera in his capital, more as a splendid spectacle, which no other sovereign could afford to support, than from the pleasure which he

received from modulated sound. He was, however, during his minority, taught the guitar by an Italian, whom cardinal Mazarin sent for expressly from Italy; but as the actions and faculties of this young monarch were to be regarded as wonderful, he is said by his flatterers, in eighteen months to have excelled his master (*Hist. de la Mus.*), and to have understood music in perfection. Indeed, the first dramatic music which he heard was Italian; as cardinal Mazarin, during the minority of this prince, had two operas in Italian verse, and set to Italian music, performed by a company of Italian singers sent from Italy, to impress the court of France with a favourable idea of the fashionable music of his country. The first of these operas, performed at the Bourbon palace in 1645, seems to have been a burletta. Its title was "La Festa Teatrale della Finta Pazzo," written by Giulio Strozzi, but by whom set does not appear. The second was "Orfeo ed Euridice," 1647. Besides these, at the nuptials of Louis XIV. 1660, "Ercole Amante," a serious Italian opera, was performed in the same manner, and well received at court by the flatterers of the cardinal, says the continuator of Bonnet's History of Music. M. de Blainville, however, in his short History of Music, says, that he had seen the score of this opera, "and found, in examining it, all the recitatives, airs, choruses, symphonies, and dances, both in melody and harmony, of the same kind as those of Lulli." And at the time that Lulli came into France, 1646, the opera in Italy had made but a small progress towards that perfection at which it afterwards arrived. It then consisted chiefly of recitative with frequent closes, *ad libitum*, and choruses, but no airs or measured melody for a single voice. And in this state the opera continued in France till the death of Rameau, and arrival of Gluck and Piccini at Paris; while in all the capitals of Italy and Germany, melody was polished, taste refined, modulation extended, and harmony enriched by new combinations. Whatever horror and hatred the ambition of Louis might have excited in his neighbours, and envy by his magnificence, his most bitter and irreconcilable enemies must have allowed that music was the only one of all the arts and sciences which was not successfully cultivated in France, during the prosperous part of his long and splendid reign. Indeed the failure of music was not so much owing to want of genius and love of the art in the natives, as to the nasal tones and natural cantilena of their language; nor would the rest of Europe have so disliked, censured, and condemned their music, if they had not at all times insisted on its being the best in the universe, and the model which all other nations ought implicitly to follow.

LOUIS, ANTHONY, an eminent French surgeon, was born at Metz on the 13th of February 1723. He attained to great reputation in his profession, and was honoured with numerous appointments and offices, the just rewards of his merit. He was secretary of the Royal Academy of Surgery at Paris, consulting surgeon to the king's forces, surgeon-major to the hospital La Charité, doctor in surgery of the faculty of Halle, in Saxony, honorary member of the Royal College of Physicians of Nancy, and member of many of the learned societies, not only in France, but in foreign countries. The time of his death is not known, but the latest of his publications is dated in 1777. In addition to the surgical part of the "Encyclopédie," which M. Louis wrote, and to several interesting papers presented to the Academy of Surgery, he was author of a great number of works on medical, surgical, and anatomical subjects, the principal of which we shall mention. "Observations sur l'Électricité," &c. Paris, 1741, 12mo: "Essai sur la Nature de l'Âme, où l'on tâche d'expliquer son union avec le corps," *ibid.* 1746, 12mo: ;

12mo.: "Cours de Chirurgie pratique sur les plaies d'armes à feu," *ibid.* 1746, 4to.: "Observations et Remarques sur les effets du virus cancreux," &c. *ibid.* 1748: "Positiones Anatomico-chirurgicæ de capite ejusque vulneribus," *ibid.* 1749: "Lettre sur la certitude des signes de la mort, avec des observations et des expériences sur les noyés," *ibid.* 1749, 12mo. He attributed the death of persons drowned to the entrance of water into the lungs, which farther experience has disproved. "Expériences sur la Lithotomie," 1757, in which he expressed his disapprobation of the bistouri caché of Frère Côme. "Mémoire sur une question anatomique, relatif à la jurisprudence," &c. 1763. This memoir, written after the shocking affair of Calas, was intended to establish the distinction of the appearances after voluntary death by hanging, and after murder by that mode. "Mémoire sur la légitimité des naissances prétendues tardives," 1764, in 8vo; in which the author maintains that the retardation of parturition beyond the natural period of gestation, *i. e.* more than ten days beyond the ninth month, is physically impossible. He published a supplement to this treatise in the same year. "Recueil d'Observations d'Anatomie et de Chirurgie, pour servir de base à la Théorie des lésions de la tête par contrecoup," 1766: "Histoire de l'Académie Royale de Chirurgie depuis son établissement jusqu'en 1743," printed in the fourth volume of the memoirs. His last publication was a translation of M. Astruc's work "De Morbis Venericis," into French. In addition to these works, M. Louis also translated Boerhaave's Aphorisms of Surgery, with Van Swieten's Commentary; and wrote several eulogies on deceased members of the Academy of Surgery, and various controversial tracts, especially concerning the disputes between the physicians and surgeons of Paris in 1748 &c. Eloy Dict. Hist. Gen. Biog.

LOUIS, Lewis, Louis d'or, or Lewidore, a French coin, first struck in 1641, under the reign of Louis XIII. and which has since had a considerable currency.

Louis d'ors, at first, were valued at ten livres, afterwards at eleven, and at length at twelve and fourteen. In the latter end of the reign of Louis XIV. they were risen to twenty, and in the beginning of that of Louis XV. to thirty and thirty-six, nay forty and upwards; with this difference, however, that in the last coinings the weight was augmented in some proportion to the price, which in the former reign was never regarded. The Louis d'ors coined before 1726, which then passed for 20 livres, were coined at the rate of $36\frac{1}{2}$ per French mark of gold, 22 carats fine: the remedy in the weight was 14 grains per mark, and the remedy in the alloy one-fourth of a carat. These ceased to be a legal coin in France as far back as 1726; but they still continued to circulate through many parts of Germany and Switzerland, where they had a fixed value, and were known by the name of "Old Louis d'ors:" of these few are now in circulation. From the year 1726 to 1785, Louis d'ors were coined at the rate of 30 to the mark of gold, 22 carats fine, with a remedy of 15 grains in the weight, and $\frac{1}{2}$ of a carat in the alloy. Accordingly before 1786, the double Louis weighed 10 dwt 11 gr. contained in pure gold 224.9 gr. and was valued at 1*l.* 19*s.* 9*d.* sterling: the Louis weighed 5 dwt. 5 gr. contained in pure gold 112.4 gr. and was valued at 19*s.* 10*d.* sterling: and the demi-louis weighed 2 dwt. 14 gr. contained in pure gold 56.2 gr. and was valued at 9*s.* 11*d.* sterling. These coins ceased to be current in France in 1786. In Holland, Germany, &c. they were called "New Louis d'ors," by way of distinction from those which we have before mentioned; though these are now become the old ones. The intrinsic value of such a Louis d'or (making the full allowance for

remedy) is very little more than a pound sterling. In 1785 and 1786, all the gold coins in France were called in and ordered to be melted down; and a new coinage took place, at the rate of 32 Louis d'ors to the mark of the same degree of fineness, with the same allowances for remedy as above. Accordingly, the double Louis coined since 1786, weighed 9 dwt. 20 gr. contained 212.6 gr. of pure gold, and was valued at 1*l.* 17*s.* 8*d.* sterling: the Louis weighed 4 dwt. 22 gr. contained of pure gold 106.3 gr. and was valued at 18*s.* 10*d.* sterling. The intrinsic value of this new Louis d'or (allowance being made for remedy) is 18*s.* 9*d.* sterling; and 1*l.* sterling = 25 livres, 10 sous Tournois, in gold. Louis d'ors may be considered as a current coin in most parts of the continent; but in England they are sold merely as merchandize, and their price has fluctuated from 18*s.* 6*d.* to 21*s.* sterling.

On one side of the coin is the king's head, with his name and title, thus: LUD. XVI. D.G. FR. ET NAV. REX. *i. e.* Louis XVI. king of France and Navarre; on the reverse, the arms of France and Navarre, with a crown over them. On the pieces coined before 1786, there are two distinct shields; and on those coined since 1786, a double shield: the legend is, CHR. REGN. VINC. IMPER. *i. e.* Christ reigns, conquers, governs: under the arms is a letter, by which the mint where the piece was coined is distinguished. The double and half Louis bear the same impression.

There are also white Louises, or Louis d'argent, some of 120, others of 60 sols a piece, called also ecus; and among us French crowns, half-crowns, &c. The old ecus, coined before 1726, were coined at the rate of 9 pieces to the mark of 10 deniers 22 grains fine: these, like the Louis d'ors of the same period, after they had ceased to be current in France, still preserved a fixed value in some parts of Germany; but they are now scarcely in circulation. In 1726, the coinage of ecus was regulated, and continued without alteration, as follows: $8\frac{1}{2}$ ecus of 6 livres, or 16*½* ecus of 3 livres, were to be coined from a mark of silver 11 deniers fine, with a remedy of 36 grains per mark in the weight, and $\frac{1}{8}$ of a denier in the alloy: and their intrinsic value is (allowance being made for remedy) 4*s.* 9*d.* sterling; or, 1*l.* sterling = 25 livres, 3 sous Tournois, in silver.

On the one side of these is the king's head, and on the other the French arms, with this legend, "Sit nomen Domini benedictum."

The Louis d'or is a gold coin of Malta. The double, single, and half Louis d'ors are coined by the grand master Rohan, at 20, 10, and 5 scudi, copper or current money. The double Louis weighs 10 dwt. 16 gr., contains of pure gold 215.3 gr., and is valued at 1*l.* 18*s.* 1*d.* sterling. The Louis weighs 5 dwt. 8 gr., contains of pure gold 108 gr., and is valued at 19*s.* 1*d.* sterling. The demi-louis weighs 2 dwt. 16 gr., contains of pure gold 54.5 gr., and is valued at 9*s.* 7*d.* sterling. The fineness of the gold coins of Malta undergoes great variation. Kelly's Universal Cambist.

LOUIS, Knights of St., is the name of a royal and military order, instituted by Louis XIV., in addition to that of "Christian charity," which had been founded by Henry III. king of France, in 1693, in favour of the maimed officers and soldiers of his army, who had signalized themselves in the service. This order consisted of eight great crosses, and twenty-four commanders, besides the king, who was grand master, the dauphin always invested with it, and the treasurer, recorder, and usher. The badge of the order was "a cross of eight points enamelled white, edged with gold:

in the angles four fleur-de-lis; and in the middle a circle, within which on one side the image of St. Louis in armour, with the royal mantle over it, holding in his right hand a crown of laurel, and in his left hand a crown of thorns, and the three passion-nails, all proper; with this inscription, LUDOVICUS MAGNUS INSTITUIT 1693: on the reverse, "a sword erect, the point through a chaplet of laurel," bound with a white ribbon enamelled, with this motto, BELLECE VIRTUTIS PRÆMIUM. The great crosses had the cross pendent to a broad bright red ribbon, which they wore passing fearfully over the left shoulder and under the right arm: they also wore the like cross embroidered with gold on the outside of their upper garment. The commanders wore the cross pendent to a broad ribbon, in the same manner as worn by the great crosses; but they have it not embroidered on their clothes. The knights wore a small gold cross pendent at a red ribbon, fastened at a button-hole of their coats.

At the time of their institution, the king charged his revenue with a fund of three hundred thousand livres, for the pensions of the commanders and knights.

LOUIS, St., in *Geography*, an island on the west coast of Africa, at the mouth of the river Senegal; flat, sandy, and barren. Its name is derived from a fort built by the French. Both were ceded to the English by the treaty of Versailles, in 1763. During the American war it was taken by the French, and kept by them after the peace of 1783. N. lat. 16°. W. long. 16° 8'.—Also, a sea-port town on the south coast of the island of Hispaniola. It is situated at the head of a bay of its name. N. lat. 18° 16'. W. long. 74° 19'.—Also, a sea-port town of Hispaniola, on the north coast: ruined in 1797 by a hurricane; 5 miles S.E. of Cape François.—Also, a town of South America, in the province of Guiana. N. lat. 3° 55'. W. long. 52° 30'.—Also, the capital town of Guadaloupe, Grand Terre, with a fortress; 3 leagues S.E. of the Salt river.—Also, a town on the west side of the river Mississippi, 25 miles below the mouth of the Missouri. It is situated on a pleasant and healthy eminence, and contained, in 1799, 130 large commodious houses, built of stone, and 925 inhabitants, of whom 268 are slaves. In this year the productions of the settlement were 4300 bushels of wheat, 12,300 bushels of corn, and 1650 pounds of tobacco. The inhabitants possessed 1140 horned cattle, and 215 horses.—Also, a small, compact, beautiful bay in West Florida, with about seven feet water: the land near it is of a light soil, and good for pasture. Formerly here were several settlers; but in the year 1767 the Choctaw Indians killed their cattle, and obliged them to remove.—Also, a lake of Canada, commencing, or rather terminating at La Chine, a village which stands at the lower end of it. The lake is about 12 miles in length, and four in breadth. At its uppermost extremity it receives a large branch of the Utawas river, and also the south-west branch of the river St. Lawrence, which by some geographers is called the river Cadaraqui, and by others the river Iroquois; but in the country, generally speaking, the whole of that river, running from lake Ontario to the gulf of St. Lawrence, goes simply under the name of St. Lawrence. At the upper end of lake St. Louis, the water is very shallow, owing to the banks of mud and sand washed up by the two rivers; and these banks are entirely covered with reeds, so that when a vessel sails over them, the appears at a little distance to be absolutely sailing over dry land. This part of the lake is infested with clouds of insects, similar to those which have been commonly observed on various parts of the river St. Lawrence. Their size is about that of a gnat; their colour is white; and their form so delicate,

that the slightest touch destroyed them, and reduced them to powder. Their wings are broad in proportion to their size, and fly heavily; so that it is only when the air is remarkably calm, that they can venture to make their appearance. N. lat. 45° 25'. W. long. 73° 20'. Weld's Travels through Canada, vol. ii.—Also, a group of small islands in the river St. Lawrence. N. lat. 45° 23'. W. long. 73° 30'.—Also, a river of America, which runs into lake Superior. N. lat. 46° 44'. W. long. 91° 52'.

Louis de Maranham, St., a town on the north coast of Brazil, and on the Atlantic ocean, situated on the east side of Mearim river; about half way between point Mocoripe and the mouth of the river Para.

LOUISA, or **DEGERBY**, a sea-port town of Sweden, in the province of Nyland, on the north coast of the gulf of Finland, built in 1745 as a frontier town towards Russia, and at first called Degerby, but afterwards Louisa, in 1752, by king Adolphus Frederic. It is an open town, defended towards the sea by a small fortress. The houses are all of wood, and of two stories, painted with a red colour, and appearing much neater than the common towns in Russia. N. lat. 60° 27'. E. long. 26° 16'.

LOUISA, a county of Virginia, adjoining Orange, Albemarle, Fluvanna, Spottsylvania, and Goochland counties. It is about 35 miles long, and 20 broad, and contains 5000 free inhabitants, and 5992 slaves. Many parts of this county are covered with pine.—Also, a river of Virginia, the head-water of Cole river, a south-west branch of the Great Kanlaway.—Also, a river of Africa, which runs into the Atlantic, S. lat. 5° 10'.

LOUISA Chitto, or **Loesja Chitto**, a river of America, which rises on the borders of South Carolina, and runs a south-westerly course, through the Georgia Western lands, and joins the Mississippi just below the Walnut hills, and 10 miles from Stony river. It is 30 yards wide at its mouth, and said to be navigable for canoes 30 or 40 leagues.

LOUISBOURG, the capital of Sydney, or Cape Breton, island, in North America; situated on a point of land, on the south-east side of the island. Its streets are regular and broad, consisting chiefly of stone houses, with a large parade, at a little distance from the citadel, the inside of which is a fine square, nearly 200 feet on each side. On its north side, while the French had possession of it, stood the governor's house and the church; the other sides were occupied by barracks, bomb-proof, in which the French secured their women and children during the siege. The town is nearly half a mile long, and two in circuit. Its harbour is one of the finest in that country, being almost four leagues in circuit, with six or seven fathoms of water in every part of it. The anchorage is good, and ships may run aground without danger. Its entrance is not above 300 toises in breadth, formed by two small islands, and is known, 12 leagues out at sea, by cape Lorembec, situated near the north-east side of it. The interior of the harbour is more than half a mile broad from N.W. to S.E. in the narrowest part, and six miles long from N.E. to S.W. In the north-east part is a fine careening wharf, secure from all winds. On the opposite side are the fishing stages, and room for 2000 boats to cure their fish. The cod-fishery may be continued from April to the close of November. In winter the harbor is entirely frozen, so that it may be walked over; and it continues in this state from the end of November till May or June. The principal trade of Louisbourg is the cod-fishery, from which the inhabitants derive great profits; fish being plentiful, and deemed better than any about Newfoundland. This place was taken from the French in 1745.

and restored to France by the treaty of Aix-la-Chapelle in 1748. It was again captured by the English in 1758, and its fortifications have been since demolished. N. lat. 45° 55'. W. long. 59° 50'.

LOUISBOURGH, in Pennsylvania. See HARRISBURGH.

LOUISBURG, a post-town of America, in Franklin county, North Carolina; 265 miles from Washington.

LOUISIADE, the southern coast of a considerable island belonging to New Guinea, so called by M. Bougainville in 1768.

LOUISIANA, a country of North America, first discovered by Ferdinand de Soto in 1541, and afterwards visited by colonel Wood in 1654, and by captain Bolt in 1670. But the first person who attempted to settle in this country was M. de la Salle, who, in 1682, traversed the Mississippi; and in the following year he repaired to France, and, in consequence of the representations which he made of his discoveries, obtained a grant of four small vessels and 170 men, with which armament he set sail for the mouth of the Mississippi. In 1683 this small colony, under the direction of their leader, landed in the bay of St. Bernard's, about 300 miles west of the place of their destination. After struggling with many hardships, both in their landing and in their endeavours to settle, some of this colony murdered La Salle, and all the rest perished, except seven persons, who penetrated through the country to Canada. In 1699, M. Iberville of Canada, a brave naval officer, having obtained the patronage of the French court, sailed from Rochfort with two ships and a number of men, and laid the foundation of the first French colony on the Mississippi. This colony was diminished, by some unfavourable circumstances in 1712, to 28 families. At this time Crozat, a merchant of great opulence and an adventuring spirit, obtained the exclusive trade of Louisiana; but his plans, which were extensive and patriotic, proving ineffectual, he resigned his charter, in 1717, to a company formed by the famous projector John Law. From this period the country became an object of interest to speculative adventurers, so that in 1718 and 1719 a numerous colony of labourers, collected from France, Germany, and Switzerland, was conveyed to Louisiana, and settled in a district called "Biloxi" on the island of Orleans, a barren and unhealthy situation, where many hundreds died through want and vexation. This event ruined the reputation of the country; and the colony having languished till the year 1731, the company at length, for the sum of 1,450,000 livres, purchased the favour of surrendering their concerns into the hands of the government. The French continued in quiet possession of Louisiana, frequent contests with the Indians excepted, till the year 1762. Among these tribes of hostile Indians we may reckon the Natchez, who appear in the year 1731 to have been almost wholly extirpated. In 1736 and 1740 the colonists were engaged in bloody wars with the Chickasaw Indians; but these, in process of time, terminated in permanent peace. From this time the prospects of the colonists were brightening, as their peltary trade with the Indians and their commerce with the West Indies were increasing. Several hundred Canadians and recruits of inhabitants from other countries settled on the banks of the Mississippi, and imparted additional strength and prosperity to the original colony.

Such was the state of the country, when in the year 1764 the inhabitants received information that in November 1762, Louisiana, comprehending New Orleans and the whole territory W. of the Mississippi, had been ceded to Spain by a secret treaty. This measure incensed the colonists, and was vigorously opposed, so that complete possession of the coun-

try was not obtained by Spain till the 17th of August 1769, after which event several victims were sacrificed, to atone for the delay of submission, and others were conveyed away to languish out their lives in the dungeons of the Havana. By the treaty of peace in 1763, which ceded Canada to Great Britain, the boundaries of the British provinces were extended southward to the gulf of Mexico, and westward to the Mississippi, and Louisiana was limited N. by Canada, and E. by the Mississippi, excepting that it included the island of New Orleans and its E. bank. The state of things remained till the American revolutionary war, during which Spain took from Great Britain the two Floridas: the United States, according to their present limits, became an independent government, and left to Great Britain, of all her American provinces, those only which lie N. and E. of the United States. All these changes were sanctioned and confirmed by the treaty of 1783. Thus things continued till the treaty of St. Idelfonso, October 1, 1800, by which Spain engaged to cede to the French republic, on certain conditions, the colony or province of Louisiana, with the same extent which it actually had when France possessed it. This treaty was confirmed and enforced by the treaty of Madrid, March 21, 1801. From France it passed to the United States by the treaty of the 30th of April 1803. In consideration of this cession, the government of the United States engaged to pay to the French government, under certain stipulations, the sum of 60,000,000 francs, independent of the sum which should be fixed by another convention for the payment of the debts due by France to the citizens of the United States. The boundaries of Louisiana, as formerly possessed by France and Spain, and now held by the United States, are stated as follows; viz. S. on the gulf of Mexico, from the bay of St. Bernard, S.W. of the Mississippi to the mouth of the Rio Perdido, or Lost river, so called by the Spaniards, because it loses itself under ground, and afterwards appears again, and discharges itself into the sea a little to the E. of Mobile, on which the first French planters settled; up the Perdido to its source, and thence (if it rise not N. of the 31st degree of lat.) in a straight line N. to that parallel; thence along the southern boundary of the United States, W. to the Mississippi; then up this river to its source, as established by the treaty of 1783. Beyond this point, the limits, (which have never been accurately ascertained,) may be considered as including the whole country between the White Bear Lake, or other head of the Mississippi, and the source of the Missouri; and between this last and the head springs of the Arkansas, Red river, and other copious streams, which fall into the Mississippi; or, in other words, Louisiana may be considered as bounded N. and N.W. by the high lands, which divide the waters that fall into the St. Lawrence and Hudson's Bay from those which fall into the Mississippi; W. by that high chain of mountains, known by the name of the "Shining Mountains," which may be called the "Spine" or "Andes" of that part of North America, and which turn the waters on the W. of them to the Pacific, and those on the E. to the Atlantic ocean. In a word, it embraces the whole slope, or inclined plain, fronting the S.E. and E. down which the various streams flow into the bed of the Mississippi. On the S.W. it is bounded by New Mexico, between which and Louisiana the divisional line has never been settled. Some pretend that this boundary is a right line from the head of Red river to that of Rio Bravo, and thence down its channel to the gulf of Mexico. Others make the Rio Colorado, and others, with greater probability, make the Rio Mexicano, the S.W. boundary of Louisiana.

Louisiana may naturally be divided into the three following districts:

Districts: viz. Eastern, Lower, and Upper Louisiana. The *Eastern* division comprehends all that part of this territory which lies E. of the Mississippi, bounded S. by the gulf of Mexico, E. by Perdido river, N. by the Mississippi territory, and W. by the Mississippi river. This division includes the island of New Orleans, and is watered by the Mobile, Pascagoula, Pearl, Boguchito, Tanisipaho, and Amit rivers, with Thompson's creek, and Bayou Sara. The whole coast, embracing the old Biloxi district, consists of a fine white sand, injurious to the eyes, and so dry as not to be fit to produce any thing but pine, cedar, and some ever-green oaks. The Mobile river has few fish, and its banks and vicinity are not very fertile. Between Pascagoula and Mississippi rivers, the country is intermixed with extensive hills, fine meadows, numerous thickets, and in some places woods thickset with cane, particularly on the banks of rivers and brooks, and proper for agriculture. Its coast, though flat, dry, and sandy, abounds with delicious shell and other fish, and affords security against the invasion of an enemy.

Lower Louisiana comprehends that part of this territory bounded E. by the Mississippi river, S. by the gulf of Mexico, S. W. and W. by New Mexico, N. by a line drawn from the Mississippi W., dividing the country in which stone is found from that in which there is none. This part of Louisiana is watered by Red river, and many others which fall into the gulf of Mexico. On both sides of the mouths of the Mississippi are quagmires, affording a safe retreat for water-fowl, guats, and mosquitoes, and extending for more than twenty miles. The whole coast from the Mississippi, W. as far as St. Bernard's bay and beyond it, resembles that already described of the eastern division: and the soil is barren. In ascending the Mississippi, beyond the marshes, are some narrow strips of firm land, partly bare of trees and partly thickly covered with them; which are fit for cultivation. This part seems to have been either recovered from the sea, or formed by various materials that have descended to it; and it is not unreasonable to imagine, that in process of time the river and sea may form another tract of country like Lower Louisiana. The principal river is the Mississippi; which see. The Red river has its source not far from that of Rio Bravo, or Riodel Norte, on which the city of Santa Fé is built, and in the mountain which has the springs of the Missouri. On each side of this river are some scattered settlements, for about fifty miles to Bayan Rapide, in which are about 100 families. The land here is not inferior to any in the world with regard to fertility; and for a space of about 40 miles from hence to the commencement of the Appalusa prairies, the country is equally rich and well-timbered. It is perfectly level, and the soil 20 feet deep, and like a bed of manure. Higher up, the banks and low lands are of similar quality with the lands on Bayan Rapide, the texture of the soil being somewhat looser; but there are few settlements, till you come to the river Cane settlements, 60 or 70 miles higher up Red river. Hence to the village or port of Natchitoches, about 50 miles, and 25 miles above it, the banks of one branch of Red river are settled like those of the Mississippi, and the country abounds with beautiful fields and plantations, and luxuriant crops of corn, cotton, and tobacco. (See NATCHITOCHEES.) The low grounds of Red river, generally five or six miles wide, have an uncommonly rich soil, which is overflowed annually in the month of April. The crops of corn and tobacco are plentiful, and never fail. The soil is particularly favourable for tobacco; an acre yields from 80 to 100 bushels of corn; and it is no less productive of cotton. Two men, with ten or twelve old pots and kettles, supply the settlement on Red river with salt, the springs of which are almost inexhaustible.

Here is likewise plenty of iron and copper ore, pit-coal, shell and stone lime. The different branches of the river the lakes, creeks, and bayans furnish abundance of very fine fish, cockles, soft-shelled turtle and shrimps, and in winter great varieties of wild fowl. The country is far from being sickly. The moschetto is rarely seen. The high lands are covered with oak, hickory, ash, gum, sassafras, dogwood, grape-vines, &c. intermixed with short-leaved pine, and interperfed with prairies, creeks, lakes, and fountains. Its hills and vallies are gently varied, and the soil is generally a stony clay. The country on Red river is most valuable, beginning about 50 or 60 miles above the upper settlements, and extending 4 or 500 miles. The low lands, about 40 miles on each side, are remarkably rich, interperfed with prairies, and beautiful streams and fountains; also quarries of free-stone, lime, flint, slate, grit, and almost every kind of stone. About 30 miles from the mouth of Red river, Black river falls into it on the N. side, which is a clear and navigable stream for 5 or 600 miles: about 100 miles upwards, it branches in three different directions: the eastern branch, called the Tenaw, is navigable for many miles, and affords rich land: the middle or main branch, called Watheta, is navigable 500 miles, and affords excellent lands, salt-springs, lead-ore, and plenty of very good mill and grind-stones: the western branch, called Catahola, runs through a beautiful, rich, prairie country, in which is a large lake, called Catahola lake. On this lake are salt-springs, and it abounds with fish and fowl. On the river called Ozark are many valuable tracts of land, which is likewise the case with respect to White river and St. Francois.

Upper Louisiana comprehends all the remainder of this territory, and is the largest and most valuable part. It is bound S. by Lower Louisiana, on the E. by Mississippi, N. and W. by the highlands and mountains which divide the waters of St. Lawrence, Hudson's bay, and the Pacific ocean, from those of the Mississippi. It is watered by the Red river, the Arkansas, St. Francis, and the Missouri, with a vast number of smaller streams which fall into these or the Mississippi. From the lower settlement at Sans la Grace, to the upper settlement on the Missouri, about the distance of 250 miles, is a country equal to any part of the western territory, containing a population of 50 or 60,000, and furnishing lead and iron mines. The soil is at the bottom a solid red clay, and this is covered by a light earth almost black and very fertile. The grass grows here to a great height, and towards the end of September is set on fire; and in eight or ten days after, the young grass shoots up half a foot high. In advancing northwards towards the Arkansas and St. Francis, the country becomes more beautiful and fertile, abounding in various kinds of game, as beavers, &c. and herds of deer, elks, and buffaloes, from 6 to 100 in a drove. Here have been also found specimens of rock crystal, plaster of Paris, lead, and iron ore, lime-stone, and pit-coal. It has all the trees known in Europe, besides others that are there unknown. The cedars are remarkably fine; the cotton trees grow to such a size, that the Indians make canoes out of their trunks: hemp grows naturally; tar is made from the pines on the sea coast; and the country affords every material for ship-building. Beans grow to a large size without culture; peach trees are heavily laden with fruit; and the forests are full of mulberry and plum trees. Pomgranate and chefnut trees are covered with vines, whose grapes are very large and sweet. They have three or four crops of Indian corn in the year: as they have no other winter besides some rains. Here are also mines of pit-coal, lead and copper, quarries of free-stone, and of black, white, and jasper-like marble, of which they make their calumets.

LOUISIANA.

calumets. One species of timber, which is common from the mouth of the Ohio down the Mississippi swamp, is cotton wood, resembling the Lombardy poplar in the quickness of its growth, and the softness of the timber. Here are also the papaw and black ash, button wood or sycamore, hickory, and cypress; wild cherry, fassafras, beech, chestnut, and Bernudian mulberry trees. From the Walnut hills to Point Coupee, and easterly 15 or 20 miles, the whole country in its natural state is one continued cane-brake. The cane in general is 36 feet high, often 42; intermingled with a smaller species, which continue thence on all the creeks to the gulf of Mexico.

Above the Nachitoches are the habitations of the Cadodquiabos Indians; near one of their villages is a rich silver mine; another lies further north. Lead ore is also found in different places, and also iron ore, pit-coal, marble, slate, and plaster of Paris.

As to the climate of this country, during the winter the weather is very changeable, generally throughout Lower, and the southern part of Upper Louisiana. In summer it is regularly hot. In the latitude of the Natchez, Fahrenheit's thermometer ranges from 17° to 96° . The average degree of heat is stated to be 14° greater than in Pennsylvania. The climate of Louisiana varies in proportion as it extends northward. Its southern parts are not subject to the same degree of heat as the same latitudes in Africa, nor its northern parts to the same degree of cold as the corresponding latitudes in Europe; owing to the thick woods which cover the country, and to the great number of rivers which intersect it. The prevailing diseases on the lower part of the Ohio, on the Mississippi, and through the Floridas, are bilious fevers. In some seasons they are mild, and are little more than common intermittents; in others they are very malignant, and approach the genuine yellow fever of the West Indies.

The total population of all the parts or districts of Louisiana, including whites, free people of colour, and slaves, is 42,375, of whom 12,920 are slaves. But it is apprehended that this number is too small. The Spanish government is fully persuaded that the population at present considerably exceeds 50,000 persons. The inhabitants of this country are chiefly the descendants of the French and Canadians. In New Orleans there is a considerable number of English and Americans. The two German coasts are peopled by the descendants of settlers from Germany, and by French mixed with them. The three succeeding settlements up to Baton Rouge contain mostly Acadians, banished from Nova Scotia by the English, and their descendants. The government of Baton Rouge, especially on the E. side, which includes the whole country between the Iberville and the American line, is composed partly of Acadians, a few French, and a great majority of Americans. On the W. side they are mostly Acadians; at Point Coupee and Faussee river they are French and Acadians; of the population of the Atacapas and Opelousas, a considerable part is Americans; Nachitoches, on the Red river, contains but a few Americans, and the rest of the inhabitants are French; but the former are more numerous in the other settlements on that river, *viz.* Avoyelles, Rapide, and Ouacheta. At Arkansas they are mostly French; and at New Madrid, Americans. At least two-fifths, if not a greater proportion of all the settlers on the Spanish side of the Mississippi, in the Illinois country, are likewise supposed to be Americans. Below New Orleans the population is altogether French, and the descendants of Frenchmen. The natives of the southern part of the Mississippi are sprightly; they have a turn for

mechanics, and the fine arts; but their system of education is so wretched, that little real science is obtained. Many of the planters are opulent, industrious, and hospitable. There is a militia in Louisiana, amounting, as it is said, to about 10,340. The Indian nations within the limits of Louisiana, are as follow, according to the statement of the late president of the United States, Mr. Jefferson: on the E. bank of the Mississippi, about 25 leagues above Orleans, are the remains of the Houmas or Red men, amounting to about 60 persons; on the W. side of the same river are the remains of the Tunicas, settled near and above Point Coupee, consisting of 50 or 60 persons. In the Atacapas, on the lower part of the Bayou Teche, about 11 or 12 leagues from the sea, are two villages of Chitimachas, consisting of about 100 persons; the Atacapas, properly so called, dispersed throughout the district, are about 100; and there are about 50 wanderers of the tribes of Biloxis and Choctaws on Bayou Crocodile, which empties into the Teche. In the Opelousas, N.W. of Atacapas, are two villages of Alibamas in the centre of the district, consisting of 100 persons; and the Conchates dispersed through the country as far as the Sabinas and its neighbourhood, are about 350. On the river Rouge, at Avoyelles, 19 leagues from the Mississippi, is a village of the Biloni nation, and another on the lake of the Avoyelles, the whole including about 60 persons. At the Rapide, 26 leagues from the Mississippi, is a village of Choctaws, consisting of 100 persons, and another of Biloxes, about two leagues from it, of about 100 more; and at about eight or nine leagues higher up the Red river is a village including about 50 persons. All these are occasionally employed by the settlers as boatmen. About eighty leagues above Nachitoches on the Red river is the nation of the Cadodquiabos, or Cados, who can raise from three to four hundred warriors, the friends of the whites, and esteemed the bravest and most generous of all the nations in this vast country; they are rapidly declining by their intemperance, and by the attacks of the Osages and Choctaws. There are 500 families of the Choctaws, dispersed on the W. side of the Mississippi, on the Ouacheta and Red rivers, as far W. as Nachitoches. On the river Arkansas is a nation of the same name, consisting of about 260 warriors, brave, yet peaceable and well-disposed, attached to the French, and disposed to engage in their wars with the Chickasaws. They live in three villages at 18 leagues from the Mississippi on the Arkansas river, and the others are at three and six leagues from the first. A scarcity of game on the E. side of the Mississippi has induced a number of Cherokees, Choctaws, Chickasaws, &c. to frequent the neighbourhood of Arkansas, where game is still abundant, where they have contracted marriages with the Arkansas, and incorporated themselves with that nation. On the river St. Francis, in the vicinity of New Madrid, &c. are settled a number of vagabonds from the Delawares, Shawnees, Miamis, Chickasaws, Cherokees, Piorias, supposed to consist in all of 500 families. They are piratical in their disposition, attached to liquor, unsettled and vagrant in their habits, some of them speak English, all understand it, and some of them can even read and write it. At St. Genevieve, about 30 leagues, Kaskaskias and Illinois, are settled among the whites. There are the remains of a nation, which 50 years ago could bring into the field 1200 warriors.

On the Missouri and its waters, are many and numerous nations, the best known of which are; the Osages, situated on the river of the same name on the right bank of the Missouri, at about 80 leagues from its confluence with it; they consist of 1000 warriors, who live in two settlements at no great distance from each other. They are of a gigantic stature

are and well proportioned, are enemies of the whites and of all other Indian nations, and commit depredations from the Illinois to the Arkansas. The trade of this nation is said to be under an exclusive grant. They are a cruel and ferocious race, and are hated and feared by all the other Indians. The confluence of the Osage river with the Missouri is about eight leagues from the Mississippi. Sixty leagues higher up the Missouri, and on the same bank, is the river Kansas, and on it the nation of the same name, but at about 70 or 80 leagues from its mouth. It consists of about 250 warriors, who are as fierce and cruel as the Osages, and often molest and ill treat those who go to trade among them. Sixty leagues above the river Kansas, and at about 200 from the mouth of the Missouri, still on the right bank, is the Riviere Platte, or Shallow river, remarkable for its quicksands and bad navigation; and near its confluence with the Missouri dwells the nation of Osotolactos, commonly called Otos, consisting of about 200 warriors, among whom are 25 or 30 of the nation of Missouri, who took refuge among them about 25 years since. Forty leagues up the river Platte you come to the nation of Panis, composed of about 700 warriors in four neighbouring villages; they hunt but little, and are ill provided with fire arms; they often make war on the Spaniards in the neighbourhood of Sante Fé, from which they are not far distant. At 300 leagues from the Mississippi, and 100 from the river Platte on the same banks, are situated the villages of the Mahas. They consisted, in 1799, of 500 warriors, but are said to have been almost cut off last year by the small pox. At 50 leagues above the Mahas, and on the left bank of the Missouri, dwell the Poncas, to the number of 250 warriors, possessing in common with the Mahas, their language, ferocity, and vices. Their trade has never been of much value, and those engaged in it are exposed to pillage and ill treatment. At the distance of 450 leagues from the Mississippi, and on the right bank of the Missouri, dwell the Aricaras, to the number of 700 warriors, and 60 leagues above them, the Mandane nation, consisting of about 700 warriors likewise. These two last nations are well disposed to the whites, but have been the victims of the Sioux, or Mandowessies, who being themselves well provided with fire-arms, have taken advantage of the defenceless situation of the others, and have on all occasions murdered them without mercy. No discoveries on the Missouri, beyond the Mandane nation, have been accurately detailed, though the traders have been informed, that many navigable rivers discharge their waters into it, above it, and that there are many numerous nations settled on them. The Sioux, or Mandowessies, who frequent the country between the N. bank of the Missouri and Mississippi, are a great impediment to trade and navigation. They endeavour to prevent all communication with the nations higher up the Missouri, to deprive them of ammunition and arms, and thus keep them subservient to themselves. In the winter they are chiefly on the banks of the Missouri, and massacre all who fall into their hands. There are a number of nations at a distance from the banks of the Missouri, to the N. and S. of whom we have but little information has been received. Returning to the Mississippi, and ascending it from the Missouri, about 75 leagues above the mouth of the latter, the river Mingo, or Riviere de Moine, enters the Mississippi on the west side, and on it are situated the Ayons, a nation originally from the Missouri, speaking the language of the Otchattas; it consisted of 200 warriors before the small-pox lately raged among them. The Sacs and Renards dwell on the Mississippi, about 300 leagues above St. Louis, and frequently trade with it; they live together, and consisted of 500 warriors; their chief trade is with Michilimackinac, and

they have always been peaceable and friendly. The other nations on the Mississippi, higher up, are but little known to us. The Sac and Fox nations of India have ceded to the United States a valuable country, with a front of 600 miles on the Mississippi. It contains 80,000 square miles, and is equal to 51,200,000 acres. The treaty ceding this territory, was signed at St. Louis, the 3d of Nov. The nation of the Missouri, though cruel, treacherous, and insolent, may doubtless be kept in order by the United States, if proper regulations are adopted with respect to them. It is said, that no treaties have been entered into by Spain with the Indian nations westward of the Mississippi, and that its treaties with the Creeks, Choctaws, &c. are in effect superfluous by our treaty with that power of the 27th October 1795.

The productions of Louisiana are sugar, cotton, indigo, rice, furs, and peltry, lumber, tar, pitch, lead, flour, horses, and cattle. The soil is fertile, the climate salubrious, and the means of communication between most parts of the province certain, and by water. The exports of Louisiana amount in value to 2,158,000 dollars; and the imports, in merchandize, plantation utensils, slaves, &c. amount to 2½ millions, the difference being made up by the money introduced by the government, to pay the expences of governing and protecting the colony. The imports to the United States from Louisiana and the Floridas amounted in 1802 to 1,006,214 dollars, and the exports to Louisiana and the Floridas in the same year to 1,224,710 dollars. In Louisiana there are few domestic manufactures. The Acadians manufacture a little cotton into quilts and cottonades, and in the remoter parts of the province, the poorer planters spin and weave some negro cloths of cotton and wool mixed. In the city, besides the trades which are absolutely necessary, there is a considerable manufacture of cordage, and four small ones of shot and hair powder; and within a few leagues of the town are twelve distilleries for making tafia, which are said to distil annually a considerable quantity, and one sugar refinery, which is said to make about 200,000 lbs. of loaf sugar. There are no colleges, and but one public school, which is at New Orleans. There are a few private schools for children. Not more than half of the inhabitants are able to read and write. In general the learning of the inhabitants does not extend beyond those two arts; though they seem to be endowed with a good natural genius, and a good and an uncommon facility of learning whatever they undertake. The clergy consists of a bishop, who does not reside in the province, whose salary of 4000 dollars is charged on the revenue of certain bishoprics in Mexico and Cuba; two canons, and 25 curates, receive each from 360 to 480 dollars a-year. At Orleans there is a convent of Ursulines, to which is attached about 1000 acres of land. Raynal, Jefferson, Morse.

LOUISTOWN, a town of America, in Talbot county, Maryland, on the W. side of Tuckahoe creek; four miles N. of King's-town.

LOUISVILLE, a port of entry, post-town of Kentucky, and capital of Jefferson county, pleasantly situated on the left side of the Ohio, on an elevated plain above the Rapid, nearly opposite to Fort Memy. It commands a delightful prospect, but the stagnated waters behind it render it unhealthy. It consists of three principal streets, and contains about 100 houses, 350 inhabitants, a court-house, and gaol; 40 miles W. of Frankfort. — Also, the present seat of government in Georgia, situated in Jefferson county, in the lower district of the state, on the N.E. bank of the Great Ogeechee river, 70 miles from its mouth. It contains a state-house, a tobacco warehouse, and upwards of forty dwelling houses. In the vicinity is situated a liberally endow-

dowed college; 52 miles S.E. of Augusta. N. lat. $32^{\circ} 55'$. W. long. $82^{\circ} 42'$.

LOULAY, a town of France, in the department of the Lower Charente, and chief place of a canton, in the district of St. d'Angely, and six miles N. of it. The place contains 366, and the canton 7161 inhabitants, on a territory of $167\frac{1}{2}$ kilometres, in 19 communes.

LOULE, a town of Portugal, in the province of Algarva, on a river of the same name, near the sea; surrounded with antique walls, and containing a castle, hospital, three convents, and about 4400 inhabitants; nine miles N. of Faro. N. lat. $37^{\circ} 8'$. W. long. $7^{\circ} 54'$.

LOULIE, FRANÇOIS, in *Biography*, a French musician, who published in 1696 an ingenious and useful book, intitled "Elements of Music," with a description of a chronometer to measure time by a pendulum. See CHRONOMETER, and its description, from this book, in Malcolm, p. 407, and in 1698, another book was printed by Etienne Roger, at Amsterdam, called "A New System of Music," by the same author. In this work, besides the usual instructions in elementary books, he explains the nature of transposition, and proposes a method of reducing a piece of music into any key different from that in which it was originally composed, by means of imaginary clefs. See TRANSPOSITION, and Dr. Pepusch's "Treatise on Harmony."

LOUNG, in *Geography*, a town of Hindoostan, in the circle of Schaurumpour; 28 miles S. of Merat.

LOU-NGHAN, a city of China, of the first rank, in the province of Chen-li. N. lat. $36^{\circ} 42'$. E. long. $116^{\circ} 42'$.

LOUP, a river of France, which runs into the Mediterranean. N. lat. $43^{\circ} 38'$. E. long. $7^{\circ} 12'$.—Also, a river of Canada, which runs into the lake St. Pierre. N. lat. $46^{\circ} 13'$. E. long. $72^{\circ} 47'$.

LOUP, St., a town of France, in the department of the Upper Saone, and chief place of a canton, in the district of Lure; six miles N.W. of Luxeuil. The place contains 1891, and the canton 13,366 inhabitants, on a territory of 195 kilometres, in 14 communes.—Also, a town of France, in the department of the Two Sevres, and chief place of a canton, in the district of Parthenay, near the river Thoue; nine miles N.N.E. of Parthenay. The place contains 1649, and the canton 5968 inhabitants, on a territory of $197\frac{1}{2}$ kilometres, in nine communes.

LOUP de Salle, St., a town of France, in the department of the Sone and Loire, near the river Heune; 11 miles N. of Chalon sur Saone.

LOUPPE, LA, a town of France, in the department of the Eure and Loire, and chief place of a canton, in the district of Nogent-le-Rotrou; 18 miles W. of Chartres. The place contains 1178, and the canton 10,315 inhabitants, on a territory of 245 kilometres, in 21 communes.

LOUPTIERE, JOHN CHARLES DE RELONGUE, in *Biography*, was born in the diocese of Sens in 1727; he became a member of the academy of the Arcadi at Rome, and died in the year 1784. He is known by a collection of poems in two volumes 12mo., written with much spirit and elegance; and by six parts of a Journal for ladies printed in 1761.

LOURDE, in *Geography*, a town of France, in the department of the Higher Pyrenées, and chief place of a canton, in the district of Argelès; six miles N. of Argelès. The place contains 2741, and the canton 10,418 inhabitants, on a territory of 180 kilometres, in 27 communes. N. lat. $43^{\circ} 6'$. E. long. $0^{\circ} 1'$.

LOURE, in *French Music*, a kind of dance, of which the tune is rather slow, and generally in the measure of 2, or six crotchets in a bar. *Loire* is likewise the name of an instrument resembling a bagpipe, to the music of which the tune is danced.

LOURER is a verb, which implies sustaining and cherishing the times of a movement, in opposition to *détacher*, separated.

LOUREZA, in *Geography*, a town of Spain, in Galicia; eight miles W. of Tuy.

LOURICAL, a town of Portugal, in the province of Estremadura; six miles N. of Leyria.

LOURINHA, a town of Portugal, in the province of Entre Duero e Minho; 8 miles S.S.E. of Peniche.

LOURISTAN. See LARISTAN.

LOUROUX-BECONNOIS, LE. See LOROUX. The place contains 2018, and the canton 6855 inhabitants, on a territory of $227\frac{1}{2}$ kilometres, in seven communes.

LOUS, *Æt.*, in *Chronology*, the Macedonian name for the Athenian month Hecatombæon, which was the first of their year, and answered to the latter part of our June and the beginning of July.

LOUSE, in *Zoology*. See PEDICULUS. This creature has so transparent a shell, or skin, that we are able to discover more of what passes within its body, than in most other living creatures. It has naturally three divisions, the head, the breast, and the tail part. In the head appear two fine black eyes, with a horn that has five joints, and is surrounded with hair standing before each eye; and from the end of the nose, or snout, there is a pointed projecting part, which serves as a sheath or case to a piercer, or sucker, which the creature thrusts into the skin, to draw out the blood and humours which are its destined food; for it has no mouth that opens in the common way. This piercer or sucker is judged to be seven hundred times smaller than a hair, and is contained in another case within the first, and can be thrust out or drawn in at pleasure. (Baker's Microscope, p. 177.) The breast is very beautifully marked in the middle, the skin is transparent, and full of little pits; and from the under part of it proceed six legs, each having five joints, and their skin all the way resembling shagreen, except at the ends, where it is smoother. Each leg is terminated by two claws, which are hooked, and are of an unequal length and size: these it uses as we would a thumb and a middle finger, and there are hairs between these claws as well as all over the legs. Læwenhoeck's Arcan. Nat. tom. ii. p. 74.

On the back of the tail part there may be discovered some ring-like divisions, abundance of hairs, and a sort of marks which look like the strokes of a rod on a child that has been whipped; the skin of the belly seems like shagreen, and towards the lower end is very clear, and full of pits: at the extremity of the tail there are two semicircular parts, covered all over with hairs, which serve to conceal the anus.

When the louse moves its legs, the motion of the muscles, which all unite in an oblong dark spot in the middle of the breast, may be distinguished perfectly, and so may the motion of the muscles of the head when it moves its horns. We may likewise see the various ramifications of the veins and arteries, which are white, with the pulse regularly beating in the arteries. But the most surprising of all the sights is the peristaltic motion of the guts, which is continued from the stomach down to the anus. Philos. Trans. N 102.

It one of these creatures, when hungry, be placed on

the back of the hand, it will thrust its sucker into the skin, and the blood it sucks may be seen passing in a fine stream to the fore-part of the head; where falling into a roundish cavity, it passes again in a fine stream to another circular receptacle in the middle of the head; from thence it runs through a smaller vessel to the breast, and then to a gut which reaches to the hinder part of the body, where in a curve it turns again a little upward. In the breast and the gut the blood is moved without intermission with a great force, especially in the gut; and that with so strong a propulsion downward, and such a contraction of the gut, as is very surprisng. Power's Mic. Obs. 9.

In the upper part of the crooked ascending gut before mentioned, the propelled blood stands still, and seems to undergo a separation; some of it becoming clear and watery, while other little black particles pass downward to the anus.

If a louse be placed on its back, two bloody darkish spots appear; the larger in the middle of the body, the lesser toward the tail. In the larger spot, a white film or bladder contracts and dilates upwards and downwards from the head toward the tail, the motions of which are followed by a pulsation of the dark bloody spot, in or over which the white bladder seems to lie. This motion of the systole and diastole is best seen when the creature begins to grow weak; and on pricking the white bladder, which seems to be the heart, the creature always instantly dies. The lower dark spot is supposed to be the excrements in the guts.

Lice have been supposed to be hermaphrodites, but this is erroneous; for Mr. Lowerboeck discovered that the males have stings in their tails, which the females have not. And he supposes the smarting pain these creatures sometimes give to be owing to their stinging with these stings, when made uneasy by pressure or otherwise. This accurate observer says, that he felt little or no pain from their suckers, though six of them were feeding on his hand at once.

The same accurate observer determining to know their true history and manner of breeding, put two females into a black stocking, which he wore night and day. He found, on examination, that in six days one of them had laid above fifty eggs; and upon dissecting it, he found as many yet remaining in the ovary; whence he concludes, that in twelve days it would have laid a hundred eggs. These eggs naturally hatch in six days, and would then probably have produced fifty males and as many females; and these females coming to their full growth in eighteen days, might each of them be supposed after twelve days more to lay a hundred eggs; which eggs in six days more, might produce a young brood of five thousand; so that in eight weeks one louse may see five thousand of its own descendants. A louse may be easily dissected in a small drop of water upon a slip of glass; and thus placed before the microscope, it is common to find five or six eggs of a size ready to be laid, and sixty or seventy others of different bigness. In the male the penis is very remarkably distinct, as are also the testes, of which he seems to have a double pair, as is also the sting, the structure of which merits a peculiar attention. Lowerboeck's Arcan. Natur. tom. ii. p. 78.

Many animals, both of the quadruped and flying kinds, are subject to lice; but these are of peculiar species on each animal, and are not at all like those which infest the human body. Nay, even insects are infested with vermin, which feed on them and torment them. Several kinds of beetles are very subject to lice; but particularly that kind called

thence the *lousy beetle*. The lice on this are very numerous, but will not be shook off. The ear-wig is often infested with lice just at the setting on of its head; these are white and shining like mites, but they are much smaller; they are round-backed, flat-bellied, and have long legs, particularly the foremost pair. Snails of all kinds, but especially the large naked kinds, are very subject to lice, which are continually seen running about them, and devouring them. Numbers of little red lice, with a very small head, and in shape resembling a tortoise, are often seen about the legs of spiders, and they never leave the spider while he lives, but if he be killed, they almost instantly forsake him. A sort of whitish lice are very common on humble-bees; they are also found on ants; and many sorts of fishes are not less subject to them than the land animals. Kircher says, that he has found lice also on flies. Baker's Microscope, p. 182.

Signior Redi, who has more accurately examined these creatures than any other author, has engraved several species found on different animals. He calls those found on beasts lice, and those found on birds fleas. He is of opinion, that every species of birds has its peculiar sort of flea, different from those of other birds; and has observed that they are hatched white, but that they gradually acquire a colour, like that of the feathers they live among; yet they usually remain transparent enough for a good microscope to discover the motion of their intestines. The kinds he has observed are these: on the hawk three different sorts; on the large pigeon, the turtle-dove, the hen, the starling, the crane, the magpie, the heron, the lesser heron, the swan, the turkey, the duck, the sea-mew, the small swan, the teal, the castrel, the peacock, the capon, and the crow, on each one sort; on the moor-hen three sorts; on the wild goose two sorts; and on the crane, beside the common one, a white sort, marked, as it were, with Arabic characters. Men, he observes, are subject to two kinds, the common louse, and that called the *crab louse*. He also found peculiar sorts on the goat, the camel, the ass, the African ram, the stag, which has, like many of the birds, two kinds, and on the lion and the tiger. The same author has observed, that the size of these creatures is not at all proportioned to that of the animal they are to inhabit, for the starling has them as large as the swan. Redi, Gen. Inf. p. 312.

It is observable, that some sort of constitutions are more apt to breed lice than others; and that in certain places of different degrees of heat, they are very certain to be destroyed upon people, who in other climates are overrun with them. It is an observation of Oviedo, that the Spanish sailors, who are generally much afflicted with lice, always lose them in a certain degree in their voyage to the Indies, and have them again on their coming to the same degree at their return; this is not only true of the Spaniards, but of all other people who make the same voyage; for though they set out ever so lousy, they have not one of these creatures to be found after they come to the tropic. And in the Indies there is no such thing as a louse about the body, though the people be ever so nasty. The sailors continue free from these creatures till their return; but in going back they usually begin to be lousy, after they come to about the latitude of Madeira. The extreme sweats which the working people naturally fall into between this latitude and the Indies, drown and destroy the lice, and are of the same effect as the rubbing over the lousy heads of children with butter and oil. The sweat in and about the Indies is not rank as in Europe, and therefore it is not apt to breed lice; but when the people return into latitudes where they sweat
rank

rank again, their nastiness subjects them to the same visitations of these vermin which it used to have.

The people in general, in the Indies, are very subject to lice in their heads, though free from them in their bodies. The reason of this is, that their heads sweat less than their body, and they take no care to comb and clean them. The Spanish negroes wash their heads thoroughly once every week with soap, to prevent their being lousy. This makes them escape much better than the other negroes who are slaves there, for the lice grow so numerous in their heads, that they often eat large holes in this part.

M. de la Hire has given a curious account of the creature which he found on the common fly. Having occasion to view a living fly by the microscope, he observed on its head, back, and shoulders, a great number of small animals, crawling very nimbly about, and often climbing up the hairs, which grow at the origin of the fly's legs. He, with a fine needle, took up one of these, and placed it before the microscope, used to view the animalcules in fluids. It had eight legs, four on each side; they were not placed very distant from one another, but the four toward the head were separated by a small space from the four toward the tail. The feet were of a particular structure, being composed of several fingers, as it were, and fitted for taking fast hold of any thing; the two nearest the head were also more remarkable in this particular than those near the tail; the extremities of the legs, for a little way above the feet, were dry and void of flesh, like the legs of birds, but above this part they appeared plump and fleshy. It had two small horns upon its head, formed of several hairs arranged closely together; and there were some other clusters of hairs by the side of these horns, but they had not the same figure; and toward the origin of the hinder legs there were two other such clusters of hairs, which took their origin at the middle of the back. The whole creature was of a bright yellowish red; and the legs, and all the body, except a large spot in the centre, were perfectly transparent. In size, the author believes it was about $\frac{1}{1000}$ th part of the bigness of the head of the fly; he observes, that it is rarely that flies are found infested with them. Mem. Acad. Par. 1693.

LOUSE, *Tree*. See APHIS.

LOUSE, *Wood*. See MILLEPEDES.

LOUSE-WORT, in Botany. See PEDICULARIS.

LOUSE-WORT, *Yellow*. See RHINANTHUS.

The Dutch carry on a trade with the seeds and seed-vessels of a species of this plant, resembling the common yellow meadow louse-wort, to Germany, and call it *semen faradillos*; they use it for destroying bugs: for this purpose, they boil a quantity of the seeds and capsules in common water, with which they wash their wainseats, bedsteads, &c. where these insects are lodged; and thus they are effectually destroyed. Miller.

LOU-TCHOU, in Geography, a river of Thibet, which runs into the Sampoo; 22 miles S.W. of Tankia.

LOUTESTINA, a town of Croatia; 12 miles S. of Creutz.

LOUTH, a large market town in the wapentake of Louth Eike, in the Lindsey division of Lincolnshire, England, is situated in a fertile valley at the eastern foot of the Wolds, 26 miles distant from Lincoln, and 153 from London. It was anciently called *Luda*, from its proximity to the Ludd, a small rivulet formed by the confluence of two streams. Among the few historical events relative to Louth, we find that in the rebellion of the year 1536, occasioned by the suppression of the religious houses, the inhabitants took an active part, under Dr Mackerel, who was known by the name of captain Cobler, when the

prior of Barling's abbey, with the vicar and thirteen other ring-leaders, suffered death. In this town were anciently established three religious fraternities, called "The Guild of our Blessed Lady, the Guild of the Holy Trinity, and the Chantry of John of Louth." King Edward VI. alienated the funds of these guilds, and granted them for the purpose of erecting and endowing a free grammar school. The lands then produced 40*l. per annum*, but are now let at 400*l.* One-half of the produce was granted for a head master's salary, one-fourth for the usher's, and the remainder for the perpetual maintenance of twelve poor women. The trustees of this foundation were incorporated by the name of "The warden and six assistants of the town of Louth, and free-school of king Edward VI. in Louth." Another free-school, on a very respectable scale, was founded in pursuance of the will of Dr. Mapletost, dean of Ely, bearing date August 17th, 1677. The church of St. James is a spacious edifice, consisting of a nave, two aisles, with an elegant tower and spire at the west end. The east end, which presents a fine elevation, exhibits a large central window, having six upright mullions and varied tracery, with two lateral windows opening into the aisles. Internally the nave is separated from the aisles by octagonal columns, the alternate sides of which are relieved by single flutes. The chancel, which has an altar piece containing a picture of the Descent from the Cross by William, is of more modern date than the body of the church, and is probably coeval with the justly admired steeple. The latter was begun in the year 1501, and completed in fifteen years. The height was originally 360 feet; but the flat stone on the summit was blown off in 1587, and carried with it part of the building into the body of the church. The whole spire being blown down October 11th, 1634, the present one was erected. The tower part of the steeple consists of three stories: each stage terminates with elegant pediments, supported by ornamental corbels; in this manner diminishing to the top, where are four octagonal embattled turrets. At eighty feet from the base, round the exterior of the tower, runs a gallery, guarded by a parapet wall; and at the height of 170 feet the battlements commence. The top stone projects with a cornice; the height of the spire to the cross is 141 feet; the total height of the whole 288 feet. The living of St. James is a vicarage, in the gift of a prebendary of Lincoln cathedral, to which it was annexed by the Conqueror. The vicarage house, which stands contiguous to the church yard, is an old thatched building; and the present vicar has, in unison with its appearance, laid out his garden in a curious style of ingenious rusticity: it is denominated the hermitage. In Louth was formerly another church, named St. Mary's; it is now totally demolished; but the church-yard is the place of sepulture for the town, as that of St. James has not been used for that purpose for forty years past. The Dissenters from the establishment have three places of worship; one for Catholics, one for Baptists, and one for Methodists. The other principal buildings are a town-hall, an assembly room, and a theatre. The civil government of the town is vested in the warden and six assistants, incorporated, as already mentioned, by Edward VI., who in the same charter granted two markets to be held on Wednesdays and Saturdays, and three fairs to commence on the third Sunday after Easter, St. James's day, and the feast of St. Martin; with a particular injunction, that they should continue two whole days after, that the first day of each fair might be appropriated "to hearing the word of God." Queen Elizabeth gave to the corporation the manor of Louth, of which the annual value was then 78*l.* 14*s.* 4*d.* for the better support of the corporate dignity; and some additional privileges were granted

by James I. In the year 1801, the inhabitants of Louth, as appears by the return under the population act, were 4236, and the number of houses 950; but a considerable increase has been made since that time. A carpet and blanket manufactory has been recently established here, and is now in a very prosperous state; here is also a large manufactory of soap, and a mill for making coarse paper. In the year 1761 an act was obtained for cutting a canal between Louth and the North sea. It commences about half a mile from the town, and keeps parallel with the Ludd, which supplies it with water; leaving the river about four miles from the town, it sweeps to the north and joins the sea at a place called Tetney lock. The undertaking cost 12,000*l.*, which brings in very good interest. By this channel vessels of considerable burthen regularly trade to London, Hull, and several parts of Yorkshire, carrying out corn and wool, and bringing home timber, coals, grocery, &c. In Louth and its vicinity are various springs of a very peculiar nature, worthy of investigation by the philosopher and chemist.

About a mile from the town is the site of Louth Park abbey, which was built by Alexander, bishop of Lincoln, in the year 1139, and appropriated to Cistercian monks. In the time of Henry III. this house contained 66 monks and 150 converts or labourers. Beauties of England and Wales, vol. ix. See also an account of Louth Church and Plan of the Town, published by Mr. T. Esplin, a respectable school-master of Louth.

LOUTH, a county of Ireland, which, though usually reckoned in Leinster, bears a great resemblance in many particulars to the adjoining ones in Ulster. It is bounded on the N. by the county of Armagh; on the N.E. by the bay of Carlingford, which separates it from Down; on the E. by the Irish sea; on the S. by Meath, and on the W. by this last county and Monaghan. It is the smallest county in Ireland; its greatest length being only 21 Irish (near 27 English) miles, and its breadth 14 Irish (18 English) miles. The number of acres in Irish measure is 110,750, equal to 173 square miles, which in English measure is about 177,926 acres, or 278 square miles. Small as it is, it contains 61 parishes in the diocese of Armagh, and its population many years ago was estimated at 57,750. Louth is in general a rich and well cultivated tract, in which there is very little waste ground, and the population of which is very great. Though not deficient in those undulations of the ground which render a country interesting, it cannot be called hilly, except in the peninsula between the bays of Carlingford and Dundalk, and on the confines of Armagh. It is very much under tillage, and more attention is paid to agricultural improvement than in most other parts of the island, which may in great measure be attributed to the exertions of the late lord chief baron Forster, who is called by Arthur Young "the prince of reformers," and of his son the Rt. Hon. John Forster, who has not only followed up his father's measures, but in the high public offices he has held, has been an active promoter of agriculture throughout Ireland, by the laws he proposed for its encouragement. The crops consist of wheat, barley, oats, flax and potatoes, and there is also a great deal of peas and red clover. Limestone is found in a small tract adjoining the county of Meath in the south, in the neighbourhood of Carlingford, and at Cattetown, on the confines of Armagh, but not in the country between Drogheda and Dundalk. This valuable manure is, however, procured at a moderate expence, and contributes to the improvement of the soil. At some depth in the bogs under the turf there is fine white shelly marble in great abundance, which is also found a very useful manure. Those who live near the sea-coast also avail them-

selves of their situation to use weeds which are found there. The mineral treasures of Louth do not seem to be great. Some ochres and soap rock are mentioned, and formerly a lead mine was wrought at Salterstown, on the sea-coast, in the neighbourhood of Cattlebellingham; but the riches of Louth consist in the produce of its cultivated lands. The stone chiefly found is the same as that found in Armagh and Monaghan, and called *whinstone*, but which differs from other stones so called. It is hard, but not so much so as to strike fire with steel. Sir C. Coote says, that it contains 46 parts of silica, 22 of alumine, 28 oxyd of iron, and four of lime in the 100 parts. The principal river of this county is the Boyne, which flowing from Meath, becomes the southern boundary, about two miles W. of Drogheda, and falls into the sea about two miles below that town. It is a river capable of affording great advantages to the country through which it passes. (See BOYNE.) Several other small rivers cross the county and fall into the bay of Dundalk. The towns of Carlingford, Dundalk, Drogheda, and Collon, have been already noticed under their respective names. Of these Dundalk is the assize town, and Drogheda returns one member, so that the county has three representatives. There are in Louth a greater number than in any other part of Ireland of those high artificial mounts, the fortresses of early ages which the Irish call *raths*, and attribute to the Danes. In Wright's Louthiana will be found a full account of these antiquities, many of which are noticed in different articles of this work. Louth was early colonized by the English and was within the Pale. It had a large share of the disturbances which have afflicted Ireland. Beaufort, Young, &c.

LOUTH, a township of Upper Canada, W. of Grantham, and fronting Lake Ontario.

LOUTRA, GREAT and LITTLE, two small Greek islands in the gulf of Engia; seven miles N.W. of Engia.

LOVTZOVA, a town of Russia, in the government of Irkutsk; 10 miles N.E. of Verchnei Udinsk.

LOUVAIN, a city of France, and principal place of a district, in the department of the Dyle. The number of inhabitants is estimated at 18,000, in two cantons, one consisting of 17,796 inhabitants, on a territory of 87½ kilometres in 12 communes, and the other containing 18,230, on a territory of 140 kilometres, in 15 communes. This city was formerly the capital of Brabant, and as some say, probably without sufficient authority, founded by Julius Cæsar, or by one Lupus, who lived long before him; it is certain, however, that this place was known in the year 885, when Godfrey, duke of Normandy, having ravaged the country, encamped near the Dyle, on the plain of Louvain. The emperor Arnulph built a castle about this time to defend the country against the Normans, which was called "Loen," or "le Chateau de Cæsar," Cæsar's castle, and was a long time the ordinary residence of the dukes of Brabant. Here Henry I. was assassinated in 1038; and here also the emperor Charles V. and his sisters, were brought up till the year 1520; and formerly the assembly of states was held here. It was first surrounded with walls in 1165, and much enlarged in the fourteenth century by Wenceslaus and John, two dukes of Brabant. It was formerly much larger and richer than it is now, and its trade was much more extensive. At the commencement of the fourteenth century, 4000 houses were inhabited by clothiers, who employed above 150,000 workmen. It is a traditionary report, that when the weavers left off work, notice was given of it by a large bell, that the children might be kept within doors, to prevent their being thrown down and trampled to death. Hence it became necessary to have more magistrates than in other

other cities, who assenbled in the town-house, which is a beautiful Gothic structure. In the year 1382 the weavers and other tradesmen revolted against Wenceslaus, duke of Brabant, and not only threw 17 of the magistrates out of the windows of the town-house, but proceeded to commit other acts of enormity, and to lay waste the province; but being besieged, they supplicated for mercy and obtained pardon, the most culpable only being punished; and the weavers, who instigated the insurrection, were banished; and most of them retired to England, where they were well received. As Louvain, on this occasion, was nearly deprived of commerce and inhabitants, John IV. duke of Brabant, in the year 1426, founded an university, which was afterwards deemed the ornament and glory of the place, and is said to have resembled our English universities more than any other abroad. In this university there are 60 colleges, which have been much admired for their situation and building, though less sumptuous than those of Oxford and Cambridge. Louvain had also a Dutch college for Roman Catholics, an English one of Dominican friars, an Irish one of secular priests, another of Dominican friars, and another of Franciscans. Here was also a convent of English nuns, reckoned the best of any of this nation in the Low Countries. The trade of this place at present, which is much declined from what it was in the ancient days of its prosperity and glory, is not very considerable, and consists principally in beer, of which a great quantity is sent to Brussels, Antwerp, Liege, Tirlmont, and other cities and towns. Louvain is ill adapted for defence against an enemy, its walls being nine miles in circumference, though not a third part of the inclosed ground has buildings, the vacant space being occupied for gardens and vineyards. It was taken by the soldiers of the French republic by Dumourier, in their hasty progress through Brabant, but evacuated March the 3d, 1793. Louvain was anciently situated partly in the diocese of Liege and partly in that of Cambrai; but when the archbishopric of Malines was erected, it was placed under that diocese, and so it remained till its union with France; 21 miles S. of Antwerp. N. lat. 50 54'. E. long. 4 40.

LOUEGNE, a town of France, in the department of the Ourthe, and chief place of a canton, in the district of Liege. The place contains 1541, and the canton 5925 inhabitants, on a territory of 170 kilometres, in 7 communes.

LOUVET, PETER, in *Biography*, a native of Reinville, near Beauvais, flourished in the seventeenth century, was educated to the profession of the law, and became master of requests to queen Margaret. He was author of several works, which contain much useful and curious matter, and valuable to the historian. Of this description are "The History of the Antiquities of the Diocese of Beauvais;" "Nomenclatura et Chronologia Rerum Ecclesiasticarum Diocesis Bellovacensis;" and "Remarks on the ancient State of the Nobility in the Beauvaisin, and of several French Families." He died in 1646.

LOUVET DE COUVRAY, JOHN BAPTIST, one of the members of the French convention of France, noticed in the article LEWIS XVI. He was of the Brissotine party, and had the courage to oppose the savage Robespierre, when at the very height of his power; yet he escaped the slaughter which that tyrant inflicted on a multitude of good men, and died in the year 1797. He was author of a romance, entitled "The Amours of the Chevalier Faublas;" a political journal, called "The Sentinel;" "A Justification of Paris in 1789;" "Emily de Varmont;" and "An Account of himself, and of the Dangers which he had passed through."

LOUVIERS, in *Geography*, a town of France, and principal place of a district, in the department of the Eure, 12 miles N. of Evreux. The place contains 6500, and the canton 14,444 inhabitants, on a territory of 157½ kilometres, in 22 communes. N. lat. 49 3'. E. long. 2° 55'.

LOUVIGNE-DU-DÉSERT, a town of France, in the department of the Ile and Vilaine, and chief place of a canton, in the district of Fougères; 8 miles N.N.E. of Fougères. The place contains 3060, and the canton 13,435 inhabitants, on a territory of 172½ kilometres, in 8 communes.

LOUVILLE, EUGENE D'ALONVILLE, in *Biography*, a French mathematician and astronomer, who flourished in the former part of the eighteenth century, descended from an ancient family, was born in the diocese of Chartres in the year 1671. He was educated for the naval or military profession: he served in both capacities, and obtained a considerable rank in the army of Philip V. king of Spain. Being disbanded upon the peace of Utrecht, he devoted himself entirely to the study of the mathematics, and particularly to the science of astronomy. About the year 1713 he went to Marseillès, for the purpose of ascertaining the latitude of that place, in order that he might the better compare his observations with those of Pytheas, made almost two thousand years before. In 1714 he was admitted a member of the academy of sciences at Paris, and appointed astronomer at the observatory of that city. During the year 1715 he came into England, in order to observe the total eclipse of the sun in that year, which was to be more perfectly visible in the neighbourhood of London, than in any other part of the northern hemisphere. He was now elected a member of the Royal Society of London; and on his return to his native country, he applied himself most assiduously to his astronomical pursuits. So intent was he in prosecuting his studies, that he became a recluse, who was never to be spoken with but during the time when he was at his meals, and who immediately afterwards withdrew into privacy. Notwithstanding this temper of mind, he was noted for a delicacy and niceness with respect to dress, and articles for the table. In the year 1732 he was attacked with a lethargic disorder, which in a short time terminated his life and labours. He was author of a great number of curious "Dissertations," on physical and astronomical subjects; several of which are inserted in the "Memoirs of the Academy of Sciences," and others in the "French Mercury." Louville was a good mechanic: he possessed a fine collection of instruments, the best of which were made with his own hands. Moreri.

LOUVO, in *Geography*, a town of Siam, seated on a river which runs into the Macon. The situation is so delightful, and the air so salubrious, that the king resides here during the greatest part of the year; 40 miles S. of Siam. N. lat. 14 55'. E. long. 100 30'.

LOUVRE, in *Music*, a well-known dance-tune.

LOUVRE was also formerly the name of the royal palace at Paris.

LOUVRE, *Honours of the*. See HONOURS.

LOUVRES, in *Geography*, a town of France, in the department of the Seine and Oise; 12 miles N. of Paris. N. lat. 49 3'. E. long. 2° 55'.

LOW, EDWARD, in *Biography*, organist of Christ-church college, Oxford, in the seventeenth century. Anthony Wood speaks of him as "a proud man, who could not endure that any one of the waits or common musicians should be allowed to play at the weekly music-meetings, among regular professors and gentlemen performers." Low had

been brought up in Salisbury cathedral, and was appointed organist of Christ-church, Oxford, in 1630, where he was deputy music professor under Dr. Willson; and upon his quitting the university, Low was appointed his successor in the professorship.

Low published, in 1661, an useful little book of "Short Directions for the Performance of the Cathedral Service;" which was reprinted in 1664, under the title of "A Review of some short Directions, formerly printed, for the Performance of Cathedral Service, with many useful Additions according to the Common Prayer-book, as it is now established: published for the information of such as are ignorant in the Performance of that Service, and shall be called to officiate in Cathedral or Collegiate Churches; or any other that religiously desire to beare a Part in that Service, by E. L., Oxon. 1664." Nothing of this kind had appeared since Marbeck's book, in the time of Edward VI.; and as it is now (1804) 140 years since the second edition of Low's little tract was published, it seems high time for another to be drawn up by some regular bred and able organist, or choral performer, in one of the choirs of the metropolis.

Low, at the Restoration, was appointed one of the organists of the chapel royal. He died in 1682, and was succeeded in the king's chapel by Henry Purcell.

Low, THOMAS, a stage singer, with an exquisite tenor voice. His first profession was that of a gold and silver-lace manufacturer; and he began music too late to read it as a language, so that he learned the songs, which he performed in public, by his ear to the end of his life. He stood, however, very high in the favour of lovers of English ballads, particularly those of Dr. Arne at Drury-lane and Vauxhall, composed expressly for his voice and bounded abilities. He was the rival of Beard, and gained as much applause by the sweetness of his voice, through all his ignorance, as Beard, a regular bred musician, brought up in the king's chapel, could do by knowledge of music, humour, and good acting.

We wish not "to draw his frailties from their dread abode;" but we cannot help recording, as a beacon to other popular singers, that Low was profligate, extravagant, and unprincipled; which rendered the latter part of his life disgraceful and wretched. From acquiring unbounded applause, and an income of more than 1000*l.* a-year, he was reduced to the lowest state of indigence, and degraded into a chorus singer at Sadler's Wells, Cuper's Gardens, and even a ballad-singer in the streets.

Low Airs, in Horsemanship. See AIRS.

Low-Bell, in Birding, a name given to a bell, by means of which they take birds in the night in open champaign countries, and among stubble in October. The method is to go out about nine o'clock in a still evening, when the air is mild, and the moon does not shine.

The low-bell is to be of a deep and hollow sound, and of such a size, that a man may conveniently carry it in one hand. The person who carries it is to make it toll all the way he goes, as nearly as may be, in that manner in which the bell on the neck of a sheep tolls, as it goes on while it feeds. There must also be a box made like a large lanthorn, about a foot square, and lined with tin, but with one side open. Two or three great lights are to be set in this, and the box is to be fixed to the person's breast, with the open side forwards, so that the light may be cast forward to a great distance; it will spread as it goes out of the box, and will distinctly shew the person who carries it whatever there is in a large space of ground which it extends over, and consequently all the birds that roost upon the ground. Two

persons must follow him who carries the box and bell, one on each side, so as not to be within the reach of the light to shew themselves. Each of these is to have a hand-net of about three or four feet square, fastened to a long stick or pole; and on which ever side any bird is seen at roost, the person who is nearest is to lay his net over it, and take it with as little noise as possible. When the net is over the bird, the person who laid it is not to be in a hurry to take the bird, but must stay till he who carries the light is got beyond it, that the motions may not be discovered. The blaze of the light, and the noise of the bell, terrify and amaze the birds in such a manner, that they remain still to be taken; but the people who are about the work must keep the strictest quiet and stillness that may be.

Some people are fond of going on this scheme alone. The person then fixes the light-box to his breast, and carries the bell in one hand, and the net in the other; the net, in this case, may be somewhat smaller, and the handle shorter. When more than one are out at a time, it is always proper to carry a gun. It is no uncommon thing to espy a hare when on this expedition; and, in that case, it is better to shoot her, than to trust to the taking her in the net, for she will very easily escape from that.

Some tie their bell to their girdle, and carry the light in their left hand, and the net in their right; the light is not to be so large in this case, and the other way is therefore rather the better.

Low-Bellers, in our Statute-Books, are persons who go in the night-time with a light and bell, by the sight and noise whereof, birds sitting on the ground become stupefied, and so are covered with a net, and taken.

Low Countries, in Geography. See BRABANT, FLANDERS, and NETHERLANDS.

Low Countries, School of Engraving of the. It has been deemed eligible to adopt the usual classification, and follow the examples of the continental writers upon art, in arranging our schools of engraving. Those writers have thought proper to unite the schools of Holland and of Flanders under the general head of "l'Ecole des Pays bas;" and as our Cyclopædia had advanced beyond the letter D, before it was determined to cluster our biographical notices of the professors of this art, in schools and in chronologic succession, it is presumed the expediency of this arrangement will need no further argument in its recommendation, or reason for its adoption.

The literati and connoisseurs of the Low Countries have not been insensible to the anxieties which usually attend on the patriotism of art and scholarship, and have taken some small part in the controversy respecting the invention of letter-press engraving and printing: but the feeble pretensions of Laurence Collet of Haerlem to this fancied honour, though once strenuously asserted by Meerman, by Bokhorn, and by Junius, have been patiently resigned, and gradually withdrawn; and the story of his wandering in a wood near Haerlem, and printing from the bark of trees, refuted by the baron Heinniken, is no longer listened to with the smallest degree of credit, beyond the suburbs of the good city of Haerlem.

But the Low Countries may claim the more worthy rivalry, and the more solid distinction, of having given birth to some of the most justly celebrated engravers on copper: and the prescience and display of superior and original skill, are surely a more noble ground of contest, than the fortuitous concurrence of casual discovery, however important in its consequences.

We have already mentioned the Gothic engraving of the Holy Virgin, which is in the royal collection, and other prints,

LOW COUNTRIES, ENGRAVERS OF THE.

prints, that with the most show of reason have been presumed to be the work of *COSTER* (see that article); but if that artist, or that person rather, died in the year 1441, as is reported, how happens it that we hear so little more of letter-press engraving in the Low Countries till the time of *Van Assen* and *Peter Coeck*, who were neither of them born till toward the close of the fifteenth century?

A rude print, designed in a stiff and Gothic style, and executed in a barbarous taste, was some years ago preserved in the library of the king of France. It had formerly belonged to the celebrated *abbé Marolles*; was believed by the connoisseurs of Paris (perhaps with reason) to be the most ancient of the Flemish productions in this art; and is inscribed, in the old black letter, "*Gheprint t'Antwerpen by my Phillery, de Figur Snyder,*" i. e. in English, "*Printed at Antwerp by me, Phillery, engraver of figures.*"

The subject of this ancient engraving, which appears to be executed on wood, is a female figure sitting with a dog on her lap, near whom are two soldiers standing; but if it has been inferred to be the first, merely because it is among the very rudest and worst of Flemish productions, we can by no means acquiesce in the justness of such a criterion; and of *Mynheer Phillery*, the *figur Snyder* and printer, nothing further is known.

If we except the doubtful claims of *Phillery*, *Lucas Jacobs* of *Leyden*, *Peter Coeck* of *Alost*, and *John Walther* of *Assen*, who were contemporaneous, were the earliest engravers of the Low Countries with whose names and works we are acquainted. The former is believed to have introduced into his country the art of engraving on copper, and the method of printing with the rolling-press; and the two latter, that of engraving on wood, or so as to deliver impressions from the surface of the work, and with the letter-press; and all, though not the proclaimed and personal disciples, were evidently the students and imitators, of *Wolgemuth*, *Schoen*, and *Durer*. The internal evidence arising from comparing their styles of art, with those of the early German masters, is at least as satisfactory a proof of such a fact, as could have been derived from the testimony of contemporary writers: for mere writers upon art, partly from want of practical knowledge, and partly from the mistakes of inadvertency, have not unfrequently recorded errors; which errors sometimes continue for ages to be repeated, and to flow on through the usual literary channels, until they are detected and dragged ashore by the local knowledge and power of professional artists, or the cultivated eye and matured judgment of unassisted connoisseurship.

On comparing dates, it appears that the birth of *Jacobs* was four years posterior to those of *Coeck* and *Walther*, though he preceded them in the practice of engraving.

Peter Coeck, or *Koeck*, was born in the year 1490, at *Alost*, in *Flanders*, and died in the same city A.D. 1550. From *Barent Van Orley*, of *Brussels*, he obtained some instructions in drawing, after which he travelled to *Italy* for improvement, where he made very considerable progress in his studies, and from whence he made a voyage to *Turkey*.

On his return he married, and settled in his native town, where he enjoyed a small pension from the government; but his wife dying soon after, he removed to *Brussels*, and engaged to paint for a company of merchants, who had conceived the project of establishing a manufacture of tapestry at *Constantinople* under his direction.

During his residence abroad, he had made drawings of that magnificent city and its suburbs; which, on the failure of the tapestry scheme, he cut on seven wooden blocks, divided into as many compartments, which being joined together,

make a very large, long print, resembling a frieze. On a tablet belonging to the first block is written in bad French, "*The Manners and Customs of the Turks, with the Countries belonging to them, drawn from Nature by Peter Coeck of Alost, when he was in Turkey, in the year of Jesus Christ MDXXXIII.*" He also with his own hand executed these prints according to the drawings he had made." And upon a tablet in the last block, in the same language is inscribed, "*Mary Verhulst, widow of the said Peter d'Alost, who died in the year 1550, caused these figures to be printed under the grace and privilege of his imperial majesty, in the year MCCCCCLIII.*" The principal subjects of these blocks are, 1. The March of the Grand Seigneur with his Janisaries. 2. The Suite of the Grand Seigneur walking. 3. A Turkish Marriage, with the Ornaments and Dances of the Country. 4. Their Funeral Ceremonies. 5. Their Rejoicings on the New Moon. 6. Their Repasts. 7. Their seafaring and warlike Customs.

After *Coeck* returned to his native country, he married a second time, *Mary Verhulst*, and had a daughter, who afterwards married his pupil, *Peter Breughel* the elder. Besides many altar and cabinet pictures, executed by *Coeck*, he translated from the Italian the works of *Sebastian Serlio*, and *Vitruvius*; contributed greatly to the improvement of the architecture of his country; and was honoured with the title of first painter to the emperor *Charles V.*

Strutt says of his engravings, that they contain a vast number of figures, executed with great care, but not much taste: but that they are very curious, and were doubtless very estimable at the time they were performed. He usually marked them with his initials in the form of a monogram, which will be found in our *Plate I.* of those used by the engravers of the Netherlands.

John Walther Van Assen was also born in the year 1490, and in his youth flourished at *Amsterdam*, but the events of his life are very obscure. He engraved on wood with a degree of boldness superior to that of the age in which he lived: his invention was copious; and the heads of his figures often expressive. His print of "*Christ praying in the Garden*" has been particularly admired, and very justly so, when regarded with reference to the time and place in which he lived: but the forms of his naked, as might be expected, are Gothic, meagre, and ill drawn.

Walther commonly marked his engravings with his initials, combined in a cypher, and as if inscribed on a tablet, as may be seen in our first plate of the monograms, &c. used by the engravers of the Low Countries; and the best list which we are able to form of his works is as follows.

A set of six, of the circular form, about nine inches in diameter, from the *Life* and *Passion* of *Christ*. They are dated in the years 1513 and 1514; marked with the cypher of the artist; and each print is surrounded with a sort of Dutch grotesque ornament. Their subjects are, "*The Scourging of Christ*;" "*Our Saviour at Prayer in the Garden of Olives*," wherein his three disciples are represented asleep, and the Jews are advancing, conducted by *Judas*; (this is the print distinguished above for its superior merits;) "*Christ taken into Custody, with St. Peter cutting off the Ear of the Servant of Malchus*;" "*Christ bearing his Cross*," with the procession to mount *Calvary*; "*The Crucifixion*," in which *St. John* and the holy women are introduced at the foot of the cross; and "*Jesus laid in the Sepulchre*," attended by *Joseph of Arimathea* bearing a vase of ointment.

Another set of seven plates in folio, each consisting of six different subjects contained in architectural compartments, with descriptions in the Dutch language. The subjects are partly

partly historical and partly allegoric; some are from the Christian, and others from the heathen mythology; and it would be difficult, if it be practicable, to connect the whole on principle. The seventh print is inscribed "Gheprint tot Aemstredam, by Doen Pieter toon in Enghelenburch," and all are marked with the monogram of the artist.

Beside these, are some processions, of which we know not the titles or number, from the graver of Walther of Assen, and a small upright print of an armed figure on horseback, with the ensign of the castle of St. Angelo, inscribed "St. Hadrianum. Amstelodamus in Ædibus Donardi Petri ad signe Castri Angelica." The whole are after his own compositions.

Lucas Jacobs of Leyden, the earliest engraver on copper that the Low Countries produced, was an honour to his age and country. His country appears to have thought so, and hence in some parts of Europe his family name is nearly lost, and he is universally known by the appellation of Lucas van Leyden.

Lucas was born in the year 1494, and was the son of Hugues Jacobs, a painter, but not of much talent or reputation, and whose chief glory has been reflected from the brightness of his son's abilities. Obtaining a rudimental acquaintance with art under his paternal roof, Lucas began, even during the age of adolescence, to distinguish himself by his drawings and his extraordinary attempts in the arts of painting and engraving. He finished his elementary studies in the school of Cornelius Engelbrecht, who was then in the height of reputation. But perhaps his greatest happiness as an artist, consisted in his living at the same period with Albert Durer, between whom and himself the most intimate and sincere friendship, and the utmost freedom and liberality of professional communication, subsisted: for Durer, who was the senior of our artist by more than twenty years, on seeing some of his youthful productions, is said to have conceived for him the most lively esteem, which gave birth to a correspondence, generous and disinterested at first on the part of the German, and which by degrees grew familiar and friendly on both sides. The biographers of Lucas have reported, that between the age of nine years and twelve, he executed a print of St. Hubert, for which he was rewarded by a certain burgomaster with as many guilders as he was years of age. The present writer has not seen this juvenile production, nor has he found it mentioned in those foreign catalogues which he has consulted of the works of our artist. He therefore presumes it may have been a copy, done for practice and improvement in the new art, of the justly celebrated work of Albert Durer, which is thus entitled, and that it was probably among those early and surprising productions which called forth the favourable notice of the artist of Nuremberg, and became the basis of the subsequent intimacy between Albert and Lucas, which ended but with the life of the former.

Each of these distinguished artists regularly sent as presents to his friend, selected impressions (for the mercantile trickeries of proof-taking and proof-making had not then been invented) of every engraving which he published; and when Durer was driven from Nuremberg by the ill-temper of his wife, he sought refuge at Leyden, was received by Jacobs in the most cordial and affectionate manner, and to commemorate their mutual friendship, besides painting each other's portraits, they executed a picture in conjunction on the same pannel.

It should have been mentioned before, that Lucas acquired his knowledge of the use of the graver in the workshop of a goldsmith of Leyden, and that of the process of etching, he obtained from an armourer of that city, who employed

the corrosive power of aquafortis in ornamenting cuirasses, and other conspicuous parts of plate armour. The present writer has, in another work, stated his conjecture, that the ancient corroded sword-blades of Syria and Damascus are the probable origin of the art of etching on copper, and now suspects that he may have been mistaken in attributing (as he has done under the article *ETCHING*) its invention to Albert Durer. He now thinks it not improbable that Lucas imparted this art of corrosion to his friend, either by letter, or, he should fancy, during the residence of the latter at Leyden, if there were not grounds for supposing that this journey was not undertaken until after the year 1516, when Durer's first etching (of which the subject is the rape of Proserpine) was produced. And he thinks so the rather from reflecting on the generally received report, that the two earliest of Albert's etchings were performed on plates of iron or steel: yet Lucas's etching of St. Catherine, which is believed to be his first production in this art, did not appear until the year 1520.

Lucas of Leyden was frank, generous, and urbane, as well by nature as by habit; yet his generosity in some instances was requited with ingratitude; and his urbanity, if we might credit the tale which is related below, did not shield him from the shafts of envy and malevolence. Conspicuous by his rare and singular endowments, and unremitting in his habits of professional industry, the novelty, beauty, and number of his publications could scarcely fail to enrich him. Strutt says "he gained much money by his profession, and being of a generous turn of mind, had not the least notion of shutting up his money in his chest; on the contrary, he spent it freely, dressed well, and lived in a superior style."

To enjoy his popularity, or improve his taste, he made a journey into Zealand and Brabant, at the age of thirty-three, giving entertainments to the artists in most of the great towns and cities through which he passed; and it is reported, that during this journey, a slow poison, which was fatal to our artist, was administered to him at one of these entertainments by a painter of Flushing, who was envious of the fame which followed the exercise of his various talents. But the honour of human nature should perhaps incline us not to listen too readily to stories of this kind. No delicacy should have led, and no pardon was likely to lead, to the repression of the name of the author of a deed so atrocious. Yet he was never pointed out: and it must be a slow poison indeed! that is six years in effecting its purpose.

It seems more worthy of belief that the real poison of Lucas van Leyden, consisted of a mixture of the occasional excesses of convivial indulgence, with habits of intense professional application. Contraries which can never assimilate, few constitutions can endure; and so anxious and unremitting was the application of Lucas, that he found the day too short for his purpose, and frequently consumed great part of the night also in his studies.

Even during the last six years of his life, while he lay pining under the pressure of disease, or at least oppressed by a sickness under which ordinary minds would have languished, his industry and love of art were eminently conspicuous. When it was represented to him that such close attention did but increase the malignity of his disorder, he calmly replied, "I am content it should be so, since, by my studies, I endeavour to make my bed of sickness a bed of honour. An artist can never die in a more suitable manner than with his pencil in his hand."

He died accordingly at the age of thirty-nine in his native city, and in the year of our Lord 1533.

Beside engraving both on copper and on wood, Lucas painted in oil, in distemper, and upon glass, exercising the latter

latter art by a process that is known to few if any of its modern practitioners. He commonly marked his works with the sort of Gothic L, which will be found in our first plate of the monograms. &c. of the engravers of the Low Countries, sometimes adding the date of the year, and inscribing both on a tablet.

Vafari says, that "perhaps Lucas equals any of the best artists in the management of the graver; that his historical subjects are executed with great truth, and that he knew well how to group his figures without creating confusion in his prints;" but is certainly too laud in his praise, where he adds, that "he surpassed Dürer in composition, and succeeded in representing aerial perspective with the graver, as well as could have been done with the assistance of colour."

A juster estimate of his merits may be found in the biographical dictionary of our countryman Strutt, who affirms that his style of engraving differed considerably from that of Albert Dürer, and seems evidently to have been founded upon the works of Izaak van Meckeln. His prints are very neat and clear, but without any powerful effect. The strokes are as fine and as delicate upon the objects in the front, as upon those in the distances; and this want of variety, joined with the feebleness of the masses of shadow, give his engravings, with all their neatness, an unfinished appearance, much unlike the firm, substantial effect, which we find in the works of Albert Dürer. He was attentive to the minutie of his art. Every thing is carefully made out in his prints, and no part of them is neglected. His figures are generally tall and thin; the attitudes well chosen, and frequently graceful and elegant. In these he followed nature simply, without affectation. He gave great character and expression to the heads of his figures; but on examination of his works, we find the same heads too often repeated. The hands and feet rather mannered than correct; and when he attempted to draw the naked figure, he succeeded but indifferently. He affected to make the folds of his draperies long and flowing; but his female figures are frequently too excessively loaded with girdles, bandages, and other ornamental trappings, that much of the elegance of the design is lost; and that native simplicity, which is, as it were, the very soul of painting, is destroyed.

To Adam Bartsch of the Imperial library at Vienna, the public is indebted for a catalogue raisonné of nearly two hundred of the engravings of this master, all of which are the produce of his own fertile invention. About twenty woodcuts have also been ascribed to him, but of which he was probably only the designer. Mariette, however, possessed two hundred and thirty of his prints.

As nothing like an English catalogue has yet appeared, we shall name as many as we are able, beginning with those subjects which he has taken

From the Old Testament.—"The History of the Creation, and the Fall of our first Parents," in a set of six fine prints of small folio size, engraved A.D. 1529; of which the subject, 1. God, (represented by the figure of an old man,) creating Eve during the Sleep of Adam. 2. God laying the Injunction on Adam and Eve not to touch the forbidden Fruit. 3. Eve, seduced by the Serpent, persuading Adam to eat of the Fruit of the Tree of Life. 4. Adam and Eve expelled from Paradise. 5. Cain slaying Abel. 6. Adam and Eve deploring the Death of Abel, who is extended before them. "Adam and Eve, Fugitives, after being turned out of the terrestrial Paradise," in 4to. size. Lucas has treated "The Trespass of Eve," and "The Death of Abel," in a different manner, on six small plates; "Lamech standing, bending his Bow, and Abel sitting at the Foot of a Tree, with the Jaw-bone of an Ass before him," in 8vo.; "Abraham

and the three Angels," of quarto size; "Lot and his Daughters escaping from the burning City," a very fine engraving, dated 1530, companion to "The Sin of Adam and Eve," in small folio; "Abraham sending away Hagar and Ishmael," a middling-sized plate, lengthways, dated 1510; and known among dealers by the name of the large Hagar. The same subject otherwise treated, called the little Hagar, of 4to. size, dated 1516. The History of Joseph, in five 4o. prints, dated 1512; and of which the subjects are, 1. Joseph recounting his Dreams to his Brethren. 2. Joseph solicited by the Wife of Potiphar. 3. The Wife of Potiphar accusing Joseph. 4. Joseph in Prison, explaining the Dreams of the Officers. 5. Joseph interpreting the Dreams before Pharaoh. "The Daughter of Jephtha meeting her Father," one of the earliest productions of Lucas, engraved some time about the year 1508; "Dalla cutting off Sampson's Hair," "David and Goliath," and "David playing the Harp before Saul," all in folio; "David supplicating in behalf of his People," a large print. The same subject differently treated, an etching, dated in 1520. "Solomon worshipping the Idols," in quarto; "Elisha before king Ahazueras," a large folio plate; the proof of which, in the royal collection at Paris, cost two hundred and fifteen livres, according to the note of P. Mariette written at the back of the print. "Susannah and the Elders," of 4to. size, dated 1508.

Subjects from the New Testament.—"St. Joachim embracing St. Anne," dated 1520; "The Annunciation," "The Visitation," both of octavo size; "The Adoration of the Magi;" this is esteemed one of the most considerable works of the master, it is dated 1513; and of large folio size. "The Repose during the Flight into Egypt;" "Jesus baptized in the River Jordan," a very grand composition, containing a very numerous assemblage of figures, and engraved about the year 1510; "Jesus tempted by Satan in the Desert," dated 1518, all of quarto size; "The Resurrection of Lazarus," a grand composition, engraved in the year 1508. folio size; "The Passion of our Saviour," represented in fourteen plates, engraved A.D. 1521, and entitled as follows, viz. 1. The Last Supper. 2. Jesus on the Mount of Olives. 3. Our Saviour seized in the Garden of Olives. 4. Our Saviour taken before the High Priest. 5. Jesus reviled. 6. The Flagellation. 7. Jesus crowned with Thorns. 8. Jesus exposed to the People. 9. Christ bearing the Cross. 10. The Crucifixion. 11. The Descent from the Cross. 12. Our Saviour laid in the Sepulchre. 13. The Descent into Hell. 14. The Resurrection. Another set of "The Passion of our Saviour," in nine circular plates, eight inches in diameter. A grand "Ecce Homo," very rich in composition, containing more than a hundred figures, one of the best engravings of Lucas, dated 1510. in large folio. "Jesus-Christ on the Cross, between the two Thieves," a very fine print, nearly as rich in composition as the preceding, having twenty-four figures admirably grouped: the good impressions of this plate are very seldom to be met with, it is dated 1517, and in large folio. "Our Saviour appearing to Mary Magdalen as a Gardener," both half figures, placed before the sepulchre, in 4to. and dated 1519; "The Return of the Prodigal Son," a folio print, admirable for the spirited execution of the back-ground and small figures, engraved A.D. 1510.

Various Devotional Subjects.—"The Virgin and Child, accompanied by St. Anne," dated 1516; "The Virgin and Child, standing on a Bishop's Crozier;" "The Virgin and Infant Jesus," 1514; "A Holy Family," in quarto; "The Virgin and Holy Infant, contemplated by two Angels," in quarto. Jesus Christ and his twelve apostles, in a

set of fourteen plates, of octavo size. The four Evangelists, occupied in writing the gospel, half-length figures, in 8vo. St. Peter and St. Paul, half-length figures, octavo size. Another plate of the saints "Peter and Paul," in a landscape; a very fine engraving, dated 1527. "The Conversion of St. Paul," a very grand composition, in large folio, dated 1509. "Saint Christopher," in which he appears sitting at the foot of a rock, on the banks of a river: on one side of the saint, in the back-ground, is a hermit, coming out of his cell with a lantern. This print is one of the earliest productions of Lucas, done apparently about the year 1508, of octavo size. "Saint Christopher in the Water, with the Infant Christ on his Shoulders," a small print.

Albert Durer engraved and published the same subject in the course of the same year, and it is supposed the two artists worked in concurrence. "St. John the Baptist," dated 1513. "The Decollation of St. John the Baptist," both in octavo; "St. Jerome," the head surrounded with rays of glory, sitting in an alcove, with a skull before him. Lucas engraved this subject three times; but the print which is treated in the best manner is dated 1521, in quarto. "St. Sebastian," in which the holy martyr appears fastened to a tree, with his body pierced by arrows, in octavo, engraved probably in the year 1508; "St. Antony," habited in a long robe, with a monk's cowl on his head, and a great number of accessories, in octavo; "The Temptation of St. Antony," where he is represented seated on a hillock between two trees, looking at a figure, whom he perceives to be a female devil, from the horns sticking through her head dress. The back-ground is a mountainous landscape, with an old castle; a very fine print, dated 1509, in quarto. "St. Dominic," surrounded by rays of glory, holding a staff, terminated by a crucifix: behind him is a dog, holding in his mouth a flaming torch, in octavo, engraved some time about the year 1514. "St. Gerard Sagredus," a bishop and martyr, his head covered with an episcopal mitre, surrounded with rays of glory: he holds in his hand a heart pierced with an arrow, octavo. "St. Francis receiving the Stigmatics," from a crucifix suspended in the air: at the bottom of the print is a Capuchin monk, sitting at the foot of a tree, in octavo. "St. George liberating the Princess of Antioch," whom he has rescued. In this, as in many other old prints, the action is double: in other words, two points of time are represented, for in the back-ground is St. George combating the dragon, and the princess chained against a rock; engraved in 1508. "Mary Magdalen entering into worldly Pleasures," a celebrated print, of large folio size, known among the amateurs under the name of "The Magdalen's Dance:" in one part of the print she is represented dancing with a man to a flute and tambourin, with various other groups: lower down she is represented on horseback, at the head of a troop of huntsmen; and again flying towards a wood with three men, one of whom sounds a horn: and towards the summit of a rock is the soul of the Magdalen ravished in the air by four angels. This fine print was engraved about the year 1519, when the artist was in his meridian. "The Magdalen in a Desert at the Foot of a Rock;" in the clouds is represented the eternal father with a long beard, and a tiara on his head. This is without date, but is doubtless one of the earliest productions of Lucas, while his powers of drawing and composition were yet feeble, and is better engraved than it is designed. "The Magdalen standing on a Cloud, holding a Vase:" to this print has been mistakenly given the appellation of "Pandora letting out the Evils of the World;" it is dated 1518, and of octavo size. There is in existence a print of this subject, marked with the initials I. V. M. which has been attributed

to Israel Von Mecheln; but, on comparison, it appears to be a bad copy of the engraving by Lucas, by an unknown hand. "St. Catherine," a half-length figure, crowned with rays of glory, leaning on a wheel, with a book and sword. It is an etching, touched in some parts with the graver, and dated 1520.

Profane Subjects.—"Mahomet sleeping, with a Priest murdered by his Side, and another Figure stealing his Sword," a folio print, said to be one of his earliest productions; the seven cardinal virtues, sitting figures, each crowned by an angel, dated 1530, viz. 1. Faith. 2. Hope. 3. Charity. 4. Prudence. 5. Justice. 6. Fortitude. 7. Temperance. "The Death of Lucretia," dated 1512, which print is by some called "The Death of Dido," in octavo; "The Death of Pyramus and Thisbe;" "The Poet Virgil, suspended from a Window in a Basket, to the Derision of the Populace;" a small folio print, executed with great taste and spirit, and very correctly drawn, and well composed. Vafari, who speaks very highly of this print, says, that "Albert Durer was so sensibly struck with the merit of it, that he afterwards wished to concur with Lucas in producing a pair of prints that should correspond in form, moral, and dimensions, to which desire we owe the celebrated print of "Death's Horse." The two prints do correspond in these respects: yet the inadvertency of Vafari in this place, which has been repeated by Huber and Rost, has not hitherto been pointed out. To make any thing credible of this story, the order of the facts and persons must be reversed; for the "Death's Horse" of Albert Durer was produced to the public in the year 1513, whereas Lucas of Leyden did not publish his suspended poet till 1525. And what renders the non-detection of this error the more surprising and remarkable is, that both these engravings bear their respective dates; the latter on a fragment of broken stone at the left-hand corner of the print, the former immediately above the monogram of Albert on his usual tablet.

The emulation must, therefore, have been felt by Lucas, and his engraving of "The Courtezan suspending Virgil in a Basket," which, of all his works, approaches nearest, in point of style, to this exquisitely finished print from the graver of Durer, must have been produced accordingly.

The recondite moral and meaning of these compositions, and intentions of their authors, will then stand thus. Albert Durer had produced a justly admired engraving, by some vulgarly termed "Death's Horse," by others "The Worldly Man," but wherein a cavalier, completely armed, sallies forth on the business of Death. His steed is richly harnessed; his helmet studded and wrought with ornaments; and his armour, in the fine impressions, appears as if of silver, and of costly workmanship. He is a hero, and perhaps intended by Albert for some Alexander, or individual general of renown. Whilst he is gravely bent on the pursuit of that glory which arises from the destruction of his fellow men, a crowned spectre, which seems intended for Death, crosses the warrior's way: he is mounted on a mule, holds up an hour-glass with an index before the hero, and seems to scoff at his purpose; while a frightful monster, with various horns, like one of those mentioned in the Apocalypse, and which is probably intended for the Devil, follows hard after him, intent and ready to seize on his prey. The moral has various accessories, such as a lofty castle in the back-ground, and a lizard crawling in the road, whose allegorical office is to warn man of danger. A warning bell, too, hangs from the neck of the mule, on which rides the spectre, while to the comparison of the warrior's steed, the jingling bell of Folly is appendant.

It is altogether a profound pictured allegory, worthy of serious contemplation, and dictated by the same muse who afterwards prompted Dr. Young to write

"Deaths stand, like Mercuries, in ev'ry way,
And kindly point us to our journey's end."

It appears to the present writer, that, struck with this extraordinary display of the various powers, as poet, painter, and engraver, of his friend Durer, the Dutch artist became laudably ambitious of designing and executing a fit companion to a production which must doubtless have been very popular; and, accordingly, institutes and stimulates a comparison between the love or lust of conquest and false glory, and that of woman, and with much ingenuity calls on the spectator to behold and balance their absurd and pernicious consequences.

A pictorial comparison is thus provoked between the moral consequences of the abuse of two potent passions; and if it might be granted that we perceive the little distant figure, whom, in the print of Lucas, the courtesan suspends in a basket, and exposes to the derision of the populace, to be the poet Virgil, the moral effects would be heightened by the reflection, that it is the organ of Fame, and dispenser of terrestrial immortality, who is thus himself made to appear infamous and ridiculous, as in the print of Albert it is the destroyer who is the victim.

But of this it requires that the spectator be informed by Lucas, or by Vafari; for as the costume and characters (as in all the works of this master) are perfectly Dutch, no other men would dream that a small distant head, covered with the mitre of episcopacy, or the cap of folly, was that of the Mantuan bard.

This engraving is, however, with regard to composition, manual execution, high finish, and actions and expression of the figures on the fore-ground, particularly that of the principal male figure, one of the very best of the works of Lucas van Leyden.

To quit this digression, and resume our list of the subjects which he has designed and engraved from profane history, and his own fancy. "Venus, the beautiful Goddess of Love," a 4to. plate, dated 1528. A folio plate of "Mars and Venus," with armour and an attendant cupid, was executed during the long illness of the artist; as was also "The Goddess Pallas," armed with her ægis and spear. The latter was the last plate which he engraved, and it is said, that a short time before he died, he requested to see it; upon which occasion it seems probable, that he used those remarkable words, so much to his honour as an artist, which we have cited in his biography. "A military Officer displaying a Flag." The attitude of the figure is very spirited and soldier-like, and the print altogether is very beautifully finished; both are of octavo size. "Four Soldiers in a Forest," without a date, but probably engraven about the year 1508. A very fine print of a young man at the head of a party of soldiers, listening attentively to a man, with his hat in his hand: on each side is represented a group of three men conversing. "The Beggars," one of whom receives a platter from the other: the group is completed by a female figure, with her hand on her breast. This print appears to have been engraven about the year 1508. "The Promenade;" the back-ground represents a mansion situated at the foot of a mountain, which terminates the view, dated 1520. "The Earl and Lady, with a Falcon;" this is drily executed, and appears to have been engraven about the year 1508. "The Wood Nymph," she is walking with a peasant, and another figure conducting

them; all of octavo size. [Note.—There is a copy of the Wood Nymph, engraved by Wierix at the age of twelve.] A man with a lighted torch, conducting a female, followed by a man with a sabre, and a club across his shoulder: this print is very delicately executed, apparently about the year 1508. A female figure presenting a vase to a man; the landscape is terminated by a mountain, the summit of which is crowned with an ancient castle, dated 1520, of octavo size. "The Pilgrims," consisting of three figures, quarto size; "The wedding Ring," representing a man giving a ring into the hand of a young woman, seated by his side. This rare print is etched in a firm style, dated in 1520, and distinguished by the neatness of the execution, in quarto. "The Fool," representing a female figure, defending herself from the embraces of a fool, characterised by his dress and baubles, both half-length figures. This is an etching, slightly touched with the graver, and dated 1520. "The old Man with a Bunch of Grapes," a half-length profile. This print is admirably touched, and appears to have been done about the year 1523, when the artist was in his meridian. "The young Trumpeter," representing a boy blowing a trumpet, to the sound of which two others are dancing; one of the earliest productions of Lucas. "The Woman and the Bitch," representing a female with her head enveloped with drapery, the ends of which hang in folds over her body; towards the left are perceived the head and foot of a bitch, whom the lady is feeding with fruit. This print is executed on a white ground, and dated 1509. Another "Woman and Dog," dated 1510; "The Musicians," a very fine print, dated 1524, consisting of a man playing a guitar, and a woman playing a violin; "The Surgeon," performing an operation behind the ear of a peasant, whose countenance tells us plainly how much he suffers, dated the same as the preceding; "The quack Doctor," operating with an instrument in the mouth of a peasant, who with great vexation perceives that, during the operation, a girl behind him is emptying his purse of its contents. This print possesses equal merit with the two former, and is dated 1523; all of octavo dimensions. "The Milkmaid," holding in one hand her bonnet, and in the other a pail, into which she is about to milk a cow held by a peasant. This is a very rare print, dated 1510, of quarto size. "Uylenspiegel," or "L'Espegle," the scarcest of all the works of this master. It was in the collection of the king of France, and mistakenly said by Marolles, and other French connoisseurs, to be unique. Basan informs us, that M. Mariette had also an impression of this plate, and several are known to exist in England. It represents a man playing upon the bag-pipes, carrying two children in a basket, and a woman with an infant in her arms. It is nearly seven inches and a half high, by four inches and three quarters wide; and has been copied of the same size several times. One of the copies is by Hondius; but the best has no name to it. This rare print is dated 1520.

Various Ornaments.—The profile of a warrior's head in a medallion, surrounded with ornaments. It is dated 1527, and marked with the letter L, on a cartouche at the bottom. A composition of ornaments in the taste of that age, composed of a ram's skull and two fish, dated 1527. Another composition of ornaments, with a Mercury sitting between two sphinxes, folio size, dated 1528. A pannel of ornaments, composed of a marine deity with a trident, surrounded by sirens and chimæreæ, executed on a black ground, in octavo, and dated 1528. "The Infant Warriors," one of whom displays a flag, and the other carries a helmet; and "The Arms of the City of Leyden," in a

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small circle, surrounded by four others, each containing a genius, engraved some time about the year 1510, both of octavo size.

Portraits.—The emperor Maximilian I. with his hair plaited and wearing a large hat. Lucas painted the portrait when the emperor visited Leyden, but did not engrave it till the year 1520, after the death of that prince. The head is entirely engraved, and the remainder etched, and slightly touched with the graver to give it effect; in the back-ground is a little figure holding a scroll, marked with the letter L. This is the finest portrait Lucas ever engraved; very rare, and of folio size. A portrait of the artist himself, represented with a hat on, and a mohair doublet trimmed with fur. This portrait was drawn and etched by himself when he was but twenty years of age; it is touched in a light spirited manner, and inscribed, "*Effigies Lucæ Leidentis propria manu incisa*," of quarto size. Portrait of a young man, half length, dressed in a cap and feathers, and pointing to a skull which he holds under his robe. This portrait commonly passes for that of Lucas himself, but it is very unlike the former. Lucas is always represented with short plaited hair, and this portrait has very long and curly hair; it is of quarto size, and engraved apparently about the year 1525. There is a print attributed to Lucas, of which the subject is "*A Family surprised by Death*," but it is too poorly executed to be really his performance; for in the year 1529, the period when this print was engraven, our artist was in his meridian. The drawing of it is the best part, but there is great want of spirit and correctness in the contours.

Martin Van Veen was born at the village of Hemskirk, in Holland, in the year 1498, and till he was eclipsed in the public notice, by the celebrated painter of that name, was called after his native village. He learned the rudiments of drawing from John Lucas, and of painting from John Schoreel, but of the subsequent progress of his studies, there are two accounts of an opposite nature. Strutt says, that "his early application was attended with little success, and his genius was clouded by an appearance of natural dulness, which seemed to preclude all hope of his ever attaining to any reasonable degree of perfection." Huber, on the contrary, after seeing Strutt's biography of this artist, says, that he imitated the style of his master Schoreel so well, that he became jealous of the rising talents of Van Veen, and expelled him from his school; from which it is clear, that if the scholar was not a blockhead, the master was illiberal.

Van Veen, however, has obtained praise from Mariette, and from Girard Lairesse, and the ease and accuracy of his drawing, and firmness of his contours, have been repeatedly commended. After quitting the school of Schoreel, the fame of Michael Angelo, and the antique sculpture, attracted him to Italy, but after studying there for some time, he returned to Holland and settled at Harlem, where he died in the year 1574.

Neither the engravings nor paintings of Van Veen would now be much admired, being deficient in grace, expression, and harmony of chiaroscuro, but among his contemporaries his works commanded respectful attention. They may be known by the monogram which the reader will find in *Plate I.* of those used by the engravers of the Low Countries.

Among his best prints are "*Judah and Tamar*," and "*The Annunciation*," both in 4to.; "*Commercial Industry*," in folio, and "*The Wife and Foolish Virgins*," nearly of the same dimensions. The twelve plates of the battles of Charles V., which have been attributed to him,

are from the graver of Theodore Coornhaert, but were executed after his designs.

Dietrich, or Theodore Vander Staren, or Von Stern, was born in Holland, some time about the year 1500; the time of his death has not been recorded, but it is known that he continued to engrave till 1550. He is ranked by the French in the class of little mailers, and known by the appellation of the Master of the Star, because in his monogram he used to place a star between his initials, as seen in our first plate of those used by the engravers of the Low Countries. His compositions prove him to have been a man of talent: he has engraven many landscapes and subjects from sacred history, after his own designs. He understood the human figure tolerably well, but his proportions, like those of the Dutch people, are short and heavy; and he often crowded his back-grounds with architectural ornaments. To his monogram he usually added the day of the month on which his plates were published.

The following are engraved by Vander Staren from his own designs. "*The Miraculous Draught of Fishes*," dated 1523, in octavo; "*Christ walking on the Sea*," a small upright; "*The Temptation of Christ*," where the Devil is represented with pointed shoes; a small upright plate. A very small plate of a faint kneeling before the Virgin, who holds the infant Christ, dated 1524; "*St. Luke painting the Virgin and Child*," dated 1526, of octavo size. A folio plate of "*The Deluge*;" marked D. Van Stern. fec. 1523; and "*The Good Samaritan*," engraved A D. 1525, in octavo.

Of Francis Babylone, better known by the appellation of the Master of the Caduceus, we have various accounts, and all of them involved in more or less of uncertainty. He was probably born some time about the commencement of the sixteenth century, and, according to Rost and Huber, at Leyden: he is supposed to have studied in Italy under Marc Antonio, or Gregory Peins. The time of his decease is entirely unknown.

As he neither affixed name, date, nor initials to his very singular prints, but simply the small caduceus which will be found in our first plate of the monograms, &c. used by the engravers of the Low Countries, his very name is scarcely settled, and he has been by some writers called Israel Martin, and affirmed to have been the tutor of Albert Durer, Lucas of Leyden, and Aldegrever.

The master of the caduceus was quite original in his style of engraving, but it has not been thought worthy of imitation, and his prints are now sought after by the curious merely on account of their great rarity. He worked entirely with the graver: his courtes of lines, which are rarely crossed, are rather feeble than delicate; his extremities are poorly marked, and always too large; his draperies are perplexed with small and inelegant folds, and his heads neither characteristic nor expressive.

The principal works which have been mentioned as bearing this mysterious mark, are as follows. A small upright plate representing "*Apollo and Diana*." Another of the same size, of three men bound. "*A Holy Family*," in a small square plate, half figures: the Virgin is leaning on the stump of a tree, and the head of Joseph is seen towards the right hand of the print. Another "*Holy Family*," a small plate lengthways, where the Virgin is represented seated at the foot of a tree; the child is standing by her side; Elizabeth is seated near him; an angel is playing upon a musical instrument; and Joseph appears at the right hand of the print. "*The Adoration of the Three Kings*," a small upright plate; "*St. Jerome writing*, with a Crucifix before

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before him," a small plate lengthways. Two small upright plates: one representing a man carrying a boat, and the other, a woman with a child in her arms. Jerome Hopper has copied both these figures on one plate, much larger, and decorated the head of the woman with stars and a glory. "A Sacrifice to Priapus," (which is generally attributed to M. Antonio, because it has his tablet,) is copied smaller by this artist, and the indecency which appears in the former plate is here omitted. It represents a woman standing by the altar, and another opposite to her, holding an infant; and an old woman's head appears in the background. This is the only print by this master, with which we are acquainted, that does not appear to have been engraved from his own composition; and it, more than any other circumstance, affords us in settling his chronology.

Cornelius Matfys, or Metensis, was born some time about the year 1500, and we believe in the Low Countries: though he appears to have resided much in Italy; and it is not improbable that he was the disciple of George Peins. We have a great number of engravings by him, both from his own compositions and those of the Italian painters. His style of engraving bears superior resemblance to that of Babylon in neatness and delicacy of execution, but his figures are much more in the Italian taste, and are not destitute of elegance and proportion. Strutt has supposed there were two artists of these names, but the foreign writers mention only one. His monogram will be found in our first plate of those used by the engravers of the Low Countries.

We shall mention the following prints by this artist. "Ernest, count of Mansfeld," a print of quarto size; "Cleopatra with the Asp," a small print, dated 1550. An old man and two old women, one of whom holds a basket of eggs, a small print, dated 1549. "Judith with the Head of Holofernes," dated 1539. A battle, a small upright plate, from G. Peins. "A Holy Family," where the Virgin is represented holding the infant on a cradle, caressing the little St. John, from Raphael, of folio size. (This is from the same picture that was afterward engraven by F. de Poilly in France.) "The Miraculous Draught of Fishes," from Raphael. The Plague, a subject known in Italy under the name of "Il Morbetto," engraved by M. Antonio, and regravé by Cornelius Met, with his monogram, and the name of Raphael, folio size. "Christ laid in the Sepulchre," from an etching by Parmegiano, of quarto size.

Of Jerome Bosch, or Bos, an ancient painter and engraver of grotesque subjects, we have already treated, (see the article Bos,) but, by mistake, have placed his death in the year 1500, copying the error of Strutt. According to the best foreign authorities he was not born till 1498; the final period of his life they have not recorded. His Gothic manner of subscribing his works will be found in our *Plate I.* of the monograms, &c. used by the engravers of the Low Countries.

Besides those of his works which we have already mentioned, he engraved "The Temptation of St. Anthony," on wood, which being dated in the year 1522, corroborates the chronology which we now offer. "The Miraculous Vision of the Emperor Constantine," in quarto; "Jesus baptized by John," a folio print, with the name of Bos. A folio print representing a number of grotesque figures, inscribed, "Al dat op," &c. &c. Bosch. Another folio print of the same kind, inscribed, "Dese Jeremias Bosch drollen." An allegorical print, of an elephant, inscribed, "H. Bos inv." Paul de la Louwe, exc. in folio.

Cornelius Bus, or Bosc, or Vaaden Bosch, was born at Bois-le-Duc, in Flanders, some time about the year 1510.

In his youth he went into Italy, and established himself at Rome, where, exclusive of his profession as an engraver, he carried on a considerable commerce in prints. A subject engraved by him, of females at different domestic employments, with a German inscription, beginning thus, "Alm die ein from bidert Weib überkومت, &c." has made M. de Heinneken think that Cornelius was a German, and that in Italy he changed his name to Bus; but the general opinion is, that he was born where we have stated above, and that his true name was Bosch.

His style of engraving sometimes resembles that of Marc de Ravenna; at other times that of Eneas Vico. He never arrived at any superior degree of excellence. He worked entirely with the graver, in a stiff, dry, style, without taste. His drawing is by no means correct; neither are the heads and other extremities of his figures sufficiently attended to; and from the lights being diffused, and the feebleness of the masses of shadow, his engravings are usually destitute of effect. He has engraved after his own compositions and those of other masters; and he commonly marked his prints with one or other of the monograms which will be found attached to his name in our first plate of those used by the engravers of the Low Countries.

The following prints may be reckoned among his best. "The Last Judgment," marked with his cypher, and dated 1550, of quarto size; "Lot and his Daughters," with his monogram, dated 1550, of folio size; "King David giving the fatal Letter to Uriah," dated 1546; "Our Saviour preaching to the Jews," in folio; "Venus on her Car," in quarto, dated 1546; "Vulcan in his Forge," in folio, 1546, all marked with his cypher; "Combat of the Centaurs and Lapithæ," on two large plates, dated 1550; "A Monk seized by Death," in quarto, marked with the monogram. An equestrian statue of Marcus Aurelius, in folio, with the monogram. A set of sixteen plates of grotesque arms and trophies, engraved at Rome in the years 1550 and 1553. Another set of caryatides and thermes. "Moses receiving the Tablets of the Law," from Raphael, in folio, 1551; "Triumph of Bacchus," a large print, lengthways, engraved on three plates from Julio Romano, dated 1543; "The Entombing of Christ," a folio plate, dated 1554, from Francisco Floris, marked "Corne in Bus fecit"; "Moses breaking the Tablets of the Law," folio, from Raphael, dated 1550.

Having already treated of the family of Breughel, which flourished as painters and engravers at the period now under our notice (see the article BREUGHEL), it remains only to add in this place, that Peter Breughel the younger, surnamed, or rather *nick*-named "the Hellish," was the principal engraver of that family, and the chief of his engravings (which are somewhat numerous, and rendered very entertaining by his peculiarities) are as follow. They are generally marked with a monogram, which will be found in our first plate of those used by the engravers of the Low Countries.

A large folio plate of a village fête: a banner is displayed over the door of a cabaret, and the numerous figures introduced, some are dancing, others reclining, and others quarrelling. Another folio print of "Peasants rejoicing"; "The Feast of the Archers," in which the banner of their company is displayed before an arbour, inscribed "Dit is de Gulde." A very rare wood engraving of a masquerade, known by the name of "Valentine and Orson"; "Mercury and Psyche," the landscape part of which is a view on the Rhine; "Delalus and Icarus," companion to the above, being another view on the Rhine: both are in-

scribed "Petrus Breughel fecit Romæ 1553;" and all the above are of folio size.

Early proofs of the works of Hieronymus, or Jerome Cock, are much sought after by the curious, but it is on account of their scarcity and not their merit, for his style is laborious, poor, and scratchy. The praise which Vasari has lavished on him, is therefore not merited. His biography we have already sufficiently detailed, (see the article Cock), except that we have there omitted to mention that he was born at Antwerp in the year 1510. His monogram, similar to that of Hans Collaert, will be found in our first plate of those used by the engravers of the Low Countries. From his numerous engravings, we select the following as those which are held in most esteem, beginning with his

Portraits.—A pair of the oval form, in 4to. of Francis II. king of France and Scotland, and Mary queen of Scotland and France. Another pair of Gustavus and Maria, king and queen of Sweden. Another of Soliman, emperor of the Turks, and Camilia his daughter, all in ovals, and of folio dimensions. A large folio plate, containing the heads of Guido, Cavalcantes, Dante, Boccacio, Petrarch, Politian, and Ficinus. And, conjointly with Wierix, a set of twenty-four of celebrated artists of Germany, in folio, dated 1572.

Processions, Views, &c.—A set of fifty-nine, entitled "Præcipua aliquot Romanæ antiquitatis monumenta Antwerpæ M. D. L. I." Another set of twenty, entitled "Operum antiquorum Romanorum hinc inde per diversas Europæ regiones." "The Funeral Procession of the Emperor Charles V." engraved on several plates, and forming, when pasted together, a long frieze. A set of twelve plates, entitled "Divi Caroli V. ex multis præcipuæ victoriarum imagines 1556." A set of fifteen, entitled "Compartimentorum quod vocant multiplex genus lepidissimis historiis poetarumque tabellis ornatum, 1566. Gedruckt by Hieronymus Cock in de vier Winden."

Historical, &c.—"Moses with the Tablets of the Law;" "St. Christopher crossing the Water with the Infant Christ," a subject from the life of Sylla, inscribed "Quidquid est hujusmodi etc.;" "A Sacrifice to Priapus," where the sacrificers are represented slaughtering an ass, 1557; "Femina sub Jove sunt;" Tarquin and Lucretia, "Tarquinius, &c." An emblem of Vanity, inscribed "Hodie mihi, cras tibi;" it represents the dead body of a young man lying on a table near a skull: at the bottom of the print is written "Vigilate quia etc." Cock excud.; all in folio.

Various Subjects from the Painters of the Low Countries.—A set of fifteen historical landscapes, painted by Mathew Cock, and engraved by Jerom, of which the subjects are; 1. Abraham sacrificing Isaac. 2. Judah and Tamar. 3. The Prophet Jonas weeping over Nineveh. 4. The Departure of Tobias with the Angel. 5. The Flight into Egypt. 6. The Baptism of our Saviour. 7. Jesus tempted in the Desert. 8. The good Samaritan. 9. Mercury and Argus. 10. Mercury killing Argus. 11. Venus mourning for the Loss of Adonis. 12. Cephalus and Procris, 1558. 13. The wondrous Labyrinth. 14. The Loves of Hero and Leander. 15. Daphne metamorphosed into a Laurel. A large landscape, representing the festival of St. George, with the banner of the saint, from Mathew Cock; "Samson and Dalilah," with the temple of the Philistines in the back-ground, in large folio, from Hemskereck; "Daniel in the Lion's Den," in the back-ground are the Babylonians lamenting the overthrow of the dragon and Bel, and the prophet Habakkuk is conducted through the air by an angel, from the same master, in large folio. A set of eight, representing the illustrious women of the Old and

New Testaments, viz. Jael, Ruth, Abigail, Judith, Esther, and Susannah, from the old, and the Virgin Mary and the Magdalen from the new, in folio. An allegorical subject, representing "Fraud and Avarice;" a bacchanalian subject of "Children dancing," both of folio size, all from Hemskereck; "The Resurrection of our Saviour," from Breughel the elder, in large folio; "The Temptation of St. James and St. Anthony," 1565, both in folio; and from the same master, "The Last Judgment," with the cypher of Cock, dated 1558, in large folio; "The Laboratory of an Alchymist," in folio; "The Carnival, or Dispute between the Fat and the Lean," in two folio plates, dated 1563. A set of twelve historical landscapes, most of them sacred subjects, with Latin inscriptions, of large folio size, etched by Jerom Cock, all of them from the elder Breughel. A grotesque composition of "The large Fish devouring the smaller," from Jerom Bos; it is inscribed "Vrinden dit heestmen reel Jaren geweten Dat de groote Vissen de cley-nen eeten," in large folio. A large folio print of "The Temptation of St. Anthony," inscribed "Multæ tribulationes." "St. Martin in a Boat with Devils," in large folio; "A Dream," 1561; "Shrove Tuesday," an allegorical subject, of large folio size, 1567; "De Blau Schuyte," "The Blue Ship," in large folio, all from Jerom Bos; "The Combat of the Horatii and Curiatii," after Francis Floris; "Hercules sleeping, assailed by Pigmies," from the same master, both in large folio; "King Ahasuerus, surrounded by his Court, investing Esther with Royalty," from Lambert Lombard; "Jesus with his Disciples, at the House of Martha and Mary," 1556, in large folio; "Jesus at Table in the House of Simon the Pharisee," 1551, in folio; "The Resurrection of Lazarus," both from the same master, in large folio, all inscribed H. Cock, exc.

Subjects from Italian Masters.—"Abraham offering up Isaac," and the angel appearing with a ram, from Raphael, 1552, in folio; "The Nativity," from the same painter, in folio; "Many are called, but few are chosen," in large folio, from Andrea del Sarto, dated 1553; "Females bathing," a folio print, from Lucas Penni; "Captives respicing," a frieze from Polidore; "The Passage through the Red Sea," from Angelo Bronzino, in folio; "The Visitation of Elizabeth," from Sebastian del Piombo, in folio.

Jacob Bosius, or Bossius, surnamed in Italy *the Belgian*, was born in the early part of the sixteenth century, but in what part of the Low Countries we are unable to say. He studied in Italy under some one of the disciples of Marc Antonio, but never rose above mediocrity. His style is neat, but wants both freedom and correctness of outline. The extremities of his figures especially are heavy and not well marked.

He often marked his engravings with two B's, which shews that he adopted the surname of *Belgia*, which was conferred on him by the caprice of the Italians. The time of his death has not been mentioned.

Of his works the following few appear to include all the variety which Bossius was capable of exerting, and more than he could exert with credit as an artist.

The portrait of Michael Angelo, in octavo. Busts of St. Thomas Aquinas, and Otho Truchsess, bishop of Albany, in quarto. "The Crucifixion," in folio. A set of the four Evangelists, after Blockland, in quarto. "Jacob's mysterious Dream," and "St. Peter and St. John healing the Cripple" both in folio, and after Raphael. The statue of Pyrrhus, king of the Molosses, from the antique, in folio, dated

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dated 1562; and "The Baths of Dioclesian," with other views of antiquities executed in conjunction with Ant. Lafreri.

Lambert Suterman, or Suavius, was born at Liege, in Flanders, in the year 1510, and became the disciple of Lambert Lombard, with whom Sandrart confounds him; but Heinneken has removed all doubt on the subject, proving that Lombard was merely a painter and never used the graver at all.

Suavius engraved many plates both from his own designs and those of his master. His figures are generally tall and thin; the outlines of the naked parts of them are tolerably correct, but dry and without dignity. His draperies are generally divided into small folds, which by not being sufficiently varied or contrasted with each other, form unpleasing lines. The attitudes of his figures are seldom well chosen, or properly adapted to the subject, and the management of the light and shade by no means commendable. His style of engraving is very neat, and seems to have been contracted in the German schools; but his mode of design discovers more of the Italian than the German taste.

His engravings are numerous, but neither exquisite nor very rare; we shall mention the few following

From Lambert Lombard.—"Charity," surrounded by eight children; "The Resurrection of Lazarus," both in quarto, dated 1544; "Jesus travelling to Emmaus, with his two Disciples," in folio; "The Entombing of Christ," in quarto; "St. Peter and St. Paul healing the Sick;" "The Descent from the Cross," and "Our Saviour restoring the Widow's Son," all in folio; "Psyche with the Vase of Proserpine and Juno," marked with the name of Raphael, in small folio.

From his own Drawings.—"The twelve Apostles," in quarto. Two circular prints, representing a profile of our Saviour, and one of the Virgin Mary. A bust of Melchior Schets, in a circle, inscribed "Mundus regitur opinionibus," 1561; Anna Stralen, "Mel Schetsi conjux," 1554; "Michael Angelo Buonarotus, nobilis Florentinus," a circular print; and a portrait of Cardinal Granvelle, in quarto. All the portraits by Suavius are executed in a very delicate style.

The family of Goltzius were illustrious in art. Hubert, the first of that name who distinguished himself as an engraver, was the son of a painter of Wurtzburg, but was born at Venloo in the year 1520. Under the tuition of his father and of Lambert Lombard, he acquired some proficiency both in arts and in letters, and, having to copy some drawings which had been done from the antique, at the house of the latter, they excited in him so strong a desire to see and study from the originals, that he forthwith set out for Rome. After remaining some time in that distinguished metropolis, he travelled homeward through Italy, France, and Germany, leaving few of the celebrated works of art, or European monuments of antiquity, unseen; and finally established himself at Bruges, where he successfully published those volumes of medals, inscriptions, and other objects of antiquarian research, collected during his travels, which are still sought after by the curious; and where he died in the year 1583.

Strutt says, "he was twice married, and the abominable crossness and ill temper of his second wife (ill suited as a companion to a studious man) is said to have shortened his days." Most of his antiquarian writings are composed in the Latin language, and were printed, as well as their engraved accompaniments, in his own house.

Hubert painted some few pictures which have been spoken of with commendation, and are valued for their rarity, but is chiefly known as a man of letters and an engraver. He ob-

tained the title of painter and historian to Philip II. of Spain, to whom he dedicated, "Falti Romani ex antiquis numismatibus et marmoribus are expressi et illustrati;" and "Icones Imperatorum Romanorum, et series Austriacorum, &c." both in folio, and printed at Bruges.

The medals in these works are executed in *clair obscure*; and it has since been copied and reprinted at Antwerp by Balthazar Moret, who has added five medallions from designs by Rubens, in order to bring down the series to the time of Ferdinand III.

The manner in which Goltzius produced his prints in *clair obscure*, was by first printing from an outline etched on copper, and afterward impressing the half tint and deeper shadows from the surfaces of blocks of wood and with the letter-press. In this manner our artist produced two other works, adorned with numerous engravings by himself and Joseph Gietleughen of Courtrai, of which the first, printed at Bruges in 1563, and containing forty-six prints, is entitled "C. Julius Cæsar five historiarum Imperatorum Cæsarum Romanorum ex antiquis numismatibus relicturæ, liber primus, Huberto Goltzio Herbipolita Vanloniano Auctore et Sculptore;" and the second, containing two hundred and thirty-four engravings, printed at Bruges in 1566, bears the title of "Falti Magistrorum et Triumphorum Romanorum ab urbe condita ad Augusti obitum ex antiquis Monumentis relictos, Hubertus Goltzius Herbipolita Venloianus dedicavit."

Henry Goltzius was a man of more genius, though of less research, than Hubert. His father, John Goltzius, was a painter on glass, of Mulbrech, in the neighbourhood of Venloo, where our artist was born in the year 1558.

After acquiring some knowledge in the rudimental part of drawing under his paternal roof, Henry was placed, first under Jaques Leonherd, and afterward became the disciple of Theodore Coornhaert, who taught him engraving, and under whose tuition he soon began to discover very surprising talents in that novel and difficult art, notwithstanding the disadvantage of a lame hand, which was occasioned by falling into the fire during his infancy.

Goltzius afterwards worked, for a short time, for Philip Galle, but in consequence of domestic troubles and an ill state of health, occasioned partly by his too close professional application, was advised to travel. His desire of improvement coinciding with his medical advisers, he passed through Germany into Italy, visiting Bologna, Florence, Naples, Venice, and Rome, frequently assuming a feigned name, that he might with the less interruption apply himself to the study of the antique and the *grand gusto* of Michael Angelo.

Now was the time when what the professor Fuseli terms the "frantic pilgrimage" of artists to Italy, raged with crusading zeal, and no painter in the estimation of the hypercritics, might be considered as perfect in his art, who had not trembled before the Last Judgment of the terrible Michael Angelo; moderation in style, was insensibility; and Goltzius himself, though a man of discernment, became infected to a certain degree with the fashionable bombast.

In the genial climate of Italy his health returned, and at Rome he remained for some years, producing there several very excellent engravings from Raphael, Polidoro, and other eminent masters. He finally returned to the Low Countries, and established himself at Haerlem, where he engraved many plates, of which the subjects consist partly of his own compositions, and are partly taken from the drawings which he copied from celebrated works of art during his residence in Italy, where, in 1617, he died at the age of fifty-nine years.

He married a widow lady of Haerlem, whose son James Maetham (the fruit of a former marriage) became (as we

shall

shall have occasion to notice) a distinguished engraver, under the instruction of his father-in-law. He is said to have been forty years of age before he began to print. His pictures are few in number, and their rarity perhaps has raised them to a higher value than they might else have attained.

But we have to speak of him chiefly as an engraver. Possessing considerable anatomical knowledge, he drew the human figures admirably, and articulated the joints and extremities with superior skill. But conceiving himself qualified, on his return from Italy, to correct the littleness and Gothic stiffness of his Dutch and German contemporaries in art, and the taste which prevailed among the connoisseurs of the Low Countries, he too frequently ran into the opposite extreme, and twisted and bent his fingers and his feet, sometimes into absolute distortion, in spite of nature and his own superior knowledge. While the mania lasted, his intended grace became real affectation, and his grandeur ridiculous swagging.

In order to shew that the revolution in style which he aimed at accomplishing, was the result of superior powers, and that it proceeded not from his inability to emulate and excel, at their own weapons, the heroes of Holland and Germany, he took a most effectual method, in the prosecution of which he was eminently successful. He composed and engraved what are termed his *chef-d'œuvres*, or *masterpieces*, which shew the amazing versatility of his talents; and which, though chiefly aimed at the reputations of Albert Durer and Lucas of Leyden, does not scruple to provoke comparison also, with Bassan, with Parmegiano, and even with Raphael himself.

There had not been wanting among the connoisseurs and amateurs of the Low Countries, some who insinuated that Goltzius deviated from the styles of art which had called forth their admiration, because he had fancied or found them to be inimitable. No expedient could more justly or more completely have silenced these observations, than the contrivance and execution of these six large engravings. Before he made public that of which the subject is "The Circumcision," and which was designed to vie with Albert Durer; and before his general purpose was known, he bellowed a few years of age on an impression, by means of smoke, and exhibited it in the presence of a chosen few, who, to the great entertainment and secret satisfaction of our artist, stood in spectacles and in raptures, before the supposed engraving of Albert Durer. And, in truth, this print so very much resembles the very best works of that master, both in design and execution, as to be scarcely any impeachment of the discernment of the connoisseurs who were thus deceived.

Goltzius might now fearlessly publish his masterpieces, which he did with extraordinary success, and in which, after varying his style five times in order to imitate severally the masters above-mentioned, he finishes the set of six with an "Holy Family," which he meant should be understood as the improved style of Henry Goltzius, and which closes the procession, and completes his triumph,—but not the catalogue of his merits.

He engraved portraits from his own drawings, in a very masterly manner, very tastefully uniting excellent drawing, and vigorous effect of light and shade, with neatness of execution. He also engraved from his own compositions on wood, in the manner which is technically termed *claire obscure*, or *chiaroscuro*, in which he differed from Hubert Goltzius, by employing *three* blocks of wood; on the first of which he cut his outline with great boldness and spirit; the second served to impress the demi-tints, the high lights being cut away; and the third the deeper shadows. In the works which he executed in this way, the lights appear as if em-

bossed, and they are on the whole very masterly productions.

The power of Goltzius over his graver, which was the chief instrument of his art, and the freedom, boldness, and copious variety of combination with which he hatched his courses of lines, is wonderful, and would have been truly fascinating, had he adhered to that pure and accurate style of drawing which once distinguished him, instead of deviating into extravagance and eccentricity.

The cypher with which he marked his engravings, when he did not subscribe his name at length, may be seen in our first plate of those used by the engravers of the Low Countries.

We begin our catalogue of his works, which will probably long continue to rank in the very first class of the arts of his country, with his

Portraits.—A bust of Gertraud Adriaansz Brederods, in an oval, with an allegoric accompaniment of two tigers and a laurel, a very rare print; Henry III. king of France, an oval, very rare, dated 1592; Frederic II. king of Denmark, quarto size; William prince of Orange, in an oval, surrounded with a grotesque border, in folio; Charlotte of Bourbon, princess of Orange, companion to the preceding; both engraved in a very delicate style; Theodorus Coornhertius ad vivum depictus et acri incisus, ab H. Goltzius, a very rare folio print; Hans Bol, after Joannes Boltius, a folio print, surrounded with ornaments; John Stradan, a painter of Bruges, in quarto; Philip Galle, an engraver of Antwerp, of the same size, dated 1582; Peter Forest, or Forestus, a Dutch physician, in octavo, dated 1586; Julie-Lipse, a celebrated critic, inscribed "Moribus antiquis," dated 1587; a half-length portrait of John Zurenus, painted by M. Hemskerk, in quarto; Monsieur de la Faille, inscribed "Leges tueri. Harm. Adolfs. exc." in quarto; Madame de la Faille, companion to the above, (a young woman with a skull in her hand.) This pair of portraits are executed with extreme delicacy, and are much celebrated. Christopher Plantin, a famous printer; and Francis d'Egmont, completely armed, a half-length portrait, both in quarto; Robert, earl of Leicester, general in the United Provinces, 1586, a very fine print, in a small oval; S. Sovius, inscribed, "Bene agere et nil timere," 1583, rare; a half-length portrait of a man measuring a globe, inscribed "L'homme propose, et Dieu dispose," 1595. This is believed to be the portrait of Petri, an astronomer of Amsterdam, in 12mo. A lady sitting in a garden chair, supposed to be the portrait of Catherine Dekker, of Haerlem, of the same size; bust of a man with a round hat, in 4to.; bust of a female with a hat, executed entirely with the graver; half-length portrait of a female, veiled, and covered with drapery, 1606, tastefully engraven in a neat and elaborate style; and the bust of a man, with a cocked hat, both of quarto size.

Various Subjects from his own Compositions.—A circular print in quarto, of "Judah and Tamar," one of the earliest engravings of Goltzius. A set of six capital prints, which we have particularly noticed in his biography, and which are known by the name of the *masterpieces* of Goltzius. 1. The Annunciation, in the style of Raphael. 2. The Visitation, in the style of Parmegiano. 3. The Annunciation, in the style of Bassan. 4. The Circumcision, in the style of Albert Durer. 5. The Adoration of the Kings, in the style of L. of Leyden. And 6. A Holy Family, in his own style, or, according to some critics, in the style of Barrocio, all of large folio size: it should be known, that in the Circumcision he has introduced his own portrait. A very rare print of "The Nativity," in large folio, which is unfinished; inscribed Jac. Matham, exc. 1615. "The Ado-

ration of the Kings," in quarto. rare; "The Slaughter of the Innocents," C. Visscher excud. likewise very rare; and in an unfinished state, a very large folio. "A Repose," H. Goltzius fecit. in 4to. 1589; "The Good Samaritan," H. Goltzius sc. et excud. 1589; The Passion of our Saviour, in twelve plates, H. Goltz. fec. 1597, in 4to. These are engraven somewhat in the style of Lucas of Leyden. The half-length figures of Christ, and thirteen apostles, with Latin inscriptions, engraved on fourteen plates, H. Goltzius fec. in octavo, 1598. Another set from the same originals, said by Huber and Rost to be almost as large as life, and the name of each apostle added; executed with very bold courses of lines. "The Adoration of the Kings," a singular composition, and a very rare folio print; "The Infant Christ," seated on a cushion holding a globe, and surrounded with a glory of angels, a very finely engraved plate, in 4to. dated 1597; "The Temptation of St. Antony," and "A Saint, holding a Book," (perhaps Jerome,) both in quarto. A set of fifty-two, from the Metamorphoses of Ovid: it is believed that Goltzius was assisted by his pupils in the execution of this set. A set of ten of the heroes of ancient Rome, viz. 1. The Horatii and Curiatii. 2. Horatius Cocles. 3. Mutius Scævola. 4. Curtius. 5. Torquatus. 6. Corvinus. 7. Manlius. 8. Calpurnius. 9 and 10 are allegorical subjects. This set is executed with very bold strokes, and have very fine back-grounds. A circular print of Venus resting against a tree, and Cupid presenting a sword, inscribed "Sine Cerere et Baccho, friget Venus," executed in so very delicate a manner, that it forms a striking contrast with the former. A set of three ovals, representing 1. Bacchus; 2. Venus; and 3. Ceres, dedicated to Cornelius of Haerlem. Another set of three ovals, of 1. Pallas; 2. Juno; and 3. Venus, dated 1596. A couchant Venus, surrounded by the four elements, personified by cupids, an oval print, all of folio size. "Mars and Venus, exposed to the Ridicule of the Gods," 1585, in large folio. Three folio plates of the loves of the gods; 1. Jupiter and Juno. 2. Neptune and Amphitrite. 3. Pluto and Proserpine. "Apollo in the Clouds," with an inscription round his head, 1588; "Pygmalion and the Statue," 1593, all in folio. A small oval print of "Mercury and Argus," very rare; the nine muses, dedicated to John Sadeler, dated 1592, in folio; three folio circular prints of "The Destinies;" "The three Graces," crowned with laurel, in folio; a large folio print of "Apollo Pythius, Statua antiqua Romæ, in palatio Pontificis Belvedere, etc." "Hercules ΑΛΕΞΙΚΑΚΟΣ Inscrip-tus Roman. Commodus Imperator. Statua antiqua Romæ, in palatio Pontificis Belvedere, etc." in large folio, with four Latin verses; and "Hercules Victor. Statua antiqua Romæ, in palatio Cardinalis Farnesii, etc." published after the death of Goltzius by Herman Adoif, in large folio. These three statues form a very beautiful and interesting set, where the vigorous powers which distinguish the graver of Goltzius, are exhibited in high perfection. "Hercules;" in the back-ground are represented some of his labours; of very large folio size, dated 1589. In this print the artist appears to have intended to convey an idea of god-like strength, but has run far into the extravagance which we have censured in his biography. "Apollo playing on his Lyre, surrounded by the Muses," a very large print, dated 1590. The seven cardinal virtues; Faith, Hope, Charity, Justice, Prudence, Fortitude, and Temperance; of quarto size; seated on ornamental architecture. Three very fine prints, in folio. Eight females embracing, representing human virtues in four very fine folio prints; "Labour and Diligence, (personified by a man and female,) embracing," a very rare quarto print, dated 1582. A naked infant resting

against a skull; an emblem of human vanity, in large quarto. "Christian Prudence," represented by a draped female, inscribed "Ardere serpentes, et simplicitate columbas," a very rare engraving, in a small circle; "The Blind leading the Blind," a small circle, very rare; "The War Chariot," with an explanation in French and Dutch, of large folio size. A young female, refusing the offer of a rich old man, followed by a young one. A companion, of a young man refusing an old woman, both rare prints, and of folio dimensions. "The Dog of Goltzius," or "The Boy and Dog;" it is pretended by some that the boy who is introduced is the son of the Venetian painter Theodore Frisius, to whom the print is dedicated; and by others that it is the portrait of the engraver himself: it is in large folio, an exquisite print, and the good impressions are now become rare and valuable. "Coridon au Silvia," a pastoral subject beautifully engraven. A man in a Spanish dress, carrying two flowers, in folio, inscribed "Sic transit gloria mundi." An officer with a halbert, with a battle in the back-ground, in fol. An officer marching, and a view of the city of Prague in the back-ground, 1587. A grand mountainous landscape with shepherds tending their flocks in the fore-ground; and in which Dedalus and Icarus are seen in the air; a large folio print, and one of the finest etchings by Goltzius.

Engravings on Wood, in Clair-obscur, and Cameo.—A landscape, with rustic buildings, and a female drawing water from a well, in 4to. A landscape, with an enormous rock on the shore of a raging ocean, and an hermit prostrate, in 4to. A rustic subject with sheep feeding, in 4to. Half-length portrait of a warrior, with lance and helmet, in folio. "Hercules combating with the Giant Cacus," engraved on a single block, in folio. The same subject executed in clair-obscur. A set of seven figures of heathen divinities, viz. Jupiter, Neptune, Pluto, Thetis, Flora, Night, and Eternity; these prints are in ovals of large folio size, and have a very striking effect.

Subjects from Italian Masters.—"St. Joachim," from a picture by Raphael in the church of St. Augustin at Rome, dated 1592, in folio; "The Triumph of Galatea," from a picture by Raphael, in the Farnesian gallery. Eight divinities in niches, from Polidoro; viz. Saturn, Neptune, Pluto, Vulcan, Apollo, Jupiter, Bacchus, Mercury, in folio. Two sybils, after antique statues, in 4to. "The Last Supper," from a very grand composition by Paul Veronese, dated 1585; "The Marriage of Cana," after J. Salviati, a very large engraving, executed on two plates; "St. Jerom meditating in a Desert," from Palma the younger, in large folio.

Subjects from various Masters in the Low Countries.—"The Fall of our first Parents," in 4to. from Barth. Spranger, 1585; "A Dead Christ," supported by an angel, from the same master, in large folio; "The Celebration of the Nuptials of Cupid and Psyche among the Gods," from the same master, executed on two large plates; "The Dragon devouring the Companions of Cadmus," after Corneille Cornelius, in folio, 1588; "Ulysses reproving Irus before the Suitors of Penelope," from the same master, in large folio. Large circular prints of the four elements, represented by Tantalus, Icarus, Ixion, and Phaeton; "St. Paul shaking off the Viper, in the Isle of Melita," from J. Stradan, in folio; "Lot and his Family forsaking the burning City," from Ant. Blocklant, dated 1582, in large folio; and "The four Evangelists at the Sepulchre of Christ," from the same master, 1583, of large folio dimensions.

Julius Goltzius was probably of the same family with Henry, but the acquisitions of genius are unalienable, and Julius attained to no eminence as an engraver. He was apparently

parently educated in the school of the Galles, but of his birth or death there is no record, though his principal work was executed in 1581. He engraved on copper, but his objects are ill drawn and tastelessly executed. Great part of the figures in "Habitus Variorum Orbis Gentium," published by Boissard, is from his hand, as are also "The good and bad Shepherd," from Martin de Vos, and "Christ appearing to Mary Magdalen," after Fred. Suckar.

Henry Van Cleef, or Cleef, also called *Clivenfis*, was born at Antwerp in the year 1520, and died in the same city in 1580. He was the brother of Martin van Cleef, whom Vasari confounds with Martin Schoen. He studied in Italy, and beside his proficiency in engraving, became an excellent landscape painter, possessing great freedom of touch, and producing an harmonious chiaroscuro. Upon his return to his native city in 1555, he was elected a member of the Antwerp academy of painters: he likewise engraved a great number of plates, which he sometimes marked with the monogram, which will be found in our first plate of those used by the engravers of the Low Countries; and at others, with "Henricus Clivenfis fecit."

Among his works the following will probably be found most worthy of selection. A bull fight, exhibited at Rome, before the Farnese palace, in folio. Two landscapes and figures, in folio. A set of six landscapes, intitled, 1. Veneris Templum. 2. Forum Æmilii. 3. Templum Fortunæ. 4. Caroli. 5. Cataractes Tiburti. 6. Corfu Insula. H. van Cleef fecit. Ph. Galle exc. in folio. Another set of landscapes: 1. View of a bridge at Segovia. 2. A promontory at Campania. 3. The tomb of the Horatii. 4. A view on the lake of Aricia, in folio. There is also a collection of thirty-five views by this artist, published under the title of "Henri a Cleve ruinarum rurumque aliquot delineationes execute, per Galleum," in folio.

Of his brother Martin van Cleef we know very little, and of his engravings nothing, excepting that professor Christ says, they were marked with a monkey seated, with the letters V. C. upon its body, in the manner represented in our Plate I. of the monograms, &c. used by the engravers of the Low Countries.

A monkey it seems, which in England is nicknamed Jacko, is called Martin in Flanders: combined with the initials of Van Cleef, it therefore formed a kind of pun; and the age in which these engravers lived, is known to have been a time when puns were fashionable, and passed for wit. Martin van Cleef, sometimes mistaken for Schoen, is the real Martin of Antwerp, of Vasari, and those Italian writers who have copied his errors.

Adrian Collaert, the elder, an artist of great merit, and likewise a printseller, was born at Antwerp A. D. 1520. He became acquainted with the rudiments of his art in his native country, but made a journey to Italy, where he resided some time in order to perfect himself in his profession. He worked entirely with the graver in a firm and neat style, but somewhat stiff. His masses of light are rarely well managed, or skilfully blended with his demi-tints, and from being too much scattered and without the necessary graduation, he rarely produced even a tolerable chiaroscuro. But to compensate these defects (which may, in part at least, be ascribed to the age in which Adrian lived), he drew with great ability. The heads of his figures are frequently beautiful and characteristic, and the other extremities well marked.

The engravings of the elder Collaert are somewhat numerous, and are generally marked with a cypher, for which see our first plate of those used by the engravers of the

Low Countries. We select from them the following, beginning with those which are done

From his own Compositions.—A man and his wife conducted by Death, dated 1562, in 12mo. An armed warrior, to whom a female presents a dog, a child, and a cock. The four elements, with a verse in Latin under each, in 8vo. A set of thirty-six prints, in 12mo., entitled "Vita Jesu Salvatoris variis iconibus, ab Adriano Collaert expressa." A set of thirty, in 4to. entitled "Avium vivæ icones in ære incisæ et editæ ab Adriano Collaert." One hundred and twenty-five subjects, entitled "Piscium vivæ icones." Another set, entitled "Florilegium ab Adriano Collaert creatum, et ab Phil. Gallo editum;" in twenty-four 4to. plates. A large folio plate from the "Last Judgment" of Stradan. "St. Anthony tormented by Devils;" and "St. Apollonius," surrounded by subjects from his life, both of folio dimensions.

From various Masters.—The twelve months of the year, from Joshua of Momper, of 4to. size: the same subjects were copied by Callot. A set of twelve beautiful horses in various attitudes, from Stradan, 8vo. plates, engraved very delicately. A set of chaces and fishing parties, from Stradan, in 4to. Four fine landscapes from H. van Cleef, entitled "Regionum rurum variis atque amoenis prospectus." A set of hermitesses, from M. de Vos, in the engraving of which, Adrian was assisted by his son, 4to. size. "The Israelitish Women singing the Psalm of Praise for the Destruction of the Egyptian Host in the Red Sea," a 4to. plate from Stradan; "Maternal Love," presumptively a satirical print, its real subject being a woman tearing her child to pieces with the fury of a lion, in 4to. from the same master; "The Vocation of St. Andrew," from Baroccio, in folio. This subject was likewise engraved by G. Sadeler. "The Mystery of the Mass," from Th. Bernard; "A Repose during the Flight into Egypt," where St. Joseph is represented gathering grapes, from H. Goltzius, dated 1585. The Annunciations of Isaac, Sampson, St. John the Baptist, and our Saviour. St. Joseph, and the Angel of the Shepherds, from the same master, 1586, all of folio dimensions. These last six plates are reckoned the best engravings of Collaert.

Hans, or John Collaert, the son of the preceding artist, was born at the same place, in the year 1540. He learned the elements of art of his father, but afterwards went to Italy for improvement. He assisted his father in most of his larger works, besides engraving a great number of plates himself; which he did in a style very much resembling that of Adrian. He must have lived to a great age, for his prints are dated from 1555 to 1622. He marked his plates with his initials, combined in a cypher, which will be found in our first plate of those used by the engravers of the Low Countries, and sometimes his name at full length. Among his works we shall specify the following, beginning with those

From his own Compositions.—Ten subjects in 4to. dated 1581, entitled "Monilium Bullarum inauriumque artificiosissimæ Icones Joannis Collaert opus extremum." The history of St. Francis, in a series of sixteen plates, with grotesque ornaments, in 4to. "A Christ," accompanied by two other half-length figures, perhaps intended for Moses and Elias, in an ornamental border; "A Dead Christ on the Lap of the Virgin," inscribed "Torcular Calcavi etc. Joan Collaert sculp.;" "The Last Judgment," surrounded with small subjects from the life of Christ, inscribed, "Hunc veniant justi, etc." all of folio dimensions; "Marcus Curtius precipitating himself into the Gulf;"

and

and "Peace and Charity," with the motto "Pacem habete;" both of folio size.

From various Masters.—"St. John the Baptist preaching in the Desert," a grand composition, in folio, inscribed G. A. Z. inventor; "Moses striking the Rock," a large print, lengthways, from Lambert Lombard. A great number of small figures are introduced into this print, and they are admirably well executed: the heads are fine, and the drawing very correct. This is considered as one of the best prints from the graver of John Collaert: it was published by Jerome Cock, 1555, and is marked "Hans Collaert fecit." "A Satyr pursued by Females," from J. Straden, in folio; "A female Centaur suckling her young;" and "A Centaur nursing a young Bear," (companion to the last;) "Mars reclining on the Lap of Venus," in 4to., both from the same painter; "The Loves of Mars and Venus," in four plates, with Latin verses, in folio. From Philip Galle of Haerlem. The following prints, for the misal of Moretus, from the designs of Rubens, are much fought after by connoisseurs: 1. The Annunciation. 2. The Nativity, with the Adoration of the Shepherds. 3. The Adoration of the Eastern Kings. 4. The Last Supper. 5. The Crucifixion. 6. The Resurrection. 7. The Ascension. 8. The Descent of the Holy Ghost. 9. The Assumption. 10. An Assemblage of the Saints in Heaven. 11. David imploring the Mercy of God on his People, afflicted with the Plague. And, 12. The Tree of Genealogy of the Jewish Kings; all in small folio. This last subject is very rare.

The following are likewise from the compositions of Rubens: "Theology," personified by a female, holding a flaming torch, on each side of whom is a Thermes, representing the old and the new laws. Frontispiece to The Ecclesiastical History from the Birth of Jesus Christ to the Year 1622, wherein Religion is introduced holding a cross and tiara. Frontispiece to The Lives of the holy Fathers, by T. Vaders.

William Collaert was the son of John, and engraved with some ability. Of his works we are only acquainted with "The Visitation of Elizabeth," in folio; and a set of ten quarto plates for "Bullarum Inaurium, &c. Archetypi Artificiosi," from the designs of his father.

Theodore or Dirick Volkart Coornhaert, or Cuerenhert, was born at Amsterdam in the year 1522, and became one of that extraordinary class of men, whom the world honours with the epithet of singular or eccentric whilst they are living, and rarely knows how to value till they are no more. In other words, Coornhaert was a studious man, of various and extensive attainments, and whose perceptions and reflections were entirely his own.

Beside cultivating the arts of design, he distinguished himself in various literary pursuits; was a good poet, and at least an original theologian. In his youth he travelled into Spain and Portugal; but the motives or result of his journey, which was perhaps connected with some diplomatic purpose, have not been ascertained.

Returning to the Low Countries, he established himself as an artist and scholar at Haerlem, of which city he became public secretary, and was several times sent as ambassador to the prince of Orange, to whom he addressed a manifesto, which has been celebrated, and which was published by that prince in the year 1566.

But unfortunately for the temporal concerns of our artist, he deemed that religion was an affair between every individual man and his Creator, in which no other man had a right to prescribe tenets of doctrine or modes of faith. He, moreover, perceiving how the priesthood degraded them-

selves by worldly pursuits, had the wisdom or the folly to maintain, that the channels of spiritual communication had become corrupt; and that without a supernatural mission, accompanied by the power of working miracles, no person had a right to administer in any religious office.

Such direct heterodoxy could not fail to draw on him violent and impassioned opposition of the clergy. Both parties became heated by disputation. The priests anathematized; and Coornhaert proceeded to pronounce that man to be unworthy the name of Christian, who would enter any place of public worship; a doctrine which he not only advanced by words, but evinced the sincerity of his belief, by abstaining from all churches, and from all ghastly communication with both Protestants and Papists.

It is needless to add, that his destruction was now complete. After being several times imprisoned, during the progress of the controversy, without abjuring his heresies, he suffered the martyrdom of banishment, and died at Dergoude at the age of 68 years, persevering in his religious opinions to the last.

Coornhaert had, early in life, acquired some knowledge in engraving, among his various pursuits, and occasionally practised that art in the way of recreation, and merely for the sake of the pleasure which he derived from it; but the pertinacity of his religious zeal having impoverished him, he was obliged to have recourse to engraving for his support. The subjects of his prints are, for the most part, taken from the sacred writings; and his style, though slight, is original, and the seeming result rather of intuitive feeling than of acquired knowledge. He worked with the graver alone, in a loose and open style, so as somewhat to resemble pen and ink drawings.

Coornhaert sometimes worked in conjunction with Philip and Theodore Galle; and it is no small addition to his reputation as an artist, that he was the instructor of Henry Goltzius, of whom we have already treated. An edition of his writings was published in three folio volumes, 40 years after his death. Whether any complete edition had preceded this, we are unable to say.

Our catalogue, which follows, of the works of this extraordinary man, is unfortunately very imperfect. We believe, however, that it includes the most favourable specimens of his talents. His plates are generally marked with one or other of the two monograms, which will be found in *Plate I.* of those used by the engravers of the Low Countries, "The Descent from the Cross," in large folio, after Lambert Lombard, dated 1556; "Joseph explaining the Dream of his Father, in the presence of his Brethren," after Hemskerck, dated 1549; the companion to which is "Joseph explaining the Dreams of the Prisoners before Pharaoh," dated 1549; both from the same master, in 4to. "Job scourged by the Devil, and scolded by his Wife;" "Balaam mal-treating his Ass;" both in large folio. "The Elector of Saxony defeated at Muhlberg by the Emperor Charles V.;" and "The Landgrave of Hesse Cassel profstrate before Charles V.;" all from M. Hemskerck, of quarto dimensions.

Mark Guerard, or Gerard, was born at Bruges A.D. 1530, and died in England 1590. He was a proficient in the various arts of engraving, architecture, and painting, both landscape and historical. He also drew and etched animals with great spirit, as is evinced in his fables of Æsop, which are from his own compositions; and in his set of eighteen quarto plates of wild and domestic quadrupeds.

He likewise delineated and engraved a plan of the city of Bruges; and a set of 14 oval prints, of the Passion of Christ.

Of Crispin Vanden Broeck, and his daughter Barbara,

who flourished about this period, we have already spoken. See these articles respectively.

Beside his celebrated *chiaroscuro* of the Circumcision, which is particularized in vol. v., Crispin engraved a set of seven folio plates of "The Creation of the World," or "The first Week," with Latin inscriptions, beginning "Ex informi coeclum;" another set from Bible history, beginning with "Eve eating of the forbidden Fruit," and ending with "The Construction of the Tower of Babel," in nine folio plates; a set of nineteen, from "The Life of the Virgin," in folio; a religious emblem, of our Saviour seated, whilst people are occupied in catching the blood that flows from his wounds, in folio; "Jesus Christ on the Cross, with the Virgin and St. John," in an ornamented border. Both the last are marked with the cypher of the artist. Four circular subjects in *clair-obscur*, likewise marked with his monogram: 1. The Annunciation. 2. The Visitation. 3. The Adoration of the Shepherds. 4. The Adoration of the Kings: all of which are very rare.

For the cyphers with which Broeck occasionally inscribed his performances, see *Plate I.* of the monograms of the engravers of the Low Countries.

In a former volume, we have treated at some length of the family of De Pisse, who, by transplanting the practice of the Low Countries, contributed to improve our indigenous stock of English engraving. The principal works of Crispin, the patriarch of that family, are as follows:

Portraits.—Andrea Doria, of Genoa, in small quarto; the elector, Frederic IV. of the same size, dated 1606; Mary, baroness of Rebourie; Adolphus, baron of Schwarzenberg; Henry Frederic, prince of Nassau; Henry IV. king of France; Mary of Medicis, queen of Henry IV. all of quarto size; Philip II. king of Spain; a bust of Alexander Farnese; Axel Oxenstiern, chancellor of Sweden, all of folio size; a circular print, in quarto, of Louisa Julia, countess of Nassau; Henry Cæsarius, juris-consult, in quarto; Nicholas Fontani, a physician, in folio; Charles Niel, a clergyman, of the same size; Maurice, prince of Orange, on horseback; Albert, archduke of Austria, and Maurice, prince of Nassau, both on horseback: in the background of the latter a camp and fortrefs are introduced; both in large folio. Queen Elizabeth sumptuously habited, in quarto, from a picture by Isaac Oliver; king James I.; Henry, prince of Wales; Charles, prince of Wales, afterwards king of England, both in ovals; Anne of Denmark; sir Philip Sidney; the earl of Essex, on horseback; Thomas Percy, a celebrated conspirator, a very rare print; all of quarto size. And fifteen plates, entitled "*Speculum illustrum seminarum.*"

Historical Subjects from his own Compositions.—"Adam and Eve," where a dog is introduced; "The Chasse Sufannah," inscribed "*Pietas et Castitas*;" and Cleopatra, inscribed "*Nec Pietas nec Castitas*," as a companion to the former, both in quarto; "Hercules and Antæus," inscribed "*Vitium ut superas terra altius atque eris*," in folio; "A Quarrel in the Interior of an Hotel," dated 1589, in folio. Three small circular busts, representing Faith, Hope, and Charity, very fine engravings. "The Four Evangelists;" half-length circular prints, in octavo. Twelve plates representing angels variously occupied, of the same size. Another set of twelve, of the Sybils, inscribed "Crispin de Pisse, inv. Crispin, Simon et Magdalen sc." in folio. "The Seven liberal Arts," and "The Nine Muses," both in 12mo. A set of seventeen, intitled "*Academia sive speculum vite scholasticæ.*"—Crispini Passaei, anno 1612—"The Riding Academy of Antonia Pleurinel," in a large folio volume, executed in the best manner of Crispin.

Subjects from various Masters.—"The Twelve Months of the Year," on small circular plates, from M. de Vos. Six plates, comprising "The History of Tobit," from the same painter; "The Four Evangelists, with their Attributes," inscribed, "Geldorpius Gorcius inventor et pinx." in large folio, very fine, and in the style of Cornelius Cort. "The Annunciation of the Shepherds," from Abraham Bloemaert; "Our Saviour on the Cross, between the Two Thieves," from Jod. de Winge, both in large folio; "The Judgment of Paris," from Crispin vanden Broeck, in folio; "The Siege of Troy," from the same master, in large folio; and a set of four mountainous landscapes, with figures, from John Breughel, of folio size.

Crispin de Pisse, junior, produced but few prints, and hence it has been supposed that he either died young, or quitted the profession of engraving.

The principal of these are the portraits of Frederic, elector palatine, and Johannes Angelus Werdenhagen, both from his own drawings, but the date of the latter, 1630, shews that he lived at least to the age of thirty years; and three plates from the History of Lazarus. A fourth plate from this history, which completes the set, was engraved by the senior de Pisse.

The works of William, the second son, who resided chiefly in London, were somewhat more abundant, but consist chiefly of portraits, among which are those of Robert Dudley, earl of Leicester; Robert Devereux, earl of Essex, on horseback; George Villiers, duke of Buckingham, also on horseback; and Frances, duchess of Richmond, &c.; all of quarto dimensions. King James I. with his family, inscribed "Triumphus Jacobi Regis Angliæ qui ipsius ferolis;" James I. with prince Henry of Wales; sir John Haywood, accompanied by emblems; John George, duke of Saxony, also with emblematical accompaniments; and sir Henry Rich, in an oval, are all in folio; and the latter one of the most carefully finished engravings of William de Pisse.

A set of the five senses, with each a Latin verse, in quarto; a family of gyphers, dated 1621, in folio; and a family-piece, supposed to be that of the palatine, where the youngest child is represented playing with a rabbit, folio size. For the monograms of both these artists see our first plate of those used by the engravers of the Netherlands.

Simon, the youngest of the sons of Crispin, resided also for some time in England, where he was employed by Hilliard, who was the Reynolds of his day, and of whom Dr. Donne wrote that often-cited passage,

"A hand, an eye, by Hilliard drawn, is worth
An historie by a worse painter made."

For Hilliard, Simon de Pisse engraved the portraits of most of the royal family of England. He was afterwards employed by the king of Denmark, and probably died at Copenhagen. The latest of his works executed in England are dated 1613. They chiefly consist of portraits, with some few devotional subjects and book ornaments; and are marked with his initials combined in a cypher, which will be found in our second plate of those used by the engravers of the Netherlands. The principal portraits are those of king James I. and Anne his queen, on horseback, both in folio; prince Henry and queen Elizabeth, both in quarto; Robert Carr, earl of Somerset, an oval print, in folio; Frances Howard, countess of Somerset; George Villiers, duke of Buckingham; Francis Manners, earl of Rutland; sir Walter Raleigh; Thomas, earl of Arundel, from Mircvelt; William, earl of Pembroke, from Van Somer; George, archbishop of Canterbury, dated 1616; Accuna, earl of Condemare,

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Condomare, and plenipotentiary to Philip IV.; sir Thomas Smith, ambassador to Russia; Mary Sidney, countess of Pembroke; Robert Sidney, earl of Lisle, afterwards earl of Leicester; Henry Wriothesley, earl of Southampton; Lamoral, prince of Caver, and count of Egmont; Maurice, prince of Orange, all of quarto dimensions. Four whole-length portraits of celebrated dukes of Burgundy, John de Valois, surnamed the Intrepid; Philip de Valois, surnamed the Hardy; Philip the Good; and Charles the Timid, very rare etchings; the frontispiece to the works of the lord chancellor Bacon; a print, entitled "*Vanitas vanitatum et omnia vanitas*," with four verses in the Dutch language. "Our Saviour with the Pilgrims on their way to Emmaus," in folio; and "A Holy Family," where the infant Jesus is represented taking a grape from St. Anne, after Baroccio, are also from the graver of Simon de Passe.

The principal engravings of his sister Madeline we have already noticed in our article on *ENGLISH Engraving*. Her monograms are inserted in our *Plate I.* of those of the engravers of the Low Countries.

The family of the Galle are more prominent than praiseworthy in the history of Flemish engraving. Philip, the first of that family, was born at Haerlem in the year 1537, but resided chiefly at Antwerp, where he published a great number of prints, and where he died in 1612.

Philip understood the human figure, handled the graver with facility, and discovered a share of talent, that, if brought into action, and kept on the stretch, might have advanced the arts of his country; but commerce was the prevailing deity of the Low Countries, and he alone was esteemed meritorious who became rich. The present writer wishes he were not struck with too much of resemblance in this respect between the Low Countries at that time, and England at this.

Galle appears to have sacrificed all desire of improvement to the rapid production of those sets of mediocre engravings which from the fountains of Holland and Flanders began about this time to flow over the rest of Europe; and in effecting this purpose he was, unfortunately for the progress of art, joined by his own sons, and by the families of Wierix and Sadeler. Strutt very truly observes that in all their works we may trace the same stiff and formal style, with little variation, and without any attempt to add taste and freedom to correctness of form, or the smallest endeavour to enlarge the compass, or improve the harmony of chiaroscuro.

From these slight engravings of Philip Galle, which for the most part are marked with one or other of the monograms, which may be seen in our second plate of those of the engravers of the Low Countries, we select the following, as being most creditable to his abilities, and least unworthy of the modern portfolio.

A set of six, of portraits of reformers and other distinguished characters of the sixteenth century, viz. Martin Luther, John Calvin, Ulrich Zwinglius, Bilelaldus Pircheymer, Dante, and sir Thomas More; pedestrian statue of the duke of Alva; portraits of Martin Hemskerck, the painter, and William Philandre, a celebrated architect; all in quarto. A set of thirty-four from the life of St. Catherine. A set of six, in folio, of Sybils, &c. entitled "*Jesu Christi dignitatis virtutis et efficientie praeventus Sybills X.*" after Blockland. The Seven Wonders of the World, in folio; to which, as an eighth, Galle added the Amphitheatre of Vespasian at Rome, after M. Hemskerck. A set of seven battles, from Stradan; entitled "*Mediciae famulae gestarum*," in folio. "Our Saviour traveling with his two Disciples to Emmaus," in large quarto, from Brueghel; "The Death of St. Anne," in large folio,

from the same master; "The Holy Trinity," a grand composition, in large folio, from M. de Vos. This is esteemed the best engraving by Philip. "King Solomon superintending the Building of the Temple of Jerusalem," from Franc. Floris; "The Sacrifice of Isaac;" and "Mutius Scaevola, in the Tent of Porfenna;" both from the same master: all in large folio.

Theodore Galle was the eldest son of Philip, was born at Antwerp A.D. 1560, and having learned from his father the rudiments of engraving, made a journey to Italy, either with the view of improving himself in his art, or with that of rendering the profits of the print trade more productive or more secure. At Rome he engraved several plates, but adhered to the style of his father, though surrounded by the finest examples of superior art.

After his return to Antwerp, he continued occasionally to engrave; but print-selling was with him the business of life, and he published the works of other artists, as well as his own. His own have the defects of feebleness of chiaroscuro, and stiffness of style: yet the following prints from his hand, will shew, that in neatness he excelled his father, and was a better draftsman.

"Julius Lipsius," with allegorical accompaniments, explained by six Latin verses; "St. Jerome," in his caverly, in the act of adoration, both in folio, and of the oval form. A rare and large folio set of emblems, entitled "*Lites abusus*," &c. A set of small plates from "The Life of St. Norbert." A set of twenty-eight ditto, from "The Life of St. Joseph, and that of the Virgin Mary." A set of thirteen ditto, entitled "*Typus occasioms in quo recepta comoda, neglecta vero incommoda personata schemate proponuntur*;" (this is from his own designs, and is now become scarce.) "The youthful Saviour contemplating the Cross and Instruments of his Passion;" "St. John the Evangelist," and "St. Jerome," all of octavo size; a folio plate of "Count Ugolino and his Sons imprisoned in the Castle of Pisa," from the *Inferno* of Dante, after J. Stradan, a rare print; "The Roman Matrons beseeching Coriolanus to relent;" "Tiber resting on his Urn, and the Vestal Lucie receiving Water in a Sieve;" "Cornelia, the mother of the Gracchii, working with her Women," all of folio size. A frontispiece, after Rubens, entitled "Aug. Mascardi, filiarum, Lib. IV.;" and another frontispiece from Rubens, entitled "Las obras en Verlo de Don Francisco de Boria;" 1654: both of quarto size.

Cornelius Galle, (commonly known by the appellation of the elder Cornelius) was the younger of the sons of Philip, and was born at Antwerp in the year 1570. He imitated his father's manner of engraving, and followed the steps of his brother Theodore, though with far better success as an artist.

At Rome he resided a considerable time, and acquired there that freedom, taste, and correctness of drawing, which are found in his best works, and render them far more estimable than those of his relatives. He finally settled at Antwerp, and took a share in that considerable commerce for prints, which was carried on there by the family of Galle. Among other engravings from his hand, the following will be found more particularly worthy of notice.

Portraits of St. Charles Borromeus, cardinal and archbishop of Milan, an octagonal print, in folio; Philip Rubens, father to the celebrated painter, in quarto; John van Havre, and Mother Anne of Jesus, a Carmelite nun, in folio, both after Rubens; Artus Wolf, et, a painter of Antwerp, in large quarto, from Vandvke; Charles I. of England, in an emblematic border, from N. V. Horst, in large quarto; Henrietta Maria, the queen of Charles I. (surrounded by

three goddesses,) in quarto, from the same master; St. Antony, in folio; and Leopold William, archduke of Austria; of the same dimensions.

Historical Subjects, after various Masters.—"Adam and Eve," from John Baptista Paggi; "Venus caressing Cupid," both in large quarto; "The Return into Egypt," a circular plate, in large folio, from the same painter; "Jesus at the Table of Simon the Pharisee," in folio, from L. Civoli; "St. Peter baptizing St. Prisque," from the same painter, quarto size; "The Virgin and Infant Jesus, to whom St. Bernard presents a Laurel Branch and Book," in folio, from F. de Vanni; "Christ on the Cross," at the bottom of which is introduced St. Francis and St. Theresa, in large folio; likewise from Vanni. A landscape, wherein Venus is represented fastened to a tree, whilst Minerva scourges Cupid, in quarto, from Aug. Caracci; "The Virgin and Child," from Raphael; "The Entombing of Christ," in an octagon, quarto, from the same master; "A Statue of the Holy Virgin," in a niche, around which children are twining garlands of fruit and flowers, from Rubens; "Judith beheading Holofernes," in large folio, a capital print; "The Four Fathers of the Church," in folio, from the same painter; this plate was enlarged, but there are impressions from it of its original size, which are more highly valued by collectors, and which are known by a black streak down either side: "Progné discovering the Head of his Son and Wife, after he had eaten their Bodies," in large folio; as a companion to "The Rape of Hippodamia," by P. de Bailliu. A naked figure, called "The Colour Grinder," also from Bailliu, in folio; and a print, entitled "Romanæ et Græcæ Antiquitatis Monumenta, e prisce Numismatibus erecta per Hubertum Goltzium Antv. 1645."

A dray-horse never descends immediately from the high bred racers of Newmarket: but mental endowments are rarely hereditary. Cornelius Galle, the younger, so called in contradistinction to the Cornelius of the preceding article, inherited engraving and print-selling, but not talent, from his father. He was born at Antwerp A.D. 1600. He was educated under his father, and endeavoured to imitate his style of engraving. His mechanical execution is sometimes tolerable, but his drawing very incorrect. Strutt thinks that he may have wanted the opportunity of studying in Italy, as his relations had done: but as those relations had enriched themselves by trade, it is rather to be inferred that he wanted motive or inclination to travel thither.

The portraits of Cornelius are somewhat superior to his historical works; and the best of his portraits are those of the emperor Ferdinand III.; Mary of Austria, his consort; Henrietta of Lorraine; and John Mieslens, the painter, all in large quarto, and after Vandyke; a folio plate of Jodoens Christophorus Kup de Kuppenstein, (a senator of Nuremberg,) after Anselm van Hulle; and Octavius Piccolomini of Arragon, also in folio, with a border of fruit and flowers, after the same painter, &c. which latter is probably, on the whole, the best print of the younger Cornelius.

From his historical engravings, the following may be selected: "A Nativity, with the Angel appearing to the Shepherds," from D. Teniers; "Venus suckling the Loves," from Rubens; "The Descent from the Cross," from Diepenbeck; "The Hospitality of Baucis and Philemon," after J. Vanden Hoeck, in folio; "Job abandoned by his Friends and scolded by his Wife," after Diepenbeck, in folio; and a quarto plate from "The Life of St. Dominic," after Vanden Hoeck.

Hans or John Bol was born at Mechlin in the year 1534,

and died at Amsterdam in 1593. His inclination leading him to the arts, he was instructed in painting by a master of no great repute, whom he soon quitted; and, going to Heidelberg, assisted the progress of his own improvement by copying the works of eminent artists. His subjects are chiefly landscapes, with animals; but he likewise painted history and miniature with no small success. We have by him some etchings, in a free spirited style, that indicate the hand of a master: these he marked with a monogram, which will be found in Plate II. of those used by the engravers of the Low Countries: and among them are "The Meeting of Jacob and Esau," a quarto circular print; "The first interview between the Servant of Abraham and Rebecca," of the same size; "The twelve Months of the Year," circular, in 8vo.; two sets of landscapes, views in Holland, in 4to.; and a large print, lengthways, representing an aquatic diversion in Holland: a man appears in a boat, catching at a goose, which is fastened to a string over the river, and a prodigious number of spectators are depicted upon the banks.

Cornelius Cort was born at Hoorn in Holland, A.D. 1536. After having learned the first principles of drawing and engraving, (as Strutt conjectures, from Coornhaert,) he worked for a time as the assistant of Jerome Cock, and afterwards travelled to Italy to complete his studies.

At Venice, where he was courteously received by Titian, he made a long stay: some say he resided in the house of Titian. However this may have been, he engraved from several of the pictures of that much admired artist, and no doubt profited by his instruction and advice.

That his mind expanded in this genial climate of art, where Titian shone forth, there is indeed abundant proof to be obtained, by comparing his engravings after that master with those frigid works after Hemskerck, which he produced under the influence of Germany and Jerome Cock.

He began now to engrave larger plates, in a bolder and broader style than that to which he had hitherto been accustomed; and removing to Rome, established there an academy of engraving, in which several meritorious pupils (among whom was Agostino Caracci) listened with advantage to his instructions, and imitated his example with so much success, that Cort may with justice be reckoned among those men of genius who have contributed to the enlargement of the boundaries of the art itself. But the career of our artist, though brilliant, was short: he died at Rome, in the meridian of his reputation, at the age of two-and-forty.

Cort worked with the graver only, in a bold and manly style: his drawing, though sometimes neglected, is generally correct; and his chiaroscuro improves upon that of his predecessors. Even in the careless passages of his works, so much taste and freedom prevail, and so many indications of sound knowledge, that his negligence must ever be esteemed the negligence of haste, and of a too easy reliance upon the friendship of the spectator, which he believes he has conciliated: not that of ignorance.

Bassan, in estimating his merit, praises with justice the taste and lightness of touch with which he engraved landscape, without the assistance of etching; and adds, that "he was the best engraver with the burin, or graver alone, that Holland ever produced:" an encomium which our countryman, Strutt, thinks may be a little overstrained.

His print of "Christ praying in the Garden," which is probably engraven from his own composition, is marked with a small instrument, or utensil, near the feet of one of the disciples, which is usually taken for a lamp, and has sometimes been mistakenly attributed to an old master who flourished in 1509. On other occasions, according to Strutt, he marked his

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prints with the two small fighting cocks, which we have copied in *Plate II.* of the marks, &c. used by the engravers of the Low Countries; though for what reason cannot easily be imagined, as he was not a Frenchman, unless it were to denote that these engravings were performed by Jerome Cock and himself in conjunction.

The abbé Marolles possessed upwards of one hundred and fifty engravings by this master. Of these we are able to enumerate the following, beginning with his

Portraits.—Cornelius Cort, engraved by himself, in a quarto oval; a pair of Henricus II. Gallorum rex, and Catherine de Medicis, the French queen, in ovals of large quarto size; Don Juan of Austria; Marc' Antonius Moretus, a Roman citizen; Andrea Alciati, all in ovals; three portraits engraved for J. Cock, viz. Roger of Brussels, Theodore van Harlem, and Joachim Dionatinis, all artists; the genealogical tree of the illustrious family of Medicis, with the portrait of Scipio Amirato; the genealogical tree of the family of Cambi Importuni; and two busts of Democritus and Heraclitus, in 12mo.

Subjects from his own Compositions.—"The Birth of the Holy Virgin," in folio, dated 1568; "The miraculous Conception," wherein the Virgin Mary is surrounded by allegorical devices, dated 1567; "The Infant Jesus in the Temple;" "A Repose during the Flight into Egypt," 1568; "A Holy Family," wherein St. Joseph is represented giving a pear to the infant Christ; "The Last Supper;" "A Crucifix," supported by two angels, whilst others are displaying the tablets of the law, and a chalice; "The Resurrection of our Saviour;" "St. Theodore the Patron Saint of Venice, fighting with a Dragon;" "St. Catherine kneeling on the Instruments of her Martyrdom, crowned by two Angels;" "St. Verediana, a Virgin, kneeling before an Altar, with a Serpent at her Feet," 1570; two tempestuous sea-pieces; a frontispiece, representing the Virgin seated between two cherubs; "A Fawn placing a young Bacchus in a Niche;" "A Soldier carrying an Infant;" and "A young Man seated, drawing a Thorn from his Foot," all of folio dimensions.

Subjects engraved from various Flemish Masters, before Cort went to Italy.—"Adam and Eve;" they are seated under the tree of life, whilst a serpent, with a human head, presents an apple to Eve, from Michael Coxie; "The Resurrection of Christ;" "The Descent of the Holy Ghost;" "Our Saviour accompanied by Sts. Peter and Paul," all of folio size, from Michael Coxie; a series of four folio plates, from the parable of "Dives and Lazarus," after Hemskereck; another series of four, from the parable of "The good Servant;" and the parable of "The Vineyard," all from the same painter, in folio; a set of six, in folio, from "The History of Noah," from Franc. Floris; "The History of Abraham," in a set of the same number; "The History of Jacob and Rachael," engraved on six plates in the form of a fan; "The Labours of Hercules," in ten folio plates; "The History of Pluto and Proserpine," in four plates of folio size; "The Triumph of Bacchus and Venus," all from the same; an emblematical subject on the immortality of virtue, after Franc. Floris, both in large folio; "The Descent from the Cross," after Van der Wyde, in folio; a standing figure of St. Roch, from J. Speckart; and St. Lawrence, from the same painter; "St. Dominic reading," from B. Spranger; "A Holy Family, surrounded with Angels," from the same; "The Virgin crowned in Heaven," after G. Moitaert; and "The Painting Academy," after Stradan, all of folio dimensions.

Subjects engraved in Italy from various great Masters.
1. *From Titian.*—"The Annunciation," in large folio;

"The Martyrdom of St. Lawrence," of the same size; another "Annunciation," in folio; "The Holy Trinity," known by the appellation of "the All-powerful," in large folio; "St. Jerome reading," in folio; another folio plate of "St. Jerome, at the Entrance of his Cell, prostrate before a Crucifix," a very rare print, omitted in Heineken's catalogue of the works of Cort: a half figure of "A Magdalen;" another "Magdalen in the Desert, before a Crucifix;" "Tarquin and Lucretia," folio size; "Diana and Calista," large folio; "Prometheus chained to the Rock;" and "Rinaldo delivering Angelica from the Dragon," both in large folio.

From Jerom Mutian.—"St. Peter walking on the Sea;" "Christ crowned with Thorns;" "Christ bearing the Cross;" "The Descent from the Cross;" "Jesus Christ appearing to the three Maries, and St. John, on their way to Jerusalem;" another "Descent from the Cross;" "St. Jerom meditating;" all of folio dimensions; and "The seven Penitents." These are large landscapes, in which are introduced small figures of the saints, Mary Magdalen, Jerome, John the Baptist, Hubert, Onophrom, Francis (stigmatised), and Francis (in ecstasy): six of them are upright plates, and the seventh lengthways.

From Julio Clovio.—"The Annunciation;" "The Adoration of the Kings;" a half figure of "The Virgin holding the Infant Jesus;" and "The youthful Jesus preaching in the Temple;" all in folio. "Jesus baptised by St. John in the River Jordan;" and "The Crucifixion," both in large folio; "The dead Body of our Saviour, and one of the Maries kissing his Hand;" "The Entombing of Christ," in folio; "Christ appearing to Mary Magdalen," of the same size; "The Conversion of St. Paul;" "Christ on the Cross," a grand composition, both in large folio; and "St. George and the Dragon," in folio.

From Taddao Zuccaro.—"The Creation of Adam and Eve," in large folio; "The youthful Virgin presented in the Temple," in folio; a large folio plate of "The Nativity," a rich composition; "A Holy Family," wherein St. John holds a lamb; "The Miracle of the five Loaves," both in folio; "The Body of our Saviour before the Sepulchre," a grand composition; "The Descent of the Holy Ghost," both of large folio dimensions; and a folio print of "The Martyrdom of St. Agatha."

After Frederic Zuccaro.—"Moses and Aaron before Pharaoh;" "The Birth of the Virgin;" and "The Conception of the Virgin," who is supported and crowned by angels; "The Annunciation of the Virgin;" "The Nativity," a grand composition, all in large folio; "The Adoration of the Magi;" "A Holy Family," where a cat is introduced catching a bird; "The Flight into Egypt;" "Our Saviour tempted in the Wilderness;" "The Woman taken in Adultery;" "Jesus turning the Money-Changers out of the Temple;" "The Resurrection of Lazarus;" "The good Samaritan;" "St. Peter chosen Head of the Church;" "Our Saviour on the Mount of Olives;" "The Jews approaching our Saviour in the Garden of Olives;" "The Death of the Virgin;" "The Coronation of the Virgin;" "St. Lawrence and St. Sixtus," surrounded with an ornamental border, all of folio dimensions; "The Dispute of the Holy Sacrament," in large folio; "Labour and Justice," an emblematical subject, in folio. A large satirical print on the officers of pope Gregory XIII., representing a young man accused by Calumny and protected by Innocence, before a judge, with the ears of an ass, (the whole of which is taken from Lucian's description of a lost picture, by Apelles): and another satirical print engraved on two large plates; in the lower part of the composition is introduced

introduced a painter sitting at his easel, painting the portraits of certain celebrated simpletons of the day; in the upper part sits Jupiter on his throne, surrounded by all the gods, protecting the arts and sciences; a very capital and rare print.

From Raphael d'Urbino.—"The Transfiguration," from the celebrated picture in the Vatican; "The Contest between the Romans and Pyrrhus," known under the appellation of "The Battle of the Elephants," both of large folio size. A large print, executed on three separate plates, of "The Victory of Constantine over the Emperor Maxentius, at Ponte-Molle." Cert left this plate unfinished at his death, but it was afterwards completed by Ph. Thomassin.

Subjects from various other Italian Masters.—"Mount Parnassus," a folio print, from Polidore; "The Adoration of the Shepherds," in large folio, from the same master; "A Repose during the Flight into Egypt," in folio, after B. Bassano; an unfinished print, in folio, of "The Apotheosis of St. Jerome," from the same master; "The Visitation of St. Elizabeth," a large folio print, from Marc de Sienna; "The Adoration of the Shepherds," a folio print, from the same master; another of "The Adoration of the Shepherds," from Paris Romano; "The Virgin sitting near a Fountain, with the Holy Infant, and St. John," in folio, from F. Baroccio; a folio print of the "Baptism of our Saviour," after F. Salviati; "The Marriage of Cana," from Lorenzo Sabbatini, in folio; "The Last Supper," after L. Agresti Forlivesano (there are impressions of this plate both with and without the mark of Cort), in large folio; "St. Stephen stoned," in large folio, from Marcellus Venusius; "St. Jerome before a Crucifix," after Riccio da Sienna, in folio; "St. Jerome, attended by two Angels," from Jacobus Parmensis, in folio; "The Girdle of St. Francis," after Caracci, in large folio; a quarto print of "The Marriage of St. Catherine;" a folio print of "St. Margaret of Cortona," from Tempesta; "A Dance of Dryades," in folio, from Maitre Rous, of Florence; "The three Destinies," from Julio Romano, in folio; and "The Tombs of the Dukes of Mantua," in large folio, after Michael Angelo.

Of Philip de Sorge, Sericeus, or Sytina, very little is known. Strutt speaks of the few prints which we shall venture to ascribe to him, as being the production of two artists: Rost and Huber are more probably in the right, in ascribing them to one. Sericeus studied under Cornelius Cort, and afterwards settled at Rome, where it is probable, from the scarcity of his works, he died at an early period of life; but neither the time of his decease, nor that of his birth, have been mentioned.

His style of engraving, evidently formed upon that which we may term the Italian style of Cort, is open, vigorous, and free; but his knowledge of the figure was inferior to that of his master, and his chiaroscuro, though not discordant, not very forcible.

We are acquainted with no other of his works than a set of twenty-eight half-length figures of the popes in chronologic succession, from the year 204 to 1568, the year in which they were published; they are in small folio, and executed with the graver only, in a stiff, slight manner. Pope Pius V. surrounded with emblematical figures, designed by Sericeus himself, and engraved in a style superior to the former. "Judith beheading Holofernes," in folio, after Julio Clovio; "The Angel warning St. Joseph to depart into Egypt," from C. Cort, of the same size as the original; "St. Francis receiving the Stigmatics," in large folio; "St. Jerome before a Crucifix in the Desert," sup-

posed to be from Mutian, in large folio; "The Virgin and Infant Christ," known by the appellation of "The Virgin of Silence," inscribed "Dormiente puero Jesu divina Mens vigilat," with the name of Philip Sericeus, dated 1566, in large folio; a large folio print of "Our Saviour on the Cross," with the Virgin and St. John the Evangelist, on either side at the foot of the cross, after Michael Angelo; and a large folio print, which is attributed to Soye, although it bears the name of Cort, representing "Prometheus chained to a Rock," from Titian's picture in the royal palace at Madrid.

John Ditmer, or Ditmar, was a native of the Low Countries, and born in the year 1538, or thereabouts. By this engraver we have a middling-sized upright plate, nearly square, representing a figure of Christ seated on the clouds, with the symbolical animals, seen in vision by the prophet Ezekiel, and which are the usual attendants on the evangelists, and angels bearing the cross, crown of thorns, &c. It is executed in a style greatly resembling that of Cort, but coarser, and by no means so well drawn as the works of that master generally are. This print is after Michael Coxie, and is dated in the year 1574, nor are we able to specify more of the works of this engraver, who was apparently instructed in his art by Cornelius Cort.

Gerard de Jode was born at Antwerp in the year 1521, and died in the same city A.D. 1591. He was celebrated both as an engraver and geometrician, and was the son of Cornelius de Jode, a well-known geographer. Part of his youth was passed in the service of the emperor Charles V., after which he gave up his attention entirely to the arts and sciences. He engraved some geographical, and a great number of historical, plates, in the style of his contemporaries and countrymen, Wierix and the Collaerts, and Papillon says that he executed some meritorious engravings on wood.

He likewise established at Antwerp a printseller's shop, which, after his death, was carried on by his widow. Being hereditarily known as a geographer, in which science he excelled, he was much encouraged by Ortelius, who was furnished the Ptolemy of his age, and of whom we have spoken under the article *ENGLISH ENGRAVING*. The principal works of Gerard de Jode, are a set of twenty-nine, of the portraits of the popes, in 4to. published in the year 1585. A Roman triumph, on twelve plates, after Hemikerck, in 4to. A set of thirteen, intitled "Memorabilium, novi Testamenti, templo Gestorum leones tredecim elegantissimi ac ornatissimi. Antwerpia excudebat Gerard de Jode," in folio, with architectural back-ground, and a very large and well engraved print, executed on three plates of "The Crucifixion," after Michael Angelo.

Peter de Jode, the elder, was born at Antwerp A.D. 1570, and died in the same city in 1634. He was the son of the preceding artist, who instructed him in the knowledge of geometry and drawing, but he studied engraving under Henry Goltzius, and afterwards travelled to Italy and to Paris, to improve his connections and complete his professional studies. In Paris he remained some time, and with the assistance of his son, executed several plates there, which were published by A. Bonenfant. He returned to Antwerp a few years after the commencement of the succeeding century, where he remained till the time of his death.

The engravings of the elder Peter possess great merit. He was an excellent draftsman; his chiaro-scuro is not inferior to that of the age in which he lived; and in his manual execution he used the graver alone, in a manner evidently founded on the neater style of Goltzius, but not with equal freedom, nor equal power of expressing the variety of substances.

stances which entered into the compositions from which his prints are engraven.

He engraved both portraits and history with success, but did not excel in landscape. From the whole of his works, which are somewhat numerous, the connoisseur may select the following with advantage.

The *Portraits* of Henry du Puy, a Dutch philosopher, in a circle surrounded by a serpent, in 4to.; John B.accio, from Titian, in folio; Ferdinand, count palatine of the Rhine, in an oval, from Rubens, quarto size; Philip III., king of Spain, in an oval, from Rubens; Francis de Mello, count of Azumar; Ambrose Spinola, surnamed the Great General, all of quarto dimensions.

Historical, &c.—"The Virgin and Child," from Titian; "The Marriage of St. Catherine," both in quarto. A large folio print of a "Holy Family," in a mountainous landscape, both from the same painter. Twelve prints of "The Life and Miracles of St. Catherine of Siena," after Francis Vanni, in folio; "The Adoration of the Shepherds," likewise in folio; "Christ at the House of Nicodemus," a night-piece, in large quarto; "The Decollation of St. John," in an oval, of octavo size, a rare print, from Rubens; "Our Saviour delivering the Keys to St. Peter," in folio; "The Coronation of St. Catherine," in folio. An allegorical subject of government, represented by a female crowning Prudence with a laurel wreath, in 4to. Another, of "The Five Senses," in folio. The frontispiece to a book, intitled "Annals of Flanders," by M. Suuro, representing Flanders, personified, leaning on a pedestal &c. &c. in folio, all from Rubens. Thirty-six prints in quarto, from the "The Life of Christ," and "The Last Judgment," after a picture by John Cousin, in the church of the Mission at Vincennes. The painter has introduced his own portrait at the left hand side of the print. This is one of the largest prints in existence, being engraved on twelve plates!

Peter de Jode, the younger, the son of him who is the subject of the preceding article, was born at Antwerp, according to Strutt and the foreign authorities, in the year 1606. He studied under his father, whom he surpassed in taste and facility of handling the graver, though he can scarcely be said to have equalled him in the drawing of the naked. Our countryman, Strutt, though generally not deficient in accuracy of notice, has contributed to confuse the chronology of this artist and his father. He says, "it does not appear that the younger de Jode went to Italy, but he certainly accompanied his father to Paris, where they engraved conjointly a considerable number of plates for M. Bonenfant, and le Sieur Plinago," which, if our author's report of the return of the elder de Jode from Paris might be credited, is making the son travel to Paris and engrave, before he was born; for Strutt, in his account of the father, expressly says, "he returned to Antwerp about the year 1601, where he resided till the time of his death."

Perhaps the senior de Jode returned from his first journey in 1601, and afterward, as he did not die till 1634, made a second journey to Paris, taking with him his son.

The prints of the junior de Jode are numerous, but very unequal in merit. Baffan says of him, that in several of his engravings "he has equalled the best engravers, and in others has sunk below himself." To which Strutt justly adds, "he was, without doubt, a very able engraver, but to place him (even in his best exertions) upon an equality with his contemporaries, Bulwer, Pontius, and Vorsterman, is, in my opinion, estimating his abilities at much too high a rate."

Among his most esteemed performances may be mentioned the following

Portraits of celebrated artists, &c. after the pictures of Vandyke, of small folio size. Peter de Jode, senior, engraved by himself; James Jordans, painter of Antwerp; Cornelias Poelenbourg, painter, of Utrecht; John Smellinx, painter, of Antwerp (the flesh of which is etched); Adam Colter; Andrew Colyns de Nolo, a statuary of Antwerp; Genevieve d'Urphie, the widow of Charles Alexander, duke of Croye; Jean de Blois; Henry Liberti, an organist; John Tzerdacs, count of Tilly; Albert, duke of Friedland, and count of Wallenstein; Diodorus de Tulden, professor at Louvain; Antonio Triest, bishop of Ghent; Charles Henri, baron of Metternich, in an ornamental border; Augustus Adolphus, baron of Trantorff, surrounded with an ornamental border, all of folio size; Thomas Ricciardi; Simon Vouet del, in 4to.; Ernest, count of Hensbourg, chevalier of the golden fleece, a half-length portrait, in armour, after Th. Willeboorts, in 4to.; and a folio print, entitled "Petrus de Francavilla, Gall. Regis Architect et Sculptor," after J. Buel.

Historical Subjects.—"St. Augustine," bishop of Hippo, crowned by Religion, with other accessory emblems, in folio; "St. Francis kneeling before a Crucifix," after Baroccio, in folio; "A Holy Family," where Elizabeth, St. John, and Zacharias, are explaining a book held by an angel, in large folio, from Titian; "An Emblem of Death," represented by an infant sleeping upon the ground, with a skull lying by his side, a small plate, lengthways, from Artemisa Gentilesea; "The Visitation of the Virgin," from a picture by Rubens, in the cathedral at Antwerp, in large folio, a very fine and rare print. A fine print of "The Three Graces," in large folio; "Venus rising from the Sea," surrounded by nymphs and tritons, in large folio; "The Alliance of the Earth and Sea," personified by Cybele and Neptune, a plate of folio size, as a companion to that of "Plenty," by Theodore van Kessel, all after Rubens; "St. Francis and St. Clara, worshipping the Infant Christ, lying in the Manger," half figures, with the effect of night, in folio, after G. Seghers, the companion to which is "St. Peter denying Christ," engraven by And. de Paulis; "Christ discoursing with Nicodemus," half figures, with the effect of night, from the same painter; "The Nativity," from Jordans, a very fine and rare print, in large folio; "St. Martin of Tours expelling the evil Spirit from a Demoniac," very large folio; "Folly and Ignorance," half figures, a large folio plate, all from Jordans; "St. Augustin surrounded by Angels," a large circular plate, after Vandyke; "Rinaldo and Armida," a large folio plate, from the same master, being the companion to another plate, which Baillen engraved after the same painter; "A Holy Family," where the infant Christ is held by St. Anne, after Abr. van Diepenbeck. An allegorical subject of "Peace," and "St. John the Baptist in the Desert," from Van Mol, all large upright plates.

Arnold de Jode, the son of Peter de Jode the younger, was born at Antwerp in the year 1636, and was instructed by his father in the art of engraving. In his youth he migrated to England, but being no great proficient in his art, was not able to contribute much to the advancement of English engraving, though the art in this country was then at a low ebb.

He resided here at the time of the great fire of London, as may be learned from an inscription beneath his print of "The Infants Christ and St. John embracing each other," after Vandyke, which runs thus, "Arnoldus de Jode, Sculp."

sculp. Londini, tempore incendii maximi." It may be worthy of note, that this engraving is dedicated to sir Peter Lely, who was at that time the possessor of Vandyke's picture.

It seems not improbable, that the low state of English taste, and paucity of artists at that period, enabled Arnold to live with more profit and consequent comfort in this country than in his own, for his talents were very indifferent, and by no means commensurate to his early opportunities of acquiring professional information.

It may be sufficient to mention the following prints from his graver, of which the portraits will, generally speaking, be found the best.

The *Portraits* of sir Peter Lely, in large folio, from a picture by sir Peter himself; Alexander Browne, (prefixed to his *Ars Pictoria*), in small folio, from J. Huyfsmans; Catherine Howard, duchess of Lenox, &c. in folio, after Vandyke; cardinal Palavicini, in 4to. after Titian.

Hijloical, &c.—"Mercury instructing Cupid," in small folio, from Correggio, engraved in London, and dated 1667; "A Magdalen," a half-length figure from Vandyke. The folio print after Vandyke, mentioned in his biography above; and a landscape after L. de Vadder, in folio.

In the sixteenth century, the orthography of proper names, as well as that of words, appears to have been extremely unsettled. On the continent, as well as in this island, men spelled variously, as they variously estimated the powers of letters, and Printing was as yet too young to have erected a standard.

John Wierix, Wierx, Wierinx, or Wirings, (for thus capriciously has the orthography of this name varied from itself,) was born at Amsterdam, in the year 1550. His love for the arts appears to have manifested itself at a very early period of his life. We know not from whom he learned the first principles of drawing and engraving; perhaps he owed them, as well as his subsequent progress, principally to his own application and patient industry. He studied the works of Albert Durer very attentively, and built his taste upon them; but from too close and servile a mode of copying them, he contracted a stiffness, of which he never divested himself. There is little or no originality in his prints. His genius seems to have been confined, and he was fearful of venturing beyond the bounds of a copyist. The incomparable neatness of his works executed with the graver only, gives them, however, a value with the curious collector, which is increased by the correctness of his drawing, and the manner in which the extremities of his figures are marked, proves the great attention he must have paid to that part of his profession. His works are exceedingly multifarious, consisting of devotional subjects of various kinds and sizes; from which the following may be selected as affording, on the whole, the most satisfactory specimens of his abilities.

Portraits of Rodolpho II. emperor of Germany; Philip William, prince of Orange, in 4to; Eleanor of Bourbon, princess of Orange; James I. of England, with his queen, whole lengths, a small upright plate, very scarce; Philip II. of Spain; Catherine of Medicis, wife of Henry II.; Henry III. of France; and the counts of Verneuil, all of quarto dimensions; the last is a companion to the portrait of Henry IV. engraved by Goltzius.

Subjects from his own Compositions.—A small print of "Christ and the Virgin;" "The Resurrection," in octavo; "The Jesuit Martyrs," in 4to. with an explanation; an allegorical subject, called "The Penitent Heart," with

Dutch inscriptions; "The Magdalen," at the entrance of a cell, reading before a crucifix, a very beautifully finished print, both of quarto dimensions; an allegorical print, called "The Redemption of Man," in folio; and "The four Elements," of the same size.

Subjects from various Masters.—A small Satyr, from Albert Durer, engraved by Wierix at the early age of twelve, in 12mo; "Adam receiving the forbidden Fruit from Eve;" a small upright plate, laboriously copied from the celebrated print of the same subject by Albert Durer. It is dated 1566, and Wierix has added his own age, which was only sixteen; "St. Hubert at the Chase, prostrate before a Crucifix," a very fine copy from Albert Durer, (whose cypher it bears,) in large folio; "St. Jerom in Meditation," a very good copy, done at the age of thirteen, in folio; "The Marriage of St. Catherine," after Dennis Calvaert, in quarto; "The Sacrifice of Isaac," from M. de Vos; "Elias translated to Heaven;" "Christ taken from the Cross," after Otto Vanius; "The Last Judgment," from Michael Angelo, a fine copy from the print by Martin Rota; and another "Dead Christ," after Bernardino Passeri, all of folio dimensions.

Hieronymus or Jerome Wierix, was also born at Amsterdam in the year 1551, and is believed to have been the brother of John, of whom he learned the principles of drawing and engraving, and imitated his style with so much precision, that it would be a matter of the utmost difficulty to distinguish the works of the one from those of the other, were it not for the marks with which they are inscribed. The prints of Jerom possess the same extraordinary neatness, which we admire in those of John, are as correctly drawn, equally deficient in taste and freedom, and equally the result of careful labour.

Jerom Wierix marked his plates with his initials, or a monogram, which will be found in our second plate of those used by the engravers of the Low Countries. His works are still more numerous than those of his elder brother; and those most worthy of esteem, are the following.

Portraits of the emperor Charlemagne, in octavo, decorated with imperial ornaments; Henry of Bourbon, king of Navarre; queen Elizabeth of England; Sigismund III. of Poland; Alexander Farnese, duke of Parma; and sir Francis Drake, all of very small size; John Corepi Becani, a physician, holding a skull, in folio; De Constaen, and G. Oberstiech Delpheus, also in folio.

Subjects from his own Compositions.—"St. Francis," in 12mo.; "St. Cecilia," in quarto; "St. Anthony, held by the Devil," in 12mo.; "St. Bruno," in octavo; "St. Charles Borromeus," of the same size; "St. Anthony and St. Francis, to whom the Virgin presents the Infant Christ;" "The Holy Virgin suckling the Infant Jesus;" "The Virgin standing on a Crescent, with the Holy Infant surrounded with Rays of Glory," both in 12mo.; "The Miraculous Conception;" "The Death of Lucretia;" "The four Monarchies of the World," on four quarto plates; "Christ on the Cross suspended from a Vine, surrounded by four Saints," all of quarto size; another "Christ on the Cross, in the midst of a Vine, surrounded with Rays of Glory," the crucifix is supported on a bunch of grapes, which is held by the two Israhitish spies of the bible, an odd conceit, in 8vo.

Subjects from various Masters.—"A dead Christ, supported upon the Lap of the Virgin," after John Mabuse; "Christ receiving little Children," from Crispin van den Broeck; "Christ on the Cross," at the bottom of which is introduced the king David, St. Paul, and St. John the Baptist, after the same master; "A Holy Family," where St. Catherine

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therine is introduced kissing the feet of the infant Jesus, after Dennis Calvaert; "The Death of the Virgin," from Otho-Vænus; "Christ at the Table of Simon the Pharisee," after the same painter, all of folio dimensions; "Death and Satan," combating for a tree, while a saint and the holy Virgin are imploring Jesus Christ to preserve it, after H. van Balen, in octavo; "The Globe of the Earth near its Destruction, upheld by Jesus Christ and the Virgin," in octavo; "The opposite Roads to Heaven, and to the Infernal Regions," in quarto, from the same painter; "Our Saviour crowned with Thorns," after G. Mollart, in folio; "Jesus Christ on the Cross, worshipped by two Angels, in the Clouds," on one side of the cross is introduced the Virgin, and on the other St. John, whilst the Magdalen embraces the cross; (this is esteemed the finest print from the graver of Jerom;) "Enoch translated to Heaven," after M. de Vos, in folio; "The Death-bed of the Just," in large folio, from Amb. Franck; "Jesus baptised by John," after H. Hondius, in folio, a fine engraving; "The Visions of Daniel," after Van Haecht, in quarto; "Jupiter descending to Danae, in a Shower of Gold," from the same painter: a very capital print, after Lucas Romanus, of "The Resurrection of Christ," in large folio; and another, from the same painter, of "The Scourging of Christ," which Strutt pronounces one of his largest and best engravings, though not so neat as his other works.

Antony Wierix was the younger brother of Jerome and John, and, in general, adopted the same neat and laboured style of engraving, especially when he worked upon small subjects; but some of his larger prints are executed with more freedom; which, of course, adds greatly to their interest, in the estimation of persons of taste. Antony drew as correctly as his brother, and employed his graver upon the same sort of subjects; often indeed working conjointly with Jerome. We shall mention the following

Portraits, (all of which are very small,) pope Clement VII.; Philip Emanuel, of Lorrain, duke of Mercœur; Isabella, of Austria, daughter of Philip II. of Spain; Robert Bellarmine, cardinal; and Albert of Austria, archbishop of Toledo, and governor of the Low Countries, in quarto.

Subjects from his own Compositions.—Saints "Theresa," in octavo; and "Sebastian," in folio; "St. Dominic receiving a Rosary from the Holy Virgin," "The Virgin Mary," and "The Marriage of St. Catherine," both in 12mo.; "The Litany of the Virgin," in eight leaves, of octavo size; "The Virgin and Child, to whom the eternal Father displays the Instruments of the Passion," in 12mo.; "The purified Souls," with French and Latin verses in octavo; "Christ surrounded with the Representations of the Sufferings of various Martyrs," in quarto; "The Emblems of future Rewards and Punishments," in octavo; and "St. Jerom praying, accompanied by two Angels," in quarto; one of the best engravings by Antony Wierix.

Engravings from various Painters.—"Abraham sacrificing Isaac," and "The Adoration of the Kings," both in folio, and from M. de Vos. Four plates in quarto, representing the History of the prophet Jonas. "Resignation," personified by a female, fastened to a rock, holding a crucifix, while an angel crowns her with laurel, from J. de Backer, in folio; "A Repose during the Flight into Egypt," where St. Joseph is represented holding a bunch of grapes, after Cam. Procacini, in folio, executed in a bold broad style; "The Death of St. Francis," in folio, from the same painter; and "The Life of Christ," to which is added "The Death and Assumption of the Virgin Mary," with explana-

tions, forming a set of fifty-nine prints in folio, engraved conjointly by the three brothers, John, Jerom, and Antony.

Abraham de Bruyn, or Brun, was born at Antwerp in the year 1540; and established at Cologne. On account of the smallness of his productions he has been ranked in that class of artists, which is distinguished by the appellation of the *little masters*, and seems hardly to have merited even the distinction which he attained; for his prints are evidently rather the productions of labour and assiduity, than of genius. The lights in them are scattered and unharmonized, which destroy the effect, and give them a cold, metallic appearance, and his drawing is incorrect. It is true, Rembrandt had not yet dawned, and intention to the chiaroscuro has been termed by the apologists of such artists as Bruyn, "rather the fault of the age, than the professor;" and notwithstanding these defects, the works of this artist are much sought after by connoisseurs. The two monograms, which he affixed to his prints, will be found in our second plate of those used by the engravers of the Low Countries; and his best engravings are entitled as follows:

Portraits of the elector palatine, Philip Louis, and Ann his wife; Albert Frederick, duke of Prussia; William, duke of Juliers, and Mary his duchess; John Sambucus, physician (a wood engraving); "Carolus nonus Francorum Rex;" and Anne of Austria.

Historical. &c.—"Moses and the burning Bush," in quarto; "The Four Evangelists," "Christ and the Woman of Samaria," and "A Philosopher," with a scroll, both in octavo. A set of seven small plates of "The Planets," and another set of "The Five Senses;" a folio print, entitled "Imperii ac Sacerdotii ornatus, diversarum gentium vestitus;" another of the same size, entitled "Diversarum gentium armatura equestris, 1577;" a set of forty-nine, inscribed "Omnium fere gentium imagines," &c. quarto size. Seventy-six plates, of figures of knights on horseback, in octavo. A set of friezes, of the various modes of hunting and hawking, marked with his two cyphers. Twelve plates of animals, in quarto; "Pyramus and Thisbe," after Franc. Floris; "The Resurrection of Lazarus," from Crispin vanden Broeck, both in quarto; and a set of small arabesque ornaments.

Nicholas de Bruyn was born at the same place with the former artist, of whom he was the son, and of whom he learned the rudiments of his art; though he did not imitate him either in his style of engraving, or the smallness of the prints which he executed. He rather copied the style of Lucas Jacobs of Leyden, whose works he appears chiefly to have studied; and engraved large plates, which he executed entirely with the graver, in a very neat but laboured style. His prints evidently prove, that he had more fertility of invention than taste, and he wanted judgment to select such forms only, as were beautiful or suited to the occasion. His compositions are generally crowded with figures, but from the following causes his effects are feeble; the lights are too much diffused, and the breadths of shadow by no means sufficient to relieve the principal objects from those at a distance; in consequence of which, the whole appears confused and unfinished. His drawing is carefully attended to; but it is rather mannered than correct. The heads of his figures are frequently very expressive: yet, amidst all the disadvantages which this artist laboured under, much sterling merit is conspicuous in his productions. The cyphers, with which he marked his plates, will both be found in our second plate of those used by the engravers of the Low Countries: and amongst his works we shall select the following as being most worthy of notice.

From his own Compositions.—"Adam and Eve in Paradise,"

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dise," in large folio; "Adam and Eve eating of the forbidden Fruit;" "The grand Festival of the Jews, after six Years Bondage;" "The King Balac, communing with the Prophet Balaam;" "The Prophet Jeremiah," in a landscape; "The Vision of Ezekiel;" "David and Goliath;" and "Abigail meeting David;" both with landscape backgrounds; "Solomon and the Queen of Sheba;" "Solomon adoring the Idols;" "The Dream of Nebuchadnezzar;" "Daniel in the Lion's Den;" "Sufannah and the Elders;" "Sufannah justified;" "Two old Men stoned to Death;" "The Nativity of our Saviour announced to the Shepherds;" "The Adoration of the Eastern Kings;" "A Repose during the Flight into Egypt;" "The Slaughter of the Innocents;" "St. John preaching in the Desert;" "Our Saviour preaching on the Mount;" "The Centurion imploring the Help of Jesus Christ;" "The Entry of Christ into Jerusalem;" "Our Saviour on his way to Mount Calvary;" "The Crucifixion;" "The Resurrection;" "St. Paul preaching;" "St. Hubert perceiving a Crucifix between the Horns of a Stag;" "Orpheus charming the Animals with his Lyre." Peasants, with their children, regaling; a landscape, into which is introduced lions, tigers, and flags; a large company of Spaniards in a forest; all these are of large folio size; a set of six prints, in octavo, for goldsmiths, from fables; twelve plates of animals for a book of quadrupeds; and two sets of thirteen each, of birds and fishes.

Subjects from various Masters.—"St. John preaching in the Wilderness," from Lucas of Leyden; "A Miracle performed at the Tomb of St. James," a Spanish apocryphal, from the same painter; "The Golden Age," from Abr. Bloemart; this is considered as his finest print, and was admirably copied in a small circle by Theodore de Brye; "Abraham sacrificing Isaac," after Giles Cominxlo; "The Predictions of the Prophet Isaiah;" "The Judgment of Midas," a fine landscape, with figures, all from the same painter; a village fair, from Dav. Vinckenbooms; a landscape, with a castle; a view of a garden, with buildings, and figures dancing, both from the same painter; a stag hunt, after John Breughel; a fine landscape, into which is introduced the subject of "Moses defending the Daughters of Jethro," after Hans Bol.; "St. Cecilia," accompanied by other saints, copied, with some alteration, from Raphael; "The Four Seasons," from M. de Vos; and an armed knight on horseback, preceded by an allegorical figure on horseback, and followed by the devil on foot, copied from what is commonly termed "The Worldly Man" of Albert Durer; all are of folio dimensions.

The family of the Sadeler make a very considerable figure in the annals of engraving: yet are they, unless we should except Giles, less illustrious by the character of their works as engravings, than worthy of notice on account of their number, subjects, and the period at which they were performed.

Hans or John Sadeler was born at Brussels, A.D. 1550. His father is believed to have been an armourer, or workman in iron and steel; for the first employment that is known to have been exercised by John, was to engrave ornaments, &c. upon those metals, in order to their being inlaid with the precious metals. Hence Florence le Comte terms him a *damasquinneur* of iron; a word which probably, at that time, was the proper technical denomination of that particular branch of the armourer's profession, and which is perhaps derived from Damascus, where arms have been fabricated with similar ornaments from a very early period.

It appears, however, that our artist did not confine himself to the scroll-work and heraldic ornaments, which were

prevalent at the time, but applied himself with requisite diligence, at an early period of life, to the study of the human figure, of which he evinced an accurate knowledge; though, in consequence of early tuition, and the Flemish and German examples which had been placed before him for imitation, he drew in a stiff and mannered style.

From these early shackles, however, which, till Rubens appeared, Flanders unwittingly forged for all her sons, Sadeler in a great measure emancipated himself, when he came to strengthen his faculties by breathing the purer atmosphere of art that circulated in Italy.

He did not at once travel from Brussels to Italy, but published several of his earlier engravings at Antwerp; from whence, in the year 1588, he went to Frankfort, and continued to travel over great part of Germany, in order to obtain instruction from the best masters who were then living in that country. At Munich he remained a few years, where his merit being made known to the duke of Bavaria, he was very graciously received; and that nobleman made him a present of a chain of gold. From Munich he went to Verona; from thence to Venice, and afterwards to Rome; but not meeting with the encouragement he expected from the pope, he returned to Venice, where he established himself, and died in that city of a fever, in the year 1600. It is uncertain from whom he first learned the art of engraving; but it appears that he availed himself of the instructions of a variety of masters. His earliest productions have much of that stiffness, not only in drawing, but in point of manual execution, which eclipses the merit of the old engravings of the German school. It is true, that after he resided in Italy, he made a considerable improvement in his style of engraving, especially in the landscape parts of his plates; but he never entirely divested himself of the habit he at first acquired. He worked with the graver only, in a clear neat style; but his plates were never highly finished. We see in them, however, the hand of a very able artist, much correctness of drawing, and great expression. His engravings are exceedingly numerous; and though a complete collection of them is rarely to be seen, detached prints and sets of prints are by no means uncommon. They are usually marked with his initials combined in a cypher, for which see *Plate II.* of those used by the engravers of the Netherlands. The following are those which are held in most estimation.

Portraits.—Orlando Lassus, master of the chapel of William, duke of Bavaria, in 8vo.; Sigismund Feyerabend, a famous printer of Frankfort-on-the-Maine, in 4to.; George Hoefnagel, an artist of Antwerp, and one of the coadjutors of Ortelius the geographer, an engraving of merit, in 4to.; her royal highness Mary de Medicis, queen of France and Navarre; Charles, prince of Sweden and duke of Sudermania; Christoffer, baron of Teuffenpach, from J. ab. Ach., all in 4to.; a three-quarter portrait of Herdesianus, a celebrated juris consulte, with twelve Latin verses, in folio; a profile of Martin Luther, in folio; Otho Henry, count of Schwarzenberg, and counsellor of William of Bavaria, sitting at a table, in large folio; an historical portrait of Clement VIII., in an oval; and St. John Capistranus, a monk of the order of St. Francis, both of folio size.

Various Sets.—"The Creation of the World," commencing with the forming of the sun and moon, and ending with the exile of Adam and Eve from Paradise, in a set of eight, after Crispin Vanden Broeck; a set of six, containing the history of Adam and Eve, and Cain and Abel, after Michael Coxie; sixteen subjects from the book of Genesis, with Latin verses, from Martin de Vos; "The Life

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Life of Christ," from the same painter; a set of hermits, engraven conjointly by the two Sadelers, from the same painter. This set is much esteemed, partly on account of the romantic variety of the back-ground landscapes. A set of twelve landscapes of the months of the year, from P. Steevens; "The four Parts of the Day," after Theod. Bernard; "The four Seasons," with Latin verses, after H. Bol, all of folio dimensions.

Historical Subjects.—"The Virgin and holy Infant asleep, and an Angel," from Carracci, in 4to.; "The Feast of Dives," after Bassan; "Jesus at the House of Martha;" and "Jesus with the two Disciples at Emmaus." These three prints are commonly known among collectors by the appellation of "Sadeler's Kitchens." "The Angel appearing to the Shepherds," a night-piece; three plates of "The Nativity," treated in different ways, all of folio size, from Bassan, and a fourth of the same subject from Polidore de Caravaggio, in large folio; "St. Jerome praying, in his Cell, before an Image of the Virgin;" "Mary Magdalen praying in a Cell," both very fine engravings, after Giles Mostaert; "The patriarchal Family of Enoch," in a very fine landscape; "St. Roch and his Dog, with two Pilgrims," both in folio, from the same painter; "Jesus calling little Children," in large folio, from J. de Winghe; "Bacchus seated on a Tub, accompanied by Love and Music;" "St. Paul at Corinth, at the House of Aquila," all in large folio, from the same master; "The Annunciation," from Pietro Candido; "The three Mariæ at the Sepulchre;" and "St. Mary the Egyptian," all in 4to.; "The Last Supper," in folio; "The Virgin and Infant Christ, worshipped by St. Stephen and St. Lawrence," in large folio, all after Candido; "The Martyrdom of St. Ursula," in large folio, from the same painter; "The Nativity," after Hans von Achen, in 4to.; "The Death of our Saviour;" "The Virgin and Infant Jesus, with the Magdalen kissing his Feet, behind them is St. Joseph," both in 4to.; "The Virgin and Infant Christ seated on a Throne, with the two St. Johns and Angels," in folio, after the same painter; "A Repose during the Flight into Egypt," from Christopher Schwarz, in folio; "The Crucifixion," with the Virgin and St. John at the foot of the cross; "The Passion of our Saviour," in seven large folio plates; "The Last Judgment," in large folio, a very capital print; "A Courtesan sitting by a Fountain, playing the Lute, wishing to attract the Attention of a Youth, whom a Sage is conducting another way," in folio, all from Schwarz; "The penitent Magdalen," from Frederic Sustris, in folio; "Jesus appearing to the Magdalen as a Gardener," in folio; "The Annunciation," in 4to.; a whimsical composition of "A holy Family," with angels in the air, carrying the materials for the church of Jesuits at Munich, in folio; "Hercules between Vice and Virtue, with Jupiter in the Clouds," in large folio, all from Sustris; "The good Shepherd," from H. Bol; "The mercenary Shepherd," from the same; "The four Seasons;" a landscape, where three herons are introduced in the air, from Paul Bril; "The four Seasons," from Bol; a pair of landscapes, and a mountainous landscape, with a castle on a rock, all after Bril, in folio; "Man surprised by the Advent of the Deluge," and "Man surprised by the Arrival of the Day of Judgment," a companion to the former, both from Th. Bernard, in large folio, two of the most celebrated and best engravings by this artist; "The Son of God sitting at the right Hand of his Father, in the Clouds, attended by the Holy Ghost, the Archangel Michael, and other Angels," after a picture by Antonio-Maria Viani at Munich,

a very fine and rare print; and "A View of the City of Venice and Bucentaure," both in large folio.

Raphael Sadeler the elder, was born at Brussels in the year 1555, and was the younger brother of John. Like him, Raphael was originally a *Damasquinier* of iron and steel, a profession which is now become obsolete; and like him, travelled through Germany to Italy for his improvement in art, and finally settled at Venice.

Whether Raphael followed John, or the brother, accompanied each other to Italy, is uncertain; but he continued to reside at Venice, having a joint share, as is believed, with his brother, in a commercial establishment there, till the time of his death, which happened in the year 1616.

When he was about the middle period of life, it was found that his application to engraving had weakened his sight; jaunting, he thought, required less optical exertion, and in this art he sought and found refuge, till the strength of his eye-sight returning, he resumed the graver.

With his success as a painter, we are not acquainted. His engravings greatly resemble those of his brother; he understood the human figure exceedingly well; his extremities are in general skilfully marked, and his historical heads are characteristic and expressive. His portraits too, of which he executed several, possess a considerable share of merit.

The Sadelers, John and Raphael, often worked in conjunction, and produced a great number of plates. Separate portraits of them of quarto dimensions, were engraved and published by Cornelius Waumans, with French inscriptions beneath.

Of the engravings of Raphael, the following, generally speaking, will be found most worthy of selection.

Portraits.—Paulus V. Pont. Max. in small folio; St. Charles Borromeus, cardinal, in folio; Ernest, archbishop of Cologne, in folio; Leopold of Austria, bishop of Salzburg, and Passau, after H. Kessl, in 4to.; Leopold, archduke of Austria, bishop of Ratibon, in folio; John Dietmar, abbé of Furlenberg, in folio; Hypolyte, Guarinonius, Dr. of Medicine, in 4to.; Philip de Monte, musical director to the emperor Rodolph II., in 8vo.; Ferdinand, archduke of Austria, in a 4to. oval; and Charles-Emanuel, duke of Savoy, on horseback; after John Carrara, in large folio.

Historical, from various Masters.—Four subjects from the Life of the Holy Virgin; 1. The Salutation. 2. The Visitation. 3. The Marriage. 4. The household Management of the Virgin, in 12mo. A set of twenty-eight from the Life and Passion of our Saviour, in 12mo.; "Mary Magdalen at the Sepulchre, with Sts. John and Peter," after Jod. de Winghe, in 4to.; the voluptuous life of Sardanapalus, surrounded by his women, in 4to.; "Lot and his Daughters," in a fine landscape, in large folio, both after the same painter; "A Holy Family," consisting of the Virgin and Child, Elizabeth introducing the infant St. John, St. Joseph reading, an angel, and two half figures, in folio, from Hans von Achen; "The Entombing of Christ," in an oval, of folio size; "Two Angels in the Sepulchre, with the Body of our Saviour," in folio; "The Resurrection," inscribed "Christi de morte triumphus," a circular print, in folio; (these three prints are very much esteemed;) "The Magdalen in a Cell," with a cross in her hand, reading a book, supported by a skull, in 4to.; "Love caressing the Mutes of Painting and Music," in 4to.; "The Judgment of Paris," a grand composition, all after Von Achen, in folio; "The Nativity of our Saviour," after Matth. Kager, in 4to.; "St. Cunégonde, attesting his Innocence;" and "St. Elizabeth relieving the Poor," both in folio, and from the same painter; "The Virgin and Child," with St. Joseph,

and two angels presenting fruit, in small folio; a half figure of the Virgin, with the holy infant on a cushion, in 4to.; "The Virgin and Child crowned," in folio, both after Candidus; "St. Francis," (in the back-ground is a figure prostrate before a crucifix,) in folio; and "The Immaculate Conception," both in folio, and after Candidus; "The Virgin seated under a Canopy," presenting the infant Christ to a high-priest, accompanied by many other figures, in large folio, from the same painter; "The Resurrection of Lazarus," after J. Rotenhamer, in folio; "The Marriage of St. Catherine," in a landscape, from Henry Goltzius, in folio; "God appearing to Cain, after the Murder of Abel," from M. de Vos; "The Dead Christ," attended by the three Marias, St. John, and two angels holding torches, after Stradan; "Venus, Bacchus, and Ceres," inscribed "Sine Cerere et Baccho friget Venus. Gil. Coignet inv.," "The Uncertainty of Life," exemplified by Death seizing a lady at a grand repast, after Stradan; "Christ on the Cross, attended by St. John and the two Marias," from the younger Palma, all of folio size; "The Virgin suckling the Infant Jesus," surrounded by a garland of flowers, in 4to. from Carracci; "A Holy Family," where the infant Jesus has one knee on his cradle, and the other on his mother's lap, while St. John presents him a little cross: the back-ground presents a mountainous landscape, in folio, from Raphael. A fine circular print of "The Annunciation," a poetical composition, after F. Zuccaro, in folio; "The Adoration of the Kings," in folio, after Bassan; "Jesus at Table with the Pilgrims to Emmaus," after the same painter; a female milking a cow, and giving drink to a little boy, in folio, known by the appellation of "The Little Milk-woman," in folio; "The Four Seasons," in folio, engraved by Raphael in conjunction with his brother John, all from Bassan; "The Four Seasons," after J. Stradan, in folio. Six landscapes, ornamented with rocks, wood, and water, after P. Steevens, in 4to. Two wild landscapes, after Matth. Bril, in folio. Four landscapes, with the history of the good Samaritan, in folio, from P. Bril. Four landscapes from the same painter, in folio. Another set of four, after the same. A set of six emblematical figures, inscribed "Amor," "Nuptia," "Labor," "Honor," "Arma," and "Venatio," after Martyn de Vos. A set of four allegorical subjects, on the four temperaments of man, in folio, from de Vos. A set of faints, entitled "Bavaria sancta," and "Bavaria pia," in folio, after Matth. Kager, engraved by Raphael the elder, and his son of that name. And "The Battle of Prague," engraved on eight plates, in folio, extremely rare, and marked with the name of Raphael Sadeler.

Egidius, or Giles Sadeler, was born at Antwerp A.D. 1570, and died at Prague in 1629. He was the nephew and disciple of the two preceding artists, and following their steps, travelled through Germany and Italy, residing awhile in those cities where art flourished, for his improvement.

He was afterwards invited to Prague by the emperor Rodolphus II. who gave him a pension, which was afterwards continued by his successors, the emperors Matthias and Ferdinand II. He handled the graver with more facility, taste, and freedom than his uncles, and represented the textures of his objects with more feeling than had hitherto been displayed, unless by the very first artists of the German school.

He treated portraits and historical subjects in a broad free style, and harmonized and opposed his lights and shadows in so judicious a manner, that it produced forcible effect, without blackness.

He generally drew correctly, but in the subjects he engraved after Spranger, the contours of his figures, in conformity with the extravagant style of that master's design, are overcharged; he excelled both in portrait and landscape; and was called by his contemporaries the phoenix of engraving. The following remarks from the pen of Watelet, which he intended should be applied to the whole family, are more particularly applicable to Giles. "It is astonishing the success with which the Sadelers have engraved landscape with the graver; the old trunks of trees have all the freedom of the pencil, and playfulness of etching; and it is impossible to represent, in any better way, falls of water, rocks, and the depths of forests: the various weeds and plants which are introduced on the fore-grounds are extremely like nature, and the buildings and back-grounds are executed with so much taste, that it represses our regret for the discouragement of etching." From the numerous engravings of this master, the following will be found worthy of selection.

Portraits.—Burekhard de Berliching, privy-counsellor of the emperor Rodolphus II.; Christophler Guarinonius Fontanus, physician to the emperor Rodolphus, a very excellent and rare print; John George Gualdamm, juris consult; Joachim Huber, counsellor; Jacob Chimarrheus, grand almoner to the emperor; the cardinal of Dietrichstein, bishop of Olmutz; Otto de Starchedel, counsellor to the elector of Saxony, all of quarto size; William Angelle, plenipotentiary to Henry IV., in folio; John Matthew Warenfels, counsellor; Adam, baron of Trautmanndorf; Siegfried de Kolonitsch; Ferdinand de Kolonitsch; the three ambassadors from the sophi of Persia to the emperor Rodolphus, viz. Mehti Kuli, Beg Sinal Chaen, and Cuchein Ollibeg, all in folio; Torquatus Tasso, a very rare print, in 4to.; Octavius Strada, antiquary, in 4to, rare; Peter Breughel, the elder, in folio; Martin de Vos; Sigismund Bathori, prince of Transylvania; Michael Voivode of Walachia, in an oval; Charles de Longueval, count of Buquoi, all in folio; bust of the emperor Matthias, surrounded with allegorical figures and inscriptions; a pair of the emperor Matthias, a three-quarter figure, and its companion, the empress Anne, both in large folio; a large upright print of the emperor Rodolphus on horseback; the emperor Ferdinand II. on horseback, with various emblematical figures and inscriptions, in two large plates, joined; an allegorical subject on the marriage of the emperor Ferdinand with Eleanor of Mantua, in folio; and an allegorical subject on the protection given to the fine arts by the emperor Rodolphus, a very fine print, in large folio.

Subjects from his own Compositions.—A set of twelve, of angels with the instruments of the passion of our Saviour, in small 4to.; a set of four, of the Evangelists, in 4to.; a set of fifty-two views in Rome, entitled "Vestigi delle Antichita di Roma," in folio; a landscape and figures, a rare print, in 8vo.; "The Burning of Troy," an etching in 4to.; a building with niches, introducing the four seasons; "Charity," with three children, both in folio; "Narcissus admiring himself in a Fountain," in large folio; "Pan and Syrinx preparing to bathe," in folio; "St. Sebastian dying, with the Angel extracting the Arrows from his Side," in large folio; "St. Dominic receiving the Institutions of his Order;" "St. Peter and St. Paul;" "The Scourging of Christ;" "The Crucifixion," all in large folio; and a grand composition of "The Hall of Prague," on two plates, a very capital engraving.

Historical, &c. after various Masters.—"The holy Virgin suckling the Infant Christ," from a picture by Raphael, in the Florentine Gallery, known by the appellation of "Ma-

donna della Segiola;" "The Angel appearing to the Shepherds," after Bassan, in folio; "St. Christopher bearing the Infant Christ on his Shoulder," in folio; "The Murder of the Innocents," in large folio, from Tintoretto; "The Call of St. Peter," after F. Barroccio; "Christ carried to the Tomb," a fine print, arched at the top, from the same painter; "The Scourging of Christ," from Joseph d'Anpinas; "The Martyrdom of St. Sebastian," after the younger Palma; "The rich Man in Hell, and the poor one in Heaven," from the same painter; "Angelica and Medora," writing on the bark of a tree, from Carlo Calari, all in large folio; "Etielavonia," a young female, elegantly apparelled, from Titian, in folio; an allegorical print on the death of the wife of Spranger, accompanied with a medallion; "The three Maries going to the Sepulchre;" "The Arts and Sciences triumphing over Ignorance and Barbarism;" "Hercules and Omphale;" "Venus and Cupid," all in large folio, after Spranger; "The Annunciation," after de Wit, in large folio; "Reward," a winged figure standing on a globe, inscribed "Deus omne Dat;" an obelisk with the armour of the count of Mansfeld, inscribed "Sum Umbra Alarum Aquilæ," both in large folio; two busts of angels, after Albert Durer; two fine heads of youths; "The Virgin and Child," in a landscape, surrounded by animals; in the back-ground is introduced the Annunciation of the Shepherds, engraved with great delicacy; "Christ bearing the Cross," all after Albert Durer, in folio; "Judith with the Head of Holofernes," from H. von Achem; "The Adoration of the Shepherds;" "The Virgin and holy Infant, caressing the little St. John," all in folio, from the same painter; "Minerva introducing Painting to the Muses," a grand composition, in the taste of Spranger, in large folio, from Ab. Ach; and four subjects from the Life of the Virgin, *viz.* "The Annunciation," "The Visitation," "The Circumcision," and "The Assumption," after J. Speccard, in folio.

Landscapes.—A set of fifteen, from John (commonly called Velvet) Brughel, in folio, in which are introduced, 1. St. Jerome before a crucifix. 2. A repose during the flight into Egypt. 3. Tobit with the angel. 4. Our Saviour tempted in the wilderness. 5. St. Francis stigmatised. 6. A fish-market on the sea-coast. 7. A view of a gulf, with company on the shore. 8. A stage-coach driving. 9. A windmill and village on the banks of a river. 10. A company of gypsies. 11. A stone and a wooden bridge, with two pilgrims. 12. Two travellers, one of whom is reposing. 13. A woody landscape. 14. Soldiers descending a mountain. 15. A ferry-boat.

Various, from Paul Brill, in folio—A mountainous landscape, into which is introduced a repose during the flight into Egypt; "A Hermit reading in his Cell," in a landscape; two bridges of wood and stone; a mountainous landscape, ornamented with cattle and figures; six views in Italy, with buildings and cattle; six landscapes, into which are introduced the twelve months of the year, very capital engravings.

Landscapes from Roland Savery.—A set of six views in Bohemia, with mills, water, and wood, in small 4to.; another set of six, in Bohemia, with cataracts, travellers, &c. in small folio; another set of six: 1. Villagers regaling under a trellis-arbour. 2. Bandogs on the banks of a canal. 3. A stag-hunt. 4. Labourers on the top of a mountain. 5. A guard-herd reposing near a cascade. And, 6. A warren, in folio. A set of five grand landscapes, from the mountains of Tyrol, in folio, with cataracts, figures, &c.; and two others, of rock and forest scenery, also from the mountains of Tyrol.

From Pietro Stephani.—A set of four rich landscapes, of the seasons, in large folio; a set of eight fine landscapes, with wind-mills, figures, &c. in large folio; and another set of twelve, in folio, of the months of the year.

Of the same family, but of merit somewhat inferior, were Jooſt or Juſtus, Philip, and Raphael Sadeler the younger, who were severally instructed by their parents, and worked mechanically in the same style, merely multiplying the number of prints, without advancing in the smallest degree the general claims or capabilities of their art.

Juſtus was the son of John, and his best performances are certain portraits of the family of Gonzague, and an odd fort of Dutch "Holy Family," from Rottenhamer, wherein the holy Virgin is represented swaddling the infant Saviour, while an angel is strangely busied in warming his linen.

Raphael Sadeler, the younger, was the son of the Raphael whom we have mentioned above, and occasionally assisted his father in his profession, particularly in engraving the set of Bavarian saints. He also engraved "Venus and Adonis," a small upright, from Titian, and "The four Evangelists," from P. Candidus, with other devotional subjects.

Philip was the degenerate son of Giles. A Mark Sadeler has also been mentioned, but is believed to have been only the publisher of the works of his more ingenious relations.

Among the caprices of fortune in his biography, it has been the fortune of some who have benefited mankind, to have their merits pass unrecorded. Von Londerſel, on the contrary, though not of first-rate talent, has been celebrated under two names, both by Papillon and by Strutt.

He appears to have been a native of Holland, born about the middle of the sixteenth century, and to have been chiefly engaged in the execution of letter-press engravings, in a neat and delicate style, resembling that of Virgil Solis, and which are marked sometimes with one and at other times with the other of the two monograms, which will be found in *Plate II.* of those of the school of the Low Countries.

It is not unlikely that these two marks may have given rise to the separation of his works into those of Ahasuerus Landſeld, and Ahasuerus Londerſel. That he was related to the John Von Londerſel, of whom we shall treat hereafter, is highly probable. From the smallness of his productions, of which the greater number adorn the books that were published at Antwerp about this period; he is classed among the little matters, but his engraving of "The Last Supper" is on a somewhat larger scale.

Among the books which he thus decorated, are the 4to. edition, in the French language, of "The Travels of Nicholas de Nicolay into Turkey," printed at Antwerp in 1576, and the large Herbal of Matthias de Lobel. Detached subjects from the holy scriptures are sometimes to be met with, which probably belong to a bible, in which Londerſel at least assisted in the production of the engravings.

Charles de Mallery was born at Antwerp A. D. 1576; it is not known of whom he learned the rudiments of drawing and engraving, but from the great resemblance his style bears to that of the two Wierixes, it is probable he studied in their school. He was a very laborious artist, and engraved a great number of devotional subjects, animals, and book ornaments.

He worked with the graver only, and so exceedingly neat, that he, in some instances, equalled the most laboured performances of Jerom and Anthony Wierix. But then he did not draw so correctly, so that with inferior powers as an artist, he seems to have possessed the fine share of patience and attention, and manual skill. He had the honour of having his portrait twice painted by Vandyke, both were successful pictures, and the prints after them by Verelstam and Momm.

Morin, are well known. In the collection of the abbe Marolles were three hundred and forty-three of the engravings of Mallery; among the best of which may be mentioned "The Adoration of the Kings," in 12mo; "The youthful Saviour," in a landscape, accompanied by two angels; "The Canaanitish Woman;" "A Crucifix," held by a man surrounded with allegorical figures; "St. Francis;" and "St. Jacintha," in 12mo.; "The Holy Family," accompanied by a Magdalen, in 4to.; "Christ among the Doctors," in 12mo.; various heads of Christ, the Virgin Mary, the apostles, saints, &c. Some of the plates, for the great hunts by Stradan, which were produced in conjunction with the Galles, Collaerts, &c. in 4to. The history of the silk worms (which were brought by two monks into Europe), on six middling-sized plates, lengthways, from J. Stradan, entitled "Vermis Sericus;" a bust of "St. Anthony," in an historical border, after Stradan; the fable of "The Man, his Son, and his Afs, going to the Fair," in four 4to. plates; and various plates of horses, for a book entitled "De la Cavalerie Françoise," in 4to., from the same painter.

Having already treated of the education and general merits as an artist of Paul Bril, of Antwerp, who performed some spirited etchings of landscape scenery about the period now under our review, it remains but to mention such of his etchings as are held in most request among connoisseurs. These are all of folio dimensions, and are known by the following designations: a pair of views in the Campania of Italy, with rocky fore-grounds, adorned with buildings, &c. dated 1590; another pair, inscribed "Paulus Bril inv. et fec. Vicenzo Cenoformis Romæ;" another view in the Campania, of the upright form; four landscapes belonging to a set, of which the remainder are engraved by Nieulandt. Sandrart mentions also a large and grand engraving by this artist, of which the subject is a view in the Campo Vaccino. For further information respecting this artist, see the article BRIL in our fifth volume.

Christopher Van Sichem was born in Holland in the year 1580, and resided chiefly at Amsterdam. He was instructed in the principles of engraving by Goltzius, from whom he copied some good portraits. The merit of his engravings on copper, consists principally in the neatness of their executions, but those on wood, after his master, are engraved in a bold style, and often possess a good effect, though he wanted taste. His monogram will be found in our second plate of those used by the engravers of the Low Countries.

The most considerable work he executed is intitled "Iconia Hæresiarum," &c. It consists of a great number of small upright plates, of the principal reformers of the church, is engraved from his own designs, and was published at Amsterdam in 1609.

On Copper.—A profile of Johannes Calvinus Nouioduni, holding a book, surrounded with an historical border; David Georgius Delphis, in Batavia, perniciosissima sectæ auctor; Durch Christop Von Sichem, *Formschneider* und *Kupffstecher* (i. e. cutter of wood, and engraver of copper); Rob. Dudley, Leycestricæ comes; Francis Valesius, dux Alençon; the emperor Charles V. in the imperial costume, inscribed "Carolus quintus Imperator Cæsar Augustus;" and queen Elizabeth, in regal attire; all of quarto dimensions. The two latter portraits have been by some attributed to Charles Van Sichem. Christopher also engraved the whole-length portraits of the earls of Holland and Zealand, in folio, from drawings by himself.

On Wood.—A set of twelve historical subjects, in 12mo. rare; "Elihu before King Ahazuerus," in 4to. from Lucas of Leyden: "The Adoration of the Shepherds," after Ab.

Bloemart; "The Circumcision," after H. Goltzius; "Judith with the Head of Holofernes," all in 4to.; "St. Cecilia playing on the Organ," and four other figures singing; bust of a man, with a hat and feathers, all from the same painter; bust of an African prince, with a helmet ornamented with diamonds and feathers, from J. Matham; a set of four, representing Judith, Sifera, David, and Sampson, from H. Goltzius; and a set of four, representing the Evangelists, with a history of their lives in Dutch; very meritorious prints: all the latter are of folio dimensions.

The baron Heinneken mentions two other Dutch engravers of the name of Van Sichem (*viz.* Cornelius and Charles); and Papillon and Baffan, the latter copying and magnifying the error of the former, has given ideal existence to a third.

Cornelius is often confounded with Christopher, but was of inferior talent. He was of the same family, and flourished about forty years afterwards.

Of laborious industry, and as if pleasureable stimuli rarely reached his mind, he scraped together not fewer than 600 subjects of figures of holy personages, scripture histories, and legendary tales, which he engraved in a stiff and heavy style, but many of them were copies from prints.

Charles was also of the same family, and engraved both on copper and on wood, but his prints merit not much attention. Their several monograms will be found in *Plate II.*

Jacques de Gheyn, or Ghein, the elder, was born at Antwerp in the year 1565, and died in 1615. He learned the elements of painting of his father, who was a painter on glass; and engraving he studied under Henry Goltzius. He successfully imitated the manner of his master, and worked with the graver only, in a bold free style, which manifests the great command he had of that instrument. He drew correctly and frequently with much taste; but all his works want effect, from the lights being scattered, and too equally powerful; neither are the masses of shadow sufficiently broad, nor well harmonized. The number of his engravings amount to one hundred and seventy. He likewise painted flowers and small figures with considerable ability. The monogram of this artist will be found in *Plate II.* of those used by the engravers of the Low Countries. Among his works the following are most worthy of notice.

Portraits.—Tycho Brahe, the celebrated Danish astronomer; Abraham Gokevius, a famous antiquary of Amsterdam; Hugo Grotius, the still more famous philosopher; and Philip de Marne, a distinguished Calvinistic reformer, all in 8vo.; Cosmo de Medicis, who is here called "The Father of his People," a circular print; Sigismond Malatesta, a military officer; and Joannes Basilowitsch, auto-crator of Russia, all in 4to.

Subjects from his own Compositions.—"Vanity," represented by a female figure at her toilet; "Mary Magdalen," a small oval; two small medallions of Mars and Venus; "A Gipsy telling a young Woman her Fortune," in folio; "The Statue of Laocoon and his Sons," in large folio; "A Lion couchant," with a landscape back-ground, a very rare oval print, in folio. A set of ten, very rare and celebrated prints, in small folio, of Masques. The twelve first Roman emperors, a set of circular prints in quarto, very much sought after; "The Sabbath, or Rendezvous of Sorcerers and Sorceresses;" a large folio print, engraved on two plates.

Subjects after various Painters.—The Passion of our Saviour, a set of fourteen, engraved in conjunction with his pupil Zechariah Dolendo, after Van Mander, in octavo; "The Twelve Sons of Israel," half-length figures, after Karl van Mander, in quarto; two emblematical subjects,

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on the folly of those people who spend their time and money in pursuit of pleasure, on two large plates; "The Erection of Babel, and Confusion of Languages," in large folio; "The Adoration of the Trinity," in folio; "The Judgment of Midas," in large folio; "The Prodigal Son," a very fine print, in large folio all from Karl van Mander; "The Crucifixion," a grand composition; and "The Apple of Discord thrown among the Gods," both in large folio, and after Vanden Broeck. A set of four, in circles, of the Evangelists, after H. Goltzius, in quarto; "The Empire of Neptune," a circular print, in folio, after Guil. Telchio. A set of twelve, reckoned among the very best of the engravings of our artist, of the guards of the emperor Rodolphus II. after Henry Goltzius; "The Annunciation," after Abr. Bloemart; "A Repose during the Flight into Egypt," in a circle; "Christ preaching to the Multitude;" and "The Miracle of the Loaves and Fishes," (of the oval form,) are all in folio, and after the same master; "Daniel in the Lion's Den," and "Diana changing Actæon to a Stag," after Th. Bernard, in folio; and "Polyphemus, Æcis, and Galatea," in still larger folio, after Cornelius de Harlem.

Jacques de Ghein, the younger, was of the same family with the preceding artist, and was born at Antwerp in the year 1610. He travelled to Italy, and, as is supposed, became the disciple of Antonio Tempesta, whose style of etching he imitated with no small success: he sometimes worked in conjunction with Coryn Boel, and marked his prints with his name at length, sometimes with the addition of "Ju ior."

Among his works may be mentioned with distinction, the portraits of Francis I. at the battle of Pavia, after A. Tempesta; and that of the emperor Charles V. on horseback, accompanied by his general officers, at the battle of Mühlberg, both in folio. He also engraved, in concert with Coryn Boel, the plates for "The Life of the Emperor Charles V." after Tempesta.

Guil aume de Ghein was also a native of the Low Countries, but of what part is uncertain, and was born some time about the year 1610. Presumptively he was of the same family with Jacques. He travelled to Paris and studied there, or, at least, practised engraving, under J. de Blou, for whom he engraved two, viz. "Spring," and "Summer," of the four seasons, personified somewhat ridiculously, by female figures attired in the French costume of the age of Louis XIII. Here also he engraved the portrait of Louis XIV. when a youth; he is represented on horseback, and attired for the chase; and that of the duke Bernard, of Weymar, also on horseback; both are of large folio dimensions, and engraved in a style which bears strong resemblance to that of Abraham Bosse.

Louis de Vadder was born at Brussels in the year 1560. He was the student of Nature alone: at least he has acknowledged no other instructor, and no other has been recorded; and painted and etched landscape with much ability: he was particularly successful in his representations of Morning, and often introduced the rising sun dissipating the dark vapours of Night, and tinging the tops of the mountains, and other lofty objects, with golden lustre. His style of etching is spirited and free, much resembling that of Van Uden; and among his best prints will be found a small village scene. The same scene, with falconers preparing to set forth on their morning's diversion; and a folio landscape, with the effect of a storm; which, in addition to the name of Vadder, bears that of Vorstermans; from which circumstance it may be presumed that the latter artist either

assisted in etching it, or worked upon the plate afterwards with the graver.

Gilbert van Veen, or Vænius, was born at Leyden in the year 1566, and died at Antwerp in 1628. He was the brother of Otho Vænius, a celebrated painter of portraits and history, who was the instructor of Rubens.

Gilbert worked with the graver only, in a style greatly resembling that of Cornelius Cort; and from the number of engravings that he produced after the Italian masters, it has been inferred that he travelled with Otho into Italy. His engravings are slight, but his outline is good; his heads expressive, and his hands and feet marked in a style that shews the soundness of his knowledge, and, as Strutt says, does him honour.

In the year 1612, we find him living at Antwerp, where, in the course of that year, he published "The Emblems of Horace," after his brother's designs; and shortly after, a set of plates, of which the subjects are taken by Otho, from the "Life of St. Thomas Aquinas," a meritorious work, engraved under the influence of a superintending simplicity, perfectly homogeneous with the style of his brother's designs, and which shewed that they were brothers in mind, as well as by consanguinity.

The principal works of this artist are the *Portraits* of Ernest, duke of Bavaria, in a medallion, supported by Fame; John of Bologna, and Alexander Farnese, after Otho Vænius, surrounded with allegorical figures, all of folio size.

Of his *Historical Works* may be mentioned, "The Emblems of Horace," in quarto; "The Emblems of divine and profane Love;" and "The Life of St. Thomas Aquinas," all after Otho Vænius; "The Four Seasons," from Raphael del Colle, in folio; "The Marriage of Isaac and Rebecca," in a frieze, composed of five folio plates, after Balth. Peruzzi, a very rare and capital work; "The Visitation of St. Elizabeth," in folio, from Baroccio; and "Our Saviour crucified, attended by the Virgin and St. John," in large folio, after the same master.

Bartholomew Dolendo was born at Leyden A.D. 1566, and became the disciple of Henry Goltzius. He worked entirely with the graver in an open style, somewhat resembling the slighter works of his master, but was much his inferior, both as an engraver and draftsman; yet it is said, that Gerard Douw learned the first principles of drawing from Dolendo.

He marked his engravings with one or other of the cyphers which may be seen in *Plate II.* of those used by the engravers of the Low Countries, and his most esteemed productions are "The Prophet Jonas thrown into the Sea," which is companion to "The Prophet Jonas asleep under his Gourd," in circles; "A Dutch Village Fete," in quarto; "Adam and Eve receiving the forbidden Fruit," after Karl van Mander, in quarto; "Jesus appearing to Mary Magdalen as a Gardener," in folio, from his own composition; "The Holy Family," and "St. John preaching in the Desert," both in folio, after M. Coxie; "Pyramus and Thisbe," after C. vanden Broeck, in quarto; "Jupiter and Ceres," after B. Spranger, in large folio; and "The Assumption of the Holy Virgin," also in large folio.

Zachariah Dolendo was born at Leyden in the year 1567, he was related to the preceding artist, and learned the elements of his art of Jacques de Ghein. He drew correctly, and was, in no respect, inferior to his master. We have, by his hand, a number of portraits which are equal to those of

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Wierix; his monogram will be found in *Plate II.* of those used by the Low Country engravers.

From his works we shall select the following, as being most worthy of esteem:—William, prince of Orange, a half-length figure in armour, in a quarto oval, and finely engraved; "Andromeda chained to a Rock," from his own composition; "The Virgin seated on a Throne, crowned by two Angels," after Jac. de Gheyn, both of quarto size; "The Crucifixion," in large folio, from the same painter; "Adam embracing Eve, whilst she receives the Apple from the Serpent," after Spranger; "St. Martin dividing his Mantle between two Beggars," from the same painter, in quarto; "The Continuance of Scipio," a circular print, from Ab. Bloemaert, both in quarto; and a set of "The Heathen Gods and Goddesses," from H. Goltzius. His naked Andromeda is a well-drawn figure, with the head and extremities marked in a masterly style. Of the two Dolendos, who were probably brothers, it may safely be asserted, that Zachariah was the superior artist. The time of his death has escaped notice: if that of his birth has been truly registered by Huber, he could have been only in his fourteenth year (which is scarcely credible) when he produced his excellent portrait of prince William of Orange, for the print bears the date of 1581.

The family of Bloemaert attained a justly founded celebrity as engravers, during the period which is now under our review: for an account of them the reader is referred to the article BLOEMAERT, in our fourth volume.

James Matham was born at Haerlem in the year 1571. As we have already stated, he became the son-in-law and pupil of Henry Goltzius, in consequence of his widowed mother marrying that distinguished artist during the adolescence of James. Advised, no doubt, by his tutors, he travelled to Italy to complete his studies, and in that country produced a considerable number of engravings: yet after his return he continued to work under the eye and the direction of Goltzius, and though he produced many valuable prints, they possess little originality as engravings, being executed in the style, or rather, in the manner of his father-in-law, whom, however, Matham never equalled in correctness of outline, or in taste, or in the science which enabled Goltzius to adapt his powers to the several occasions which called them forth. In short, though his manual command of the graver, which was the sole instrument of his art, evinced extraordinary skill, yet, like most imitators, in seizing the grosser part of the art of Goltzius, he let the essence escape. His numerous engravings, however, have been valued by most collectors, and are principally as follows.

Portraits.—A bust of Philip Winghius, after H. Goltzius, in octavo; a bust of T'leest al van den Velde, in an historical border, in quarto; and Nicolas Bulius, also in quarto; Abraham Bloemaert, in folio, after Paul Morelles; Michael Angelo Buonarroti, in folio; Philip William, prince of Orange, after Mirevelt; and Henry of Nassau, prince of Orange, both in large folio.

After various Italian Masters.—"The Statue of Moses," a sitting figure, after Michael Angelo; and the "Statue of Christ," from the same master, both in folio; "A Holy Family," where the Virgin is represented carrying the infant Christ, accompanied by St. Anne, after the picture of Raphael, which was presented to Charles II. of England, by the republic of Holland; "Mount Parnassus, with Apollo, the Muses, and the Poets," both in large folio; "A Holy Family," accompanied by St. Catherine, after Titian, in folio; "The Alliance of Venus, Ceres, and

Bacchus," from the same painter; "The Visitation of the Virgin," a rich composition, after F. Salviati, in large folio; "The Saviour's Feet anointed," a circular print, after Thaddeus Zuccaro; "Christ on the Mount of Olives," both in folio; "The Nativity," and "The Assumption of the Virgin," grand compositions from the same painter, in very large folio; "The Adoration of the Kings;" "Christ healing the Sick;" "The Resurrection of the Widow's Son," all grand compositions, after Zuccaro, of large folio size; and "The Visitation," after P. Veronese, a circular print, also in large folio.

Various subjects, after Goltzius.—"The Fall of our First Parents;" "The Holy Family," with St. Elizabeth; "Christ on the Cross," at the foot of which is St. John and the Virgin; "Christ appearing to the Magdalen, in the Garden," all of folio dimensions; "Jesus at Table with his Disciples at Emmaus;" "St. Luke painting the Virgin," in large folio; "Venus requesting Cupid to aim an Arrow at Pluto," in quarto; "The Loves of the Gods," viz. 1. Jupiter and Europa. 2. Phœbus and Leucothoe. 3. Mars and Venus. And 4. Hercules and Dejanira, engraved as a set; "The four Seasons," in circles; "The three Christian Virtues," Faith, Hope, and Charity, all in folio; "The seven Cardinal Virtues," in quarto; and "The Seven mortal Sins," in folio; "The Picture of Cebes," or "The Type of Human Life," a very large composition, engraved on three plates, in a very fine style.

Historical, after various Painters.—"Abraham dismissing Hagar," in folio; "The Annunciation," in half figures; "The Adoration of the Shepherds," all in folio; "The Parable of the Sower," with a landscape back-ground, in large folio; "The Virgin in a Glory," and her head surrounded with seven stars, the crown of immortality, in folio; "St. Veronica and St. Saviour, with two Angels," in large folio; "St. Stephen kneeling;" "The Loves of Jupiter and Danaë;" and "The Loves of Cupid and Psyche," all in folio, from Ab. Bloemaert; "Samson asleep on the Lap of Dalilah," after Rubens, in large folio; "The Holy Women, weeping over the dead Body of Christ," after Jer. Franck, in folio; "The Crucifixion," after Albert Durer, known by the appellation of "The Grand Calvary à l'accolade," large and rare; "Venus asleep, surprised by Satyrs," after Rottenhamer, in quarto; and a set of five very rare prints, after Peter Van Aertsen, (called by the French Peter the Long); namely, 1. The Poulterer and Fruiterer. 2. Six Women and a Man, surrounded with Provisions of all kinds. 3. The Kitchen of the wicked rich Man. 4. Jesus and his Disciples, in the Kitchen at Emmaus. And 5. The Toaster; of which set it is very difficult to meet with good impressions.

Theodore Matham was the son and pupil of the preceding artist, and was born at Haerlem in the year 1600. He travelled into Italy, where he studied in the school of Cornelius Bloemaert, and in conjunction with him, Persyn, Natalis, and other artists, he engraved the statues of the Justinian palace. He did not work with the graver only, but sometimes made use of the point; most of his works consist of portraits, many of which are executed in a manner which does honour to the artist; among his works we shall mention the following as being most worthy of the notice of the collector.

Portraits.—Michael le Blon, agent of the queen of Sweden, after Vandyke; Joost van de Vondel, a Dutch poet, after Sandrart; Jodocus Larenus, a reforming minister; Vopiscus Fortunatus Plempius, doctor of medicine; D. Gerardus Vossius, Canonius Cantuariensis, after Sandrart; Caspar

Caspar Barlaeus, doctor of medicine; four fine portraits, after John Spilberg; viz. 1. Philip William, count palatine of the Rhine; 2. Wolfgang William, count palatine; 3. Catherine de Medicis, and 4. Stephen Vacht, dean of Sarten; Claude Saumaize, after Dubordieu; Henricus Regius, Philos. et Med. from H. Bloemaert, all of folio size; and D. Leonardus Marius Grezanus, in large folio, from Moyart.

Historical, &c.—"The Virgin and Child, with St. John," after Bassan; for the collection of engravings from the pictures in the cabinet of M. Reynot; "A Holy Family," a grand composition, after Joachim Sandrart, in large folio; "Sainte Begga, the Daughter of Pessin, duke of Brabant," from Van Eyck, in folio; "Actæon metamorphosed into a Stag," in folio; "The Body of Christ, taken from the Cross by St. John and Joseph of Arimathea," a very large plate; and "The Allegory of Virgil," from Joost van Vondel, in quarto.

Adrian Matham was also of Haerlem, related to Theodore and James, and born some time about the beginning of the seventeenth century, but he was, on the whole, inferior to those artists in merit. He worked with the graver only, imitating the elder de Gheyn, but was always behind him, nor can it be necessary to dwell on his demerits.

He engraved part of the plates for the large folio volume, which was published at Antwerp in 1628, and entitled "Academie del'Espée;" "The Golden Age," from Goltzius, in large folio; "An old Man presenting his Purse to a young Female," (a large upright) from the same master; "A Group of itinerant Musicians," after A. Vander Venne, in folio; "A Combat between six grotesque figures, with culinary Implements," from the same painter: his other works are less worthy of notice.

He also engraved portraits, among the best of which are those of Pieter Bor Christiaensz, a Dutch historian, after Frank Hals; and D. Sibrandus Sixtius Oostervirius, after N. Moyart, both in folio.

Herman Muller was a native of Holland, but we know not the precise time or place of his birth. If he frequented the school of Henry Goltzius, which appears very doubtful, though it is asserted by Strutt, it must have been before the peculiar style of that artist was formed, and consequently before his migration to Italy. He worked in conjunction with Cornelius Cort, in the earlier part of the career of that artist, for Jerome Cock. The sole instrument of his art was the graver, which he handled with tolerable precision, but not much freedom; and in his best works his drawing is performed with care. In his later works, he aimed at the bold and free style of Goltzius, which had by this time excited the surprise of most of his contemporaries and the admiration of some, but in this endeavour our artist was not very successful.

His engravings are numerous and not uncommon; they are marked with one or other of the three monograms, for which see our *Plate II.* of those used by the engravers of the Netherlands. Among them may be distinguished "The three Destinies," and "Cleopatra," after Cornelius de Harlem; "Lucretia," after C. Kettel, (an upright) "St. Cecilia," in which plate it may be seen he has attempted to embolden his style. A set of four of "The Cardinal Virtues," after Martin Hemskerck; another set of "The six Commandments of God," illustrated by subjects from bible history, from the designs of the same painter, and some other bible subjects which range in sets, with certain works from the gravers of the Sadeliers and Galles, from J. Stradan and M. de Vos, of various folio dimensions.

John Muller, of the same family, was an artist of more vigorous powers. He was born in the year 1570, as is supposed at Amsterdam, but how he stood related to Herman is not known. His vigour, however, as an artist, was not wisely employed, like that of an Hercules; but rather extravagantly lavished; he swaggered like a giant of romance. Studying under Henry Goltzius at his worst period, he learned to exceed even his excesses. He caught the enthusiasm of that great artist, but fell short of him in judgment and variety. "The modesty of Nature," was with Muller as with Spranger, entirely out of the question, and the more he could "Out-herod Herod" in his manual execution and style of design, (especially when engraving after Bartholomew Spranger,) the better he appears to have pleased himself.

Hence some of his extravagancies are scarcely less ludicrous than others are seriously surprising. Watelet says of him, that "he handled the graver with the greatest freedom, and will ever be worthy of the attention of those artists who wish to distinguish themselves in the mechanical part of engraving; but they must learn to subdue the audacity of his style. It is very difficult to employ less work than Muller, in rendering the textures of objects, and he always worked his plates up to a good tone. He understood the human figure well, but from engraving much after Adrian van Vries and Bartholomew Spranger, acquired a mannered habit of drawing, which particularly discovered itself in his hands and feet."

To this estimate of his merits, Strutt adds, "the facility with which he handled the graver, for he worked with that instrument only, cannot be sufficiently expressed; his works must be seen to convey a proper idea of it to the mind, yet if in freedom of execution he equalled his master, in every other requisite he fell far short of him," &c.

That Solomon Muller was of the same family with Herman and John, as Strutt has conjectured, appears very doubtful, if not altogether an error. He sometimes wrote his name Miller, and is so utterly destitute of the talent and enthusiasm of the Mullers, that he appears, from his small Bible prints, which were produced about the period now under our review, rather to have copied the worst of the Wierixes, with equal neatness, but with deeper dulness.

Of the engravings of John Muller, the most distinguished are the

Portraits of Bartholomew Spranger, a kindred spirit, whom Muller terms, in the inscription beneath, "M. Pictor celeberrimus," it is dated in 1597, is in folio, and after Joab ab Ach; Everhardus Reidanus, comitis Guilhelmi Nassavoy Consiliarius; Maurice, prince of Orange; John Neyen, of Antwerp, laying his hand on a skull; Ambrose Spinola, the celebrated general, in large folio, both from Mirevelt; Christian IV., king of Denmark, from Ifacks; Albert, archduke of Austria, from Rubens, and its companion, Isabella, infant of Spain, from the same painter, in large folio.

Subjects from his own Compositions.—"The Baptism of Christ, celebrated in Heaven," in folio; "An Ecce Homo," surrounded by angels, a circular plate, in large folio; "Balthasar's Feast," and "The Adoration of the Kings," two very capital plates, in large folio, very much sought after by connoisseurs; "Chilo, the Spartan Philosopher," and "Harpocrates, the God of Silence;" two heads as large as life, engraved in a very bold, vigorous style.

Subjects from various Masters.—"Hagar in the Desert, comforted by an Angel," in quarto; "Lot and his Daughters,"

ters," in large folio, almost square; "The Nativity," with eight Latin verses, in large folio; "The Holy Family," attended by two angels, in folio; "A young Hero, conducted by Hercules and Scipio to the Temple of Glory," in quarto; "Venus attended by Nymphs and Satyrs," in folio; "A Satyr dressing the wounded Foot of a young Fawn," in quarto; "Venus and Mercury," with four Latin verses, in folio; "Ceres, Bacchus, and Venus, before a Fire," in large folio; "Mercury and Minerva arming Perseus," a very fine engraving, in large folio; "The Goddess Bellona," engraved on two large plates, and dedicated to the archduke Matthias; "Psyche contemplating Cupid asleep," in large folio, all from B. Spranger; "The Resurrection of Lazarus," after Ab. Bloemart, a very capital print; "The Murder of Abel," after Cornelius of Haerlem; "The Discomfiture of Irus, before the Suitors of Penelope," in large folio; "Arion mounted on a Dolphin," in large folio; "Fortune distributing her Gifts," a large and grand composition, engraved on two plates, all from Cornelius of Haerlem; "The Martyrdom of St. Sebastian," after Jean von Achen; a very large engraving, performed on three plates, of "The Rape of the Sabines," from a composition in wax by Adrian van Uries; "Mercury and Pandora," in large folio, from a group in bronze, by the same extravagant artist; and a set of seven circular plates, entitled "The Works of Creation," after Henry Goltzius.

Paul Moreelse, or Moreelsen, was born at Utrecht in the year 1571, and died in the same city in 1638. He studied painting under Michael Mirevelt, whom he soon equalled, and succeeded in portraits, historical subjects, and architecture; the latter is sufficiently testified by the gate of St. Catherine, in the city of Utrecht, which was built from his design. He studied during some time in Italy, and we have by him some excellent wood cuts in chiaroscuro, executed on three blocks; the first for the outline, which is cut in a very spirited style; the second for the dark shadows; and the last for the demitints. These prints have a light airy appearance, the hatchings by this artist being performed with great delicacy. They are drawn in a slight, but masterly manner, and the union of the several tints produces an agreeable effect. He usually marked his plates with a monogram, which will be found in our second plate of those used by the engravers of the Low Countries.

Of the engravings on copper by this artist we are only able to specify the two following, which are both in folio. "Cupid with several dancing Figures," and "The Death of Lucretia."

John Saenredam was born at Leyden in the year 1570. He studied the elements of engraving successively under Henry Goltzius and James de Gheyn. Possessed by the insatiation in favour of clear and sleek lines, which was fashionable at the time, he appears never to have resorted to etching, but executed his plates, which are somewhat numerous, with the graver alone. He handled that instrument, however, with great facility, and his style is at once free, clear, neat, soft, and delicate, but his chiaroscuro is deficient in vigour.

He appears to have understood drawing better than he always practised it, as may be seen by comparing the plates which he has engraved after his own compositions, with those which he has executed after pictures by other masters. The outlines in the former are generally much more correct, and they are for that reason sought after by connoisseurs with more anxiety.

Some of his prints are large. Their number is estimated by Florent le Comte at one hundred and thirty-two, which

they probably somewhat exceed; among them we shall mention the following as being most worthy of the notice of the collector. The artist usually affixed to them one or other of the two monograms, given in our second plate of those used by the engravers of the Netherlands.

Portraits.—Carl van Manden, after Goltzius, in quarto; John Césarér, painter and philosopher, a rare print, in folio; John de la Chambre, writing master, after Franc. Hals; and Peter Hogebert Hornanus, a poet and physician, surrounded with allegorical figures, after C. van Manden, both in folio.

Subjects from his own Compositions.—"Sufannah and the Elders," a small oval; "Deborah standing at the Foot of a Rock," perhaps singing or meditating her celebrated canticle, in folio; "Hercules, between Minerva and Venus," a folio print, nearly square; "Lycurgus giving Laws to the Spartans," and exemplifying the advantages of good education, from the habits of two dogs, in folio; "The wife and foolish Virgins," on five plates, with nine Latin verses; very capital, and executed in so delicate a style, that the plate soon wore under the hand of the printer, and it is therefore difficult to meet with a good impression; in folio. A large allegorical subject, relating to the government of the seven United Provinces under the house of Orange, represented by a procession attended by Concord and other political virtues, in large folio. Another allegorical subject, relating to the government of the Low Countries by the infant Isabella. That princess herself is represented standing under a tree on the right hand. Both very rare prints. And a representation of a large whale, which was thrown upon the coast of Holland, with thirty-two Latin verses; a very fine and rare print.

Subjects after various Painters.—"The Fall of our first Parents," in quarto, after Henry Goltzius; "Lot and his two Daughters," in folio; "Judith with the Head of Holofernes;" "Sufannah surprised by the Elders;" The six penitent women of the New Testament, viz. 1. Mary Magdalen. 2. The Woman of Samaria. 3. The Woman of Cana. 4. The Woman taken in Adultery. 5. The Woman with the Hemorrhoids. And 6. The paralytic Woman: with Latin explanations; in quarto. A set of three, 1. Ceres, worshipped by Labourers; 2. Venus, worshipped by Lovers; and 3. Bacchus, worshipped by Drinkers, in large folio; very fine and rare prints. "The Union of Ceres, Bacchus, and Venus," in folio; "Venus and Cupid," in quarto; "Diana, with her Nymphs," in a set of three plates, each containing two figures; "Diana discovering the Incontinence of Calisto;" "Andromeda delivered by Perseus;" "The Five Senses," in quarto; "The Seven Planets;" the three marriages, viz. "The Marriage for Interest;" "The Marriage for Passion," and "The Marriage of true Affection," in quarto; a painter drawing the portrait of a female kneeling before a mirror, known by the name of "The Painter," in folio; all from Henry Goltzius. "The Life of Adam and Eve," after Abr. Bloemart, on six plates, in folio. The history of the prophets Elisha and Elijah, four folio plates. "Elijah with the Widow of Sarepta;" "The Annunciation of the Shepherds," both in large folio; "The Prodigal Son," with a landscape background, in folio; "Vertumnus and Pomona," and "The Rape of Ganymede," both in large folio; all from Abraham Bloemart. "Mars and Venus," with four Latin verses, from P. Isaacs, in quarto; "The Bath of Diana," from Moreelsen, commonly called "The Great Bath of Diana," to distinguish it from the former one after the composition of Saenredam himself; "Judith putting the Head of Holofernes in a Bag held by her Servant," in folio, from Lucas

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of Leyden; "Deborah nailing the Head of Sifera," in folio, from the same painter; "The Meeting of Eleazar and Rebecca," after Carl van Mander, in large folio; "David with the Head of Goliath" on his sword, from Lucas of Leyden; "The Daughter of Herodias dancing at the Festival of Herod," after C. van Mander; "The Nativity," a grand composition; and "Paul and Barnabas refusing the Sacrifice of the Inhabitants of Lystra," a grand composition, all in large folio, after the same painter; "Adam and Eve in the terrestrial Paradise," in folio, from Cornelius of Haerlem; "Sufannah and the Elders;" "St. John preaching in the Wilderness;" "Paris and Oenone cutting their Names on the Bark of a Tree;" "Angelica and Medora engraving their Names on a Beech Tree;" "Vertumnus and Pomona;" all in folio, from the same painter. "The Grotto of Plato," a celebrated parable, shewing that most mortals prefer darkness to light, with twelve Latin verses, from C. of Haerlem, in large folio; a very fine print, both in composition and execution. A wounded general, carried by his soldiers, formerly supposed to be Scipio, but as the costume of the figures is Grecian, and not Roman, it is more probably "The Death of Epaminondas;" it is engraved after a drawing by Goltzius. "The Redemption of Rome by the Dictator Camillus," after a drawing by Goltzius; both of folio size. In the latter print, the characters of the Romans and Gauls are finely contrasted. A set of eight folio plates, dedicated to the duke of Aquepart, of "The History of the Unfortunate Niobe and her Children," from the drawings of Goltzius after Caravaggio; with Latin verses, very rare. The pictures form a frieze in the palace of Buffal, at Rome. "The Entombing of Our Saviour," after Michael Angelo; and "Our Saviour at the House of Levi the Publican;" executed on five plates, from the pictures of Paul Veronese in the church of St. Paul at Rome, of large folio size, and very rare.

Peter Serwouters, or Sherwouter, was born at Antwerp in the year 1574, where he always resided. He worked in a clear neat style with the graver only, but without much taste. His plates are not sufficiently finished to produce a pleasing effect, nor accurate enough to bear critical examination.

From among his works, which are not numerous, the following may be distinguished as least unworthy of the notice of the collector. A set of ten subjects of Chafes, after D. Vinckenbooms, in small folio, lengthways; "The Fall of our first Parents," of which the artists of the Netherlands appear to have thought their countrymen could not be too often reminded. In the present instance, French and Dutch verses lend their aid in impressing the religious lesson, and the whole forms a large folio print. "Sampson killing the Lion;" "David killing the Bear;" and an emblematical plate, representing in the front a Dutch merry-making, with figures dancing, and a cottage in the back-ground, from the door of which a man and his wife are issuing forth to oppose a man with a drawn sword; all in folio, from the same painter. Serwouters also engraved part of the plates for Thibault's "Academie de l'Espée," in folio, published at Antwerp A. D. 1628. The monogram which this artist sometimes affixed to his prints will be found in *Plate III.* of those used by the engravers of the Low Countries.

John von Londerfeel was born at Bruges in the year 1550. He worked entirely with the graver, in a stiff dry style, greatly resembling that of Nicholas de Bruin, whose disciple he probably was. However, his prints are not without some share of merit; and are sought after by connoisseurs.

He marked his plates in various ways, sometimes with his initials, combined as in our *Plate IV.* of the monograms, &c.

used by the engravers of the Low Countries, or, at other times, J. Lond. or J. Londer fec. Among his works, we shall select the following as being most worthy of the attention of the collector. The theological virtues, Faith, Hope, and Charity, personified by female figures, with a landscape back-ground; the Five Senses characterized by figures, seated in a landscape, both in large folio, and apparently from his own designs. A woody landscape with hunters; and one with the fable of Apollo and Daphne, both in folio, from Jac. Savery; "The disobedient Prophet devoured by a Lion;" "Tobit journeying with the Angel;" "Jacob tending the Flocks of Laban," with landscape back-grounds; "St. John in the Wilderness," all in large folio, and after G. Hondecoter; "The good Samaritan;" "The blind Warrior;" "The Woman with the Hemorrhage;" and "Abraham sacrificing Isaac," all after Giles Coninxloo. A perspective view of the interior of the church of St. John de Lateran at Rome, after Hendrick Arts, (a painter with whose name we are otherwise unacquainted) The following are all after D. Vinckenbooms; "Saul anointed King of the Hebrews;" "The Rape of Tamar;" "The Prophet foretelling to Jeroboam the Division of his Kingdom;" "Sufannah surprised by the Elders;" "The Temptation in the Wilderness;" "The Saviour praying on the Mount of Olives;" "The Maries approaching the Holy Sepulchre;" "Diana and Actæon;" and "The Pleasures of Summer." The latter is a meritorious landscape, and they are all of large folio sizes.

John Barra, or Barra, was a native of Holland, born A. D. 1572. He emigrated to England, and in the year 1624 was residing in London. His slender talents, however, merit not much attention. His instrument was the graver, and that only: his *work* may be truly so termed, being entirely without the vivaciousness of art, and characterized by all the tameness and coldness of manual labour, in which respect the worst imitator of the worst of the Sadelers did not outdo him.

Of the engravings of Barra, it may be quite sufficient to mention the

Portraits of prince Maurice of Nassau and Orange; Charles II., elector of Saxony; Joachim, count of Ortemberg; and Lodovicus, duke of Richmond and Lenox, the latter of which was engraved in this country.

Historical Subjects, &c.—"Phaeton's fatal Request to Apollo," introduced in a landscape, of folio size. Four other landscapes in quarto, in which are introduced the pilgrims to Emmaus, and different events in the history of Tobit. Two historical landscapes from the story of "Sufanna and the Elders;" "The Parable of the Sower;" "Herodias receiving the Head of John the Baptist," all in quarto. The last subject is from J. van Achen. "Time and Truth" is from Paulus ab Elstatis, and is a small upright, as is also "Bathsheba at the Bath."

Nicholas, or Claus Coeck, is scarcely more worthy of notice than him whom we have just dismissed. He was of Leyden, born in the year 1576, and, according to the baron Heineken, studied under Frank Floris, though his engraving appears rather to contradict this, and to point to Cornelius Cort as his master.

Of his works, which are not numerous, it may be sufficient to name "The Four Elements," personified by half-length figures, and "The Judgment of Midas," all after Carl van Mander, and of folio dimensions.

Gisbert van Breen, or Van Brecht, was born in Holland some time about the year 1576. He worked entirely with the graver, and is supposed to have been the disciple of

James de Gheyn. His engravings are not destitute of merit, though inferior to those of his master.

From among them the connoisseur may with advantage select the *Portraits* of James I. of England, his queen, and the young prince of Wales, on the same (folio,) plate. A set of six small prints of "The Life of a Libertine," presumptively from his own compositions. "The Marketers with Fowls and Eggs," after Claes Coeck; "Envy stripping the Clothes from the Back of a Lady," after the same author, both in small folio. A satirical print, wherein certain persons are busily employed in washing an angry jack-ass. A pair, in the first of which two young libertines are dissipating their wealth, and in the second are reduced to want and misery, in quarto, and after Van Mander. An instrumental concert, after Sbrassen. A set of small friezes of sea-ports, with shipping, &c. after C. Nicolai.

Whether the Nicholas, or Claus, Braen or Breen, who is mentioned by Baffan, was related to the preceding artist, we know not. They have by some writers been confounded together; but Nicholas appears to have been of the school of Saenredam, and was the author of a set of four ovals from compositions by himself, of which the subjects are, Samson, Sisera, Judith, and David, (David is here the stripping, and bears the head of Goliath). He also engraved "A Penitent Magdalen," after James Matham, in folio; and "Christ conducted to Calvary," also in folio, and after Tintoretto.

William van Swanenbourg, or Swanenburch, was born at Leyden in the year 1581. He was the disciple of Saenredam, and did honour to his master and himself, by the freedom and vigour of his engraving. Abram Bosse recommends his prints to students in the art, on account of the beauty of his touch: yet it must be confessed that the drawing of Swanenbourg is mannered and defective; and if students should imitate, where it is applicable, the boldness of his handling, and his dexterity of touch, they should aspire to purer delineations of form.

He affixed to his engravings a monogram, for which, see *Plate II.* of those used by the engravers of the Netherlands.

We shall specify the following prints from the graver of Swanenbourg, as being most worthy of the attention of the connoisseur.

Portraits.—Abraham Bloemart, in an ornamented border; Janus Hautenus, secretary of Leyden, both in 4to.; Daniel Heinsius, professor of Leyden; John Heurnius, doctor of medicine at Leyden; John William, duke of Cleve; Maurice, prince of Orange and Nassau; Ernest Casimir, count of Nassau, from P. Moreelsen, in large folio; and Petrus Jeannius, eques, hanc maximi viri effigiem ex vultu expressit Michael Mirevelt, &c. in folio.

Historical, &c. after various Painters.—"Jacob defrauding his Brother out of Isaac's Blessing;" and "The Resurrection of Our Saviour," both from P. Moreelsen, in large folio. A rustic festival at the entrance of a village, after Vinckenbooms, in large folio. "The Judgment of Paris," from M. Mirevelt; "Perseus rescuing Andromeda," after Saenredam, in folio; "The Adoration of the Shepherds," after Abr. Bloemart, in small folio; "The Six Penitents," in folio, viz. Saul, St. Peter, St. Paul, Zaccheus, Judas Iscariot, and the Magdalen. "St. Jerome in the Wilderness;" "The Repentance of St. Peter." Three subjects emblematical of Piety, Riches, and Vanity, in small folio, all from Bloemart. "Lot and his Daughters;" and "Jesus at Table with the Pilgrims at Emmaus," both from Rubens; and a set of fourteen, commencing by "Jesus Christ carrying the Cross," and ending with "The Last

Judgment," entitled "Thronus Justiciæ. Hoc est optimus Justiciæ tractatus electissimis quibusque exemplis judiciariis aeri incisus illustratus. Joachim Uytenwacl, pinx. G. Swanenburch, sculp. 1605, 1606."

Cornelius Boel was born at Antwerp in the year 1576. He was of the same family with Peter Boel, the eminent painter of animals and flowers, but studied engraving apparently in the school of the Sadeliers. He made little use of any other instrument than the graver, which he handled with ability in a clear and neat style.

Boel engraved a set of small oval plates for the fables of Otho Vænius, which were inscribed with Latin, English, and Italian verses, and published at Antwerp in 1608. "The Last Judgment," from a composition by himself, in small folio, and the portrait of Henry, prince of Wales, in an ornamented border, and of quarto size.

From this latter plate, and the inscription beneath the frontispiece to the large folio Bible, which was published here by royal authority in the year 1611, which inscription runs, "C. Boel fecit, in Richmond;" it is inferred that our artist visited England about the middle period of his life. But his principal and great work was a set of eight large plates, from Antonio Tempesta, of which the subjects are "The Battles of Charles V. with Francis I."

The family of Hondius or de Hondt was numerous, and some of them of distinguished merit in the arts. Joll, or Jodocus, was the son of Oliver Hondius, a very ingenious artist of Ghent, where, in the year 1563, our artist was born, and where he passed his youth in the successful study of some branches of the mathematics; but the intestine commotions which agitated that city, about the period that Jell attained the age of manhood, occasioned him to seek refuge in England.

Here he followed various pursuits, as various occasions called forth and developed the variety of his talents. He made mathematical instruments, fabricated types for letter-press printing, and engraved maps and charts. Here also he married in the year 1586, and had several children. He afterwards removed to Amsterdam, and died there A.D. 1611.

Jodocus also engraved a few portraits, which are neatly executed, though in other respects their intrinsic merit is not considerable: among them are the celebrated English navigators, Thomas Cavendish and Sir Francis Drake. The latter is a large plate, and is commended by Strutt.

From an artist, however, so variously employed as Hondius was, no man expects exquisite engravings; the place of his residence being England, and the time, the close of the sixteenth and the commencement of the seventeenth centuries. He sometimes marked his plates with the cypher, which may be seen in *Plate III.* of those of the engravers of the Low Countries; and at others, with a bound barking, and inscribed "sub cane vigilante;" which bound is, in fact, a pun upon his family name.

Beside what we have mentioned above, Jodocus engraved the charts for Drake's Voyages, and several of the maps for Speed's Collections, in large folio, which latter are in general embellished with figures; and Florent le Comte mentions, among the works of this engraver, a large perspective view of London, published at Amsterdam in 1620; but Strutt very reasonably infers a mistake either in the engraver's name, or the date of this print.

Henry Hondius the elder, so called in contradistinction to him of whom we shall speak hereafter, was born at Dussel in Brabant, A.D. 1576, and died at the Hague in 1610. Whether he was the son or brother of Jodocus has been disputed, but is not known.

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He appears to have studied in the school, and to have contracted the stiffness of Jerome Wierix, but possesses not his correctness. His principal engravings are the

Portraits of Cornelius Cort, Henry de Cleve, Giles Coninxloo, and Hans Holbein, (all painters;) John Bugenhagen, Philip Melancthon, John Wickliffe, John Knox, John Calvin, and Jerome Savonarole, (celebrated reformers,) all in 4to.

Historical, &c.—"The Judgment of Solomon," and "The Woman taken in Adultery," both after Carl von Mander; "A Flemish Recreation;" a set of five engravings, representing the celebration of St. John's day, at Menlebeck, near Brussels, by healing the sick, both from P. Breughel the droll; and "Mularum Officia," or the Muses giving a concert on mount Parnassus, an agreeable composition, though the expression of the heads is rather common, after Th. Zuccherro, all of folio dimensions.

Henry Hondius the younger is, with better reason than Henry the elder, believed to have been the son of Jodocus, and to have been born in London.—according to Huber.—in 1580, which is unfortunately four years before,—according to Strutt,—his father was married. He is supposed by Strutt to have studied under his father, and to have applied himself with diligence to the art of engraving. His prints are neat, but discover little art.

Beside finishing some plates which had been begun by Jodocus, the following are enumerated among his works.

Portraits of Bernard, duke of Saxe Weimar, in folio; a large head of queen Elizabeth; James I. of England, dated 1608; William, prince of Orange, after Alex. Cooper, dated 1641; Ferdinand, emperor of Germany, in 4to., dated 1634; and sir Francis Drake, in folio.

Landscapes, historical Subjects, &c.—A set of the four seasons, after Paul Brill, dated 1643; another set of the four seasons, consisting of landscapes, adorned with various architecture, after P. Stephan, both in folio; a set of twelve landscapes of the months of the year, in which are introduced seasonable occupations and diversions, in large folio; two prints representing drunken peasants, with landscape back-grounds; two grotesque subjects of fools, &c. both after P. Breughel; "Christ going to Emmaus;" and "The Shipwreck of St. Paul," a companion to the former, both from Giles Mostert, all of folio size; "Tobit fishing, attended by an Angel;" "St. John the Baptist preaching in the Wilderness;" and a view of the Hague, a rare print, all from Giles de Saen, in large folio.

The younger Henry visited Holland about the time of his arrival at manhood, or a little before, and resided at the Hague. Here he engraved the view of that town, which we have mentioned above; and here, in the year 1600, was born his son William or Guillaume Hondius.

William acquired the rudiments of engraving under his paternal roof; from whence he removed to Dantzic, and to the Hague, and became distinguished by the merit of his portraits, of which he engraved a considerable number.

His cypher may be seen in *Plate III.* of those of the engravers of the Low Countries; and his most remarkable portraits are those of himself, after Vandyke, with the addition of "Chalcographus Hagæ Comitis;" Francis Frank the younger, painter of Antwerp, after the same master, both in folio; prince Maurice of Austria, an excellent print, probably from a drawing by Hondius himself; Ladislaus IV. of Poland, inscribed "W. Hondius fecit 1637;" Theodore ab Werden Burgio; Berhard, duke of Saxe Weimar, all presumptively drawn by himself; Henry Cornelius Longkuis, after Mytens; Jean Casimir, king of

Poland; Charles, prince of Poland and bishop of Breslau, both after D. Scultz; and Louisa Maria de Gonzague, queen of Poland, after Juste d'Egmont, bearing the name and addition of "Wilhel Hondius Chalcographus Regius," from which it appears that our artist enjoyed the honour of being engraver to the king of Poland.

Abraham Hondius, the justly celebrated painter of animals, was of the same family with the preceding artists; for whose biography and general merit as an artist, see HONDIIUS, ABRAHAM. He etched a few plates in a slight, spirited, and painter-like style, yet with some degree of neatness, of which the subjects are the huntings of various beasts of chase; these afford very striking examples of animal expression, especially when their passions are roused to fury. His folio prints of "A Boar Hunt," and "The Chase of a Wolf," are, in this respect, admirable works, and are probably his best productions in this mode of art.

With the sixteenth century arose the genius of Rubens, which has gilded the fine art of the Netherlands with unfading glory, and even tinged with its radiance the ethics and theology of Europe. His biography and extraordinary merits as a painter will be treated under the article RUBENS, SIR PETER PAUL. He etched a few plates, of which the merits are not transcendental, though they evince the powerful and free hand of a master; but he effected a revolution in painting, and indeed may be said to have given a new constitution, more essentially free than that which preceded it, to the arts of his country, as our subsequent pages, devoted to the progress of engraving in the Low Countries, will attest.

The etchings of Rubens are performed in a slight and bold style, from his own compositions: "St. Francis d'Assize receiving the Stigmata," in 4to.; "The penitent Magdalen," ditto; "St. Catherine," with the instruments of her martyrdom, &c. designed for a ceiling, and one of the best of the etchings of Rubens, of folio size; "The communication of Light," a small upright: the plate being afterwards finished with the graver, either by Paul Pontius or Lucas Vorsterman, impressions of the etching, as it came from the hand of Rubens, are exceedingly rare and valuable. The composition consists of a boy lighting a candle at another, which is held by an old woman. These, and the portrait of an English minister, a small head, in an oval border, are all the prints with which we are acquainted, proceeding from the etching-needle of this very distinguished master.

With the vigorous and original powers of Rubens, co-operated by the fine taste of Vandyke, and roused by the trumpet that sounded forth their fame, Bolswert, the Vorstermans, and Pontius girded their loins, and leaped forth candidates of high enterprise and extraordinary promise, in the race of historical and portrait engraving.

The best of the engravers of Italy, with Marc Antonio at their head, had added truth of character to exquisite purity of outline. The heroes of the German school, led on by Martin Schoen and Albert Durer, had expressed the textures of the various surfaces or substances which adorn the face of nature, with nice discrimination; and had made some successful approaches toward a vigorous and harmonious chiaro-scuro. It remained for Bolswert, Pontius, and the Vorstermans, the champions of the Netherlands, to possess themselves of their trenches, and complete the circumvallation of engraving; and this they accomplished, aided by the commanding judgment and exquisite taste, and stimulated also by the successful example, of Rubens and Vandyke.

To deeper and richer tones than had heretofore been produced.

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duced, they added a talent of rendering local colour in the abstract, which they possessed and exercised in enviable perfection.

Lucas Vorsterman the elder was born at Antwerp, A.D. 1580, and at first studied painting in the school of Rubens; but, counselled by his master, who had remarked the true bent of his genius, he quitted the pencil for the graver. He greatly distinguished himself as an engraver before he quitted the Low Countries, in particular by the production of his print of "The Adoration of the Eastern Kings," after Rubens; which is pronounced by Huber to be one of the finest engravings that was ever executed, and is indeed a print of transcendent merit. But Vorsterman is of the number of those artists who were attracted to the court of London, by the taste and patronage of Charles I.; and as he contributed largely to the advancement of English engraving, the reader will find such of the subsequent events of his life, as are of importance to art, detailed, and accompanied by a general estimate of his merits, in our account of the *Origin and Progress of English Engraving*. A more copious list of the best works of so distinguished an artist than we were then enabled to offer, is now submitted to the admirers of legitimate engraving.

Lucas commonly signed his plates with a cypher, for which see *Plate III.* of those used by the engravers of the Low Countries.

Portraits after Vandyke.—Peter de Jode; Charles de Mallery; James Callot; Theodore Galle; Wenceslaus Coeberger; Deodatus del Mont; Peter Stevens; John Van Mildert; Hubertus Vanden Eynden; Lucas Van Uden; Cornelius Sachtleven; Horatius Gentilescius; and John Liveus, all distinguished artists, in folio; Isabella Clara Eugenia, infant of Spain; Galton, of France, duke of Orleans, brother to the king of France; Ambrosius Spinola, governor-general of the Low Countries; Wolfgang William, count palatine of the Rhine, and duke of Bavaria; Francis of Moncade, count of Offona; Nicolas Fabricius, of Peirese; Alfonso Perez de Vivero, count of Fuenfalds; Thomas Howard, earl of Arundel, all of folio dimensions; Nicolas Roccoxius, an amateur of Antwerp; one of the finest portraits of Vorsterman, in large folio.

Portraits after various other Masters.—A bust of Plato, after an antique marble; bust of Seneca the philosopher, also after an antique; a pair of Cosmo of Medicis, and Lorenzo of Medicis, in circular borders; pope Leo X., an octagon plate; Justus Lipsius, Iscanus; and Claudius Maugis, abbé of St. Nicholas, from Ph. de Champagne, all of 4to. size; John de Serres, after N. Van der Horst, in 4to.; Constantine Hughes, secretary to the prince of Orange; John Livins, del.; a bust of the emperor Charles V. and the constable of Bourbon, both from Titian, in folio; another of the emperor Charles V., after a copy by Rubens, from Titian; Charles de Longueval, count of Busquoi, after Rubens, a very fine and rare print, in large folio.

Historical, after various Painters.—"The Holy Family," on a black ground (engraved in England), after Raphael; "The Entombing of Christ," and "St. George on Horseback," both from the same painter, in folio; "Christ in the Garden of Olives," after Caracci, in large folio; "The Virgin and Holy Infant," worshipped by two pilgrims, in folio, after Michael Angelo; "The Adoration of the Shepherds," the same subject differently treated; "The Adoration of the Eastern Kings," a very fine and rare print; a repetition of the same subject, all in large folio; "The Holy Family," accompanied by St. Anne; another "Holy Family," where the infant Christ caresses

his mother; "The Virgin and Holy Infant," accompanied by St. John; "Cæsar's Tax, or the Tribute Money," all in folio; "The Descent from the Cross," in large folio; (the best impressions of this plate are inscribed C. Van Merlen); "The Angel appearing to the Holy Women at the Sepulchre of Christ," in folio; "St. Francis receiving the Stigmatics;" "The Martyrdom of St. Lawrence," both in large folio; "Mary Magdalen throwing away her Jewels;" the frontispiece of a book, intitled "A general Ecclesiastical History, from the Birth of Jesus Christ to the Year 1624," in folio, all after Rubens. "The Flagellation of our Saviour," in large folio, after G. Seghers; "The Death of St. Francis," after the same painter; "St. Ignatius of Loyola;" "The Fable of the Satyr and his Guest, who blew hot and cold with the same Breath," after Jac. Jordaens, in large folio; "The Chase of a Bear," after Snyders; and "A Vocal Concert" of six persons, among whom a girl is playing the guitar, after A. Colter, both of folio dimensions.

Contemporary and compeering with the elder Vorsterman, were the Bolsverts. The biography of these was inserted in our fourth volume before our present arrangement in schools was determined on (see BOLSWERT, ADAM, or BOETIUS, and SHELTIUS); but of the works of artists so illustrious, it has been judged proper to add a more copious list for the information of collectors, omitting those which are already before the reader in vol. iv. The monograms with which these artists severally marked their performances, may be seen in our third plate of those used by the engravers of the Low Countries.

Works of Boetius, a Bolsvert.—The portraits of Adam Salsbort, with the motto "Omnia Vanitas;" a pair of ditto of John Bergman, (a celebrated Jesuit,) kneeling before a skull; and St. Aloïse Gonzaga, kneeling before a crucifix, both in folio; Guillaume Louis, comte de Nassau, and (its companion) the corpse of the same nobleman lying in state, dated 1618, and after M. Mirevelt, in folio; a set of seventy-seven small plates, from designs by Bolsvert himself, done to accompany "The Life of Christ;" another set of small book plates, also from his own designs, engraved for a mystical work, entitled "Le Pelerinage."

Historical Subjects after various Masters.—"The Adoration of the Shepherds," after Abr. Bloemart; "A Repose during the Flight into Egypt;" both in large folio. A set of four landscapes, and fourteen plates of animals, in 4to. both from the same maller; "Jesus at the House of Martha and Mary," a rich composition, after J. Goïemar, a very large plate, very much sought after; "Death and Time, conquering Men and Animals," in folio, after D. Vinckenbooms; "Adam and Eve in the terrestrial Paradise," surrounded with animals, a very fine engraving from the same painter. These three prints are very rare, and much sought after by collectors; and "The Judgment of Solomon," a large folio plate, after Rubens.

The most esteemed works of *Sheltius a Bolsvert*, omitting those mentioned in the Cyclopædia, vol. iv. and beginning with his *landscapes*, are as follow:—The landscapes of Sheltius are indeed very surprising performances. When we consider the picturesque ruggedness of his rocks, and boles of trees, and the freedom and looseness of his foliage, it seems scarcely credible that so high a degree of excellence in this department of the art should have been attained by the use of the graver alone; yet in all his landscapes not a line of etching appears. Nor is our wonder less excited when we contemplate the tones, rich or exquisite as the various occasions required, which Bolsvert has here produced, more perfectly vibrating with those of the original pictures:

pictures: we had almost said than those of any other landscape-engraver whatever. But certainly, in this respect, no engraver has surpassed him.

A large landscape, wherein is introduced a lion-hunt, with a cavalier overthrown and another coming to his rescue. This is one of the finest engravings of the whole set. A grand mountainous subject, with romantic falls of water, into which is introduced the effect of a storm, and the fable of the hospitality of Philemon and Baucis towards Jupiter and Mercury. The companion to which is a sea-storm and shipwreck; the fore-ground is occupied by mariners who have escaped the wreck, and are kindling a fire on the shore. (This print is commonly called the "Tempest of Eneas.") A forest-scene, into which is introduced the fable of Meleager and Atalanta; the champaign of Malines, with haymakers; a large landscape, with animals in a stable, and a female filling a pig's-trough with food. (This last, completing the set, is engraved by P. Clouet.) A landscape with ruined edifices, and two women carrying baskets in the fore-ground. Ruins on a plain, with various rustic figures. A landscape, in the fore-ground of which is a wooden bridge, with a shepherd and flock. A champaign country, with two women in the fore-ground, one of whom carries a basket, and the other a rake; a rainbow is represented in the clouds. Sun set, with a man bringing horses to water, and a landscape, with the effect of moon-light.

Devotional Subjects, &c. from his own Designs.—"The Infants Christ and St. John playing with a Lamb;" "The Virgin and Infant asleep;" "The Virgin suckling the Holy Infant;" "A Statue of the Virgin, with her Hands crossed on her Bosom;" all in 2mo. "The Virgin and Child in the Air, attended by Angels and Cherubim;" "The Virgin caressed by the Infant Christ, with St. Joseph." Twelve figures of saints, half-length. Another set of twelve of saints, all in 8vo. "A Hermit prostrate before a Cross;" "The Mother of Grief, piercing her Bosom with a Sword;" "Jesus Christ triumphing over Death;" both in folio. "St. Barbara, a Virgin-Martyr;" "St. Stanislaus Koska, kneeling before an Altar;" "St. Francis Borgia;" "St. Alphonso Rodriguez;" "Robert Bellarmine, at a Bureau;" "Leonard Lessius;" all in large folio. "The resigned Death of a Saint;" and "Dreadful Death of a Sinner," two folio prints. An emblematical subject relating to prince Ferdinand, the governor of the Low Countries, in large folio. "A Thesis," dedicated to Sigismund, king of Poland, on two large plates. The frontispiece, and five other plates for Thibault's Fencing Academy, in large folio, and a rare print, entitled "The Dispute between the Fat and the Lean," in large folio.

Portraits after Sir Anthony Vandyke.—Shelcius a Bollswert; Andrea Van Ertvelt; Martin Pepyn; Adrian Brouwer; and John Baptist Barté; (all distinguished artists;) Justus Lips, an historian; Albert, prince of Aremberg, Barbançon, &c.; Maria Ruten, the wife of Vandyke; Margaret of Lorraine, duchess of Orleans; William de Vos; and Sebastian Vrank; painters, all of folio dimensions.

Historical Subjects after Vandyke.—"Maria Mater Dei, or the Virgin in Extasy," in folio; "The Virgin with the Infant Christ on her Knees, attended by St. John, and an Angel with a Crown," in large folio; "The Virgin contemplating the Infant Christ on her Lap, accompanied by a Saint holding a palm Branch;" "The Virgin seated, with the holy Infant asleep in her Arms, with St. Joseph," both of folio size; another "Holy Family, attended by Angels;" "The Elevation of the Cross on Mount Calvary;" "Christ on the Cross," at the foot of which are St. Dominic and

St. Catherine of Sienna, both in large folio; and "A Drunken Silenus, attended by Bacchanals and Satyrs," in folio.

Historical, after various Masters.—"Christ on the Cross," with St. John and the holy women at the foot, after Jordaens; "Argus lulled to sleep," with Mercury preparing to behead him; "The Infant Jupiter," with a nymph, milking the goat Amalthea, accompanied by a satyr playing the tambourine, both in large folio. The two latter are the finest of Bollswert's engravings after Jac. Jordaens. A family concert, inscribed "Soo D'Oude fongen, Soo pipen de Jongen." "Pan holding a Basket of Fruit, accompanied by Ceres crowned with Wheat, and a Figure blowing the Horn," both in folio, and from Jordaens. Impressions of the latter are become very rare; "The holy Salutation," after Gerard Seghers. "The Return from Egypt," where the Infant Christ appears walking between St. Joseph and the Virgin; "The Virgin appearing to St. Ignatius of Loyola;" "St. Francis Xavier tempted by Satan, and comforted by the Apparition of the Virgin and Child;" "The Denial of St. Peter," in an assemblage of soldiers, playing at cards; and its companion, "The Smokers," two very capital prints in large folio, after G. Seghers; "A Concert," after Theodore Rombout, being the companion to one of the same subject engraved by Vorsterman, after Coeller; "The Virgin and holy Infant," (who holds the globe of the earth,) after Erasmus Quellinus; "The Communion of St. Rose," after the same painter; "The Body of Christ on the Lap of the Virgin," after Diepenbeck; and "The Crucifixion of three Jesuits at Japan," after the same painter, all of large folio dimensions.

Historical, &c. after Rubens.—"The Annunciation," the best impressions of which are marked with the name of Vanden Enden; "The Return from Egypt;" "The Executioner giving the Head of St. John the Baptist to Herodias," in folio; "Christ crucified between the two Thieves," in folio; "A Crucifixion," wherein a soldier is piercing the side of Christ; St. John and the Virgin are standing at the foot of the cross; a very beautiful engraving, executed in a bold style, in large folio; "A Crucifixion," with the city of Jerusalem in the back-ground; and another engraving of the same subject, both in large folio; "The Body of Christ on the Lap of the Virgin, with St. Francis," in large folio; "The Resurrection," and "The Ascension of Christ," two large folio plates; "The Trinity," where Christ is represented dead, a fore-shortened figure supported by the Deity; "The four Evangelists," in large folio; "The Triumph of the Church," a large folio plate nearly square; "The Destruction of Idolatry," a large print lengthways, on two plates; "The Fathers of the Church, surrounding St. Clare, with the Sacraments," a large folio plate nearly square; "The immaculate Conception of the Virgin," a circular print in large folio; another "Assumption of the Virgin," where a disciple raises a stone at the mouth of the sepulchre; "The Virgin embraced by the Infant Christ," "The Infant Christ on a Table caressing his Mother;" "The Virgin, with the holy Infant on her Lap, holding a Globe and Sceptre;" "The Holy Family," where the infants Christ and John are playing with a lamb; and four other engravings of the same subject, in large folio; "St. Francis Xavier standing before a Crucifix," in folio; and its companion "St. Ignatius of Loyola," before the name of Jesus, surrounded with rays of glory; "St. Cecilia playing on the Organ," a distinguished plate, the first impressions of which are inscribed G. Hendrix. Those where the name of Witdoeck is substituted for that of Bollswert are retouched, and of very inferior

rior value. "St. Theresa interceding at the Feet of Christ, for the Souls in Purgatory," in large folio. Nymphs and satyrs laden with fruit and game, half figures, commonly called "The Return from the Chase," in folio. "A drunken Silenus," supported by a satyr, and another figure. The impressions, with the name of Bollwert only, without the address, are the earliest and best. "The Continence of Scipio," in large folio. Those impressions are the best with the name of Hendrix. "A triumphal Arch," in honour of Ferdinand, cardinal-infanta of Spain, and governor of the Low Countries, in large folio, and "Jesus Christ, the two Virgins, four Angels, and many other holy Persons," engraved by S. a Bollwert and Corn. Galle, and inscribed with the name of Hendrix, in folio.

Paul de Pont, or Pontius, the third of our celebrated chalcographic triumvirate of the Netherlands, was born at Antwerp A.D. 1596, and became the disciple of the elder Vorsterman, both master and pupil being at the time befriended and improved by the frequent counsel and advice of Rubens. The best works of Pontius, and which form the basis of his well founded celebrity, are free graphic translations from the originals of that great master, in the accomplishment of which he united precision of touch, with a nice perception of form, character, and expression. His manual power and command of the graver was scarcely inferior to that of his contemporary Bollwert, and if in taste he was inferior to Vorsterman; in a just and even penetrating observation of the peculiar merits of the picture before him, and the principles upon which those excellencies were produced and connected, he was inferior to neither. Care, observation, feeling, were pre-eminently his; and hence the truth and vigour of his historical heads. Genius, and profound knowledge of the human figure, certainly belonged in higher degrees of perfection to Vorsterman and the Bollwerts.

In commenting on the productions of this illustrious triumvirate, a foreign critic of eminence dwells with just emphasis on the neglect and the importance of ascertaining what ought to be esteemed *principle* in engraving, as well as in all other arts that are with propriety so termed; and when we call to mind, and apply the well-founded aphorism of Hippocrates, that "art is long, life short, opportunity fleeting, and even experiment, sometimes fallacious," it may well seem extraordinary that among the critics and connoisseurs of the Low Countries, nothing was done towards ascertaining and publicly explaining the merits of these admirable engravers, and that in any part of Europe, so little has been done in this art toward ascertaining principle at all. The art of the statuary, and the sister art of painting, have been cultivated, and have flourished under the mild and cheering influence of settled laws; their actual progress, as well as occasional retrogradations, are known and understood: while engraving has been doomed to the undetected endurance of the wildest anarchy; of licentious and contradictory practice; and merit, demerit, and mediocrity, have alike had their hour of idle gazing, and have alike fled from that steady critical comment which should have marked the stages of the progress of the art.

Some writers have idly asserted that Rubens occasionally worked on the plates of these artists. The fact is, (as we have reported in our short notice of the etchings of this master), that Rubens had so little pretensions of this kind, indeed was so far from possessing any power over the graver, that the few touches that were wanting after corrosion, to the completion of his plates, were supplied by his friends Vorsterman, Bollwert, or Pontius. The error has origi-

nated from its having been the custom of these artists, for Rubens to revise and touch from time to time upon trial-proofs that were taken to ascertain the engraver's progress: in doing which, as these engravers worked after Rubens and Vandyke, with the freedom and fellow-feeling of friends, not with the servility of slaves, it was sometimes found necessary to vary the chiaroscuro from the original pictures, in order that when the local colours were abstracted, the spectator's perceptive faculties should be impressed or operated upon, in a similar manner, and consequently his mind affected in the same way, as by the combinations of colour with light and shade in the original pictures: for, paradoxical though it may appear, it is clear that these men of genius thought and felt thus upon the subject, nor is it less clear to those who studiously compare the engravings of these masters with Rubens' original pictures, that they were right in so thinking.

The following engravings, from the hand of P. Pontius, are deservedly held in considerable estimation.

Portraits after Vandyke.—Paul Pontius, engraved by himself; Sir Peter Paul Rubens; James de Breuck, architect; John Wildens; John vans Ravellein; Palamede Palamedessen; Theodore Vanloo; Theodore Rombouts; Gerard Honthorst; Henry van Balen; Adrian Stalbert; Gerard Segher; Simon de Vos; Daniel Mytens; Gaspar de Crayes; and Martin Pepyn; all celebrated artists of Antwerp. Gaspar Gevartius, juris-consulte; and Nicholas Rockok, magistrate of Antwerp; John van den Wouwer, counsellor to the king of Spain; Caesar Alexander Scaglia, abbé of Staphard; Gustavus Adolphus, king of Sweden; Mary of Medicis, queen of France; Emmanuel Phocas Perera, count of Feria; Francis Thomas, of Savoy, prince of Carignano; John, count of Nassau, general to the king of Spain; Don Alvarez, marquis of Santa Cruz, and governor of the Low Countries; Don Carlos, of Colonna, (a Spanish general); Don Diego Philip de Gusman, marquis of Leganez, and Spanish general; Mary, princefs d'Arenberg; Henry, count de Berghe; Cornelius van den Geest; and Balthazar Gerbier, minister from the court of Spain to that of England, all of folio dimensions; Frederic Henry, prince of Orange; and Francis Thomas of Savoy, prince of Carignano, both in large folio.

Portraits after Rubens.—Sir Peter Paul Rubens; Gaspar Gevarto, juris-consulte; Ladislaus Sigismund, prince of Poland and Sweden, all in folio; Philip IV. king of Spain; and its companion, Elizabeth of Bourbon, his queen, (the best impressions of these portraits are before the name of G. Hendrix, was inserted); Elizabeth Clara Eugenia, infanta of Spain; Ferdinand, cardinal, infanta of Spain, and governor of the Low Countries; Gaspar Gusman, duke of Olivares, a very fine portrait, done from a copy by Rubens, of a picture of Velasquez, all in large folio; and a set of three, in folio, very fine and rare portraits, of Christoval, marquis of Castell-Rodrigo; Manuel de Moura Cortereal, marquis of the same place; and a Spanish lady, adorned with a necklace of precious stones; the mother of Manuel of Castell-Rodrigo.

Portraits from various other Painters.—Raphael d'Urbino, in the costume of his age; Ambrosius, count of Hornes, after F. de Nys; Abel Servien, count de la Roche des Aubins, and minister plenipotentiary to the court of Munster, after Ans. van Hulle; and John de Heem, a painter of Utrecht, after John Lyvins, all of folio dimensions.

Historical Subjects, after Rubens.—"Susanna surprised by the Elders;" "The Adoration of the Shepherds," (a circular plate,) both in large folio; "The Slaughter of the Innocents,"

Innocents," a very large print, lengthways, on two plates; "The Presentation in the Temple," a fine plate; "Christ bearing his Cross;" an allegorical piece, known by the appellation of "The Christ of the Clenched Fist," because one of the angels who are overthrowing Sin and Death has his fist clenched, a very fine engraving; "The Madre Dolorosa, or Dead Body of Christ on the Lap of the Holy Virgin," and "The Descent of the Holy Ghost, or Miracle of the Cloven Tongues," all of large folio size; "The Holy Spirit subduing the Flesh," (an allegorical subject,) a very rare print, in folio: a large folio print, called "Rubeus's Epitaph," from a picture in the church of St. James, at Antwerp. The subject is a religious allegory, in which Rubens himself appears in the character of St. George. A head of Christ, in an oval, of folio size; "The Assumption," in large folio; "The Coronation of the Virgin," one of the latter engravings of Pontius, in folio; "The Virgin suckling the Infant Jesus," a rare print, in octavo; "The Holy Family," where the Infant Jesus is caressing his mother, half-length figures; "Christ appearing to St. Roch," with "Eris in peste Patronus" inscribed on a banner, a fine print, and engraved from a picture which is esteemed among the very finest of the works of Rubens; a very large and rare engraving, in which real and allegorical personages are oddly associated, à la Rubens, for the sake of complimenting the princes of the house of Austria and the Cordeliers; and a very large upright print, of "The Dispute between Neptune and Minerva," dedicated to pope Urban VIII.

Historical, &c. after various Painters.—"The Flight into Egypt," after Jac. Jordaens, (the best impressions of the engraving are before the name of Bloteling was inserted;) "The Festival of the Kings," after the same painter, a fine engraving; "The Adoration of the Kings," after Gerard Seghers, all in large folio; "The Virgin and Holy Infant, accompanied by St. Anne," in folio; "St. Francis Xavier, prostrate before the Virgin and Child," a circular print; "St. Sebastian, and an Angel drawing an Arrow from his Side," all from G. Seghers; "The Dead Body of Our Saviour on the Lap of the Virgin," or, "Madre Dolorosa," after Vandyke, all in large folio; "St. Hermanus Joseph," from a picture painted for the Jesuits of Antwerp, and now in the royal gallery at Vienna; "St. Rosalia, receiving a Crown from the Infant Jesus," both from the same painter, in folio; "The Holy Family," after John van Hack; and "The Entombing of Christ," after Titian, in large folio.

Of merit very inferior to that of his father, was Lucas Vorsterman the younger: he was born at Antwerp in the year 1600, and learned the elements of engraving under his paternal roof. He also practised the art of drawing portraits from the life. But though he scarcely reached above mediocrity in either art, his productions, of which the following are those most worthy of esteem, are sought after by the curious.

Lucas Vorsterman, the father, from Ant. Vandyke, in folio; "The Virgin Mary," she is represented in the clouds, and surrounded by angels; "Christ crowned with Thorns, and mocked by the Jews," both in quarto, after Vandyke; "The Trinity," after Rubens, in folio; the fable of "The Satyr and his Guest, who blew hot and cold," in large folio, nearly square, after Jacques Jordaens; part of the plates for the large folio "Treatise on Horsemanship," by the duke of Newcastle; several of the plates from the gallery of the archduke Leopold, at Brussels, which were published by David Teniers, the younger: and part of the collection of drawings of Nicholas Lanier,

a musician and amateur of the reign of Charles I. This latter set is, perhaps, the best part of the works of the younger Vorsterman.

Peter Soutman was born at Haerlem in the year 1580, or not long afterward, and became the disciple of Rubens. Beside etching and engraving, he painted both history and portraits with success, and was patronized, not only in Flanders, but also in Germany and Poland.

We have a great number of prints by this artist, both from his own compositions and those of other painters, particularly his great master, Rubens. They are for the most part etched, and with great spirit, not all in the same style, but under the influence of the different notions and feelings which from time to time appeared to have prevailed, as he endeavoured to explore the capabilities of a new art, in which the practice of his predecessors and contemporaries shewed him that there remained much to discover. He is like an early voyager, who sometimes warily coasts the lands which others have touched at before him, and sometimes with better hopes and bolder navigation pushes forth into unknown regions, obscurely guided by the dubious bearings of the headlands which he fancies he has descried. Watelet says his style is, in some instances, contrary to the theory of the art, though as no system of principle was then settled, or is even yet ascertained, he can only mean that in those instances it is opposite to the practice of certain engravers, whose works had obtained the praise of such reputable and established connoisseurs as Watelet himself. He continues, "but his prints always convey an idea of the softness of flesh, and the colouring of the pictures from which they are taken. He engraved in a pure style, with the same merits and faults as I have remarked in his etchings." And Strutt, with perhaps a perception somewhat clearer of Soutman's intentions, informs his readers that "Soutman seems to have aimed at giving a striking effect, by keeping all the masses of light broad and clear; but by carrying this idea too far, almost all his prints have a slight unfinished appearance, though the engraving is, in itself, sufficiently neat. There is the style (of drawing) of the master in the treatment of the heads and other extremities of his figures," &c. &c.

For the sake of not disconnecting those artists who most distinguished themselves by their attainment of that particular merit which most strongly characterises the school of the Netherlands, and who should therefore be contemplated together, we have placed Soutman a little behind his chronological rank; but it should be recollected to his credit, that Vorsterman was his fellow pupil, and that, in all probability, the enterprising prow of our artist, and the beacon he set up, at once stimulated and taught Pontius and the Boffwerts when and where to launch forth, and how to traverse, with least danger, the unfathomed ocean of their art.

Of the engravings of Soutman, it may be sufficient, in this place, to mention the following.

Portraits.—Joannes Wolferdus de Brederod, gener. Marchalcus Belgii confederati; Gerard von Honthorst pinx; the armouries of Orange Nassau, surrounded with trophies and allegorical figures; the frontispiece to the portraits of the counts of Flanders; Soutman pinx. et sculp.; the emperor Adolphus of Nassau; the empress of Ferdinand II., queen of Hungary and Bohemia, both from Van Sompel; John the Intrepid, count of Flanders; and Philip IV. king of Spain and the Indies, all in large folio.

Historical, &c.—"The Fall of the Damned," a large upright, after Rubens, the early impressions of which are known from those subsequently printed, by their having

been taken before the address of the junior Bouttats was inscribed beneath the plate; "The Defeat of the Army of Sennacherib by the exterminating Angel," also after Rubens, and in large folio; "Jesus giving the Keys to St. Peter," from Raphael; "The miraculous Draught of Fishes," from Rubens, all in large folio; "The Last Supper," a very long print, engraved on two plates, from the celebrated picture of Da Vinci, in the refectory of the Dominicans at Milan, engraved through the medium of a drawing by Rubens; "Christ on the Cross," after Rubens, of which plate it is very uncommon to find a good impression; "Christ laid in the Sepulchre." The first impressions of this plate being very faint, Widoock worked afterwards on the plate, to give it more effect. "The Creation of a Bishop," all in folio; "The Rape of Proserpine;" "The Triumph of Venus," in large folio; and "A drunken Silenus," supported by a satyr and a negress, all after Rubens; "The Grand Sultan on Horseback," attended by his principal officers at the head of his army, in folio, from a picture by Soutman himself; a set of four large hunting pieces, namely, the chase of a lion and lionsess, ditto of a wolf, ditto of a boar, and ditto of a crocodile and hippopotamus, engraved on two plates, all after Rubens; "A couchant Venus," after Titian; and "St. Francis kneeling before a Crucifix," from Michael Angelo, both of folio size.

Sneyders was flourishing at this period, and contributed to the advancement of engraving by a book of animals, which he etched with a degree of truth and animation corresponding with what we behold with so much pleasure in his pictures. His etchings consist, we believe, of sixteen plates, which are not all of the same dimensions. For the biography of this extraordinary artist, see the article SNEYDERS, FRANCIS.

John Vredisman Frisius was born at Leuwarde in the year 1527. He was an architect of some talent, as well as an engraver; and is the designer of the arch erected at Antwerp, in honour of the triumphal entry of Charles V. and his son. The principal engravings of the elder Frisius are contained in a book of sepulchral monuments, which are presumptively from his own designs. The work was published at Antwerp, A.D. 1563. His style consists of a coarse and heavy mixture of etching, with the work of the graver.

Related to the above artist were John Eillart Frisius and Simon Frisius: the former is the author of some few portraits, among which are those of Henry IV. of France, and Henry of Nassau, prince of Orange; both of which are folio dimensions.

But Simon Frisius was an artist of abilities very superior to those of his relatives. He was born at Leuwarde in Friesland, A.D. 1580, and learned the rudiments of engraving of Eillart, or of Vredisman. He handled the etching-needle with great taste and facility; and his etchings are now become rare, and are much sought after. Abram Bosse says, "Simon Frisius handled the point with great freedom, and his hatchings possess the firmness and neatness of engraving." He adds, (what we do not very well understand,) that "this artist made use of a soft kind of varnish, such as is used by refiners in the separation of metals."

He sometimes subscribed his plates with "F. fecit;" and at others, with his initials "S. F.:" and his best prints are a set of heads of the sybils and saints, in 4to., from his own designs; a set of portraits, after H. Hondius, in small folio; a large collection of folio landscapes, after Matthew Brill, entitled "Topographia variorum Regionum;" two

landscapes, from Henry Goltzius, of which the subject of one (of 4to. size) is a cottage and figures on the sea-shore, the other is an architectural landscape in folio, with figures, in the introduction and execution of which Frisius was particularly excellent; another landscape, in which is introduced the story of Tobit and the angel, after P. Laetmann; another, with the flight into Egypt; and a very rare landscape, delicately engraven, wherein are buildings and rustic figures, in large folio.

James Fonguieres and Jodocus de Momper, or Mompert, were both born at Antwerp in the year 1580. For an account of their merits as landscape painters, see their names respectively. Both occasionally practised with success the art of etching; working from their own compositions. Fonguieres' etchings are not numerous, and consist of small landscapes: Mompert's are somewhat larger, and one in particular, which is now become rare, is a large folio landscape, a rocky scene, and etched in a very bold style, quite in the extreme of boldness.

Adrian Stalbert was also of Antwerp, and contemporary with Fonguieres and Mompert. He resided for some years in England, from whence he returned rich; though it may reasonably be suspected whether, at this period, his riches could have been obtained in this country by painting and etching landscapes. He, however, continued to paint and etch in the city of Antwerp, until he attained to upwards of fourscore years of age.

Of his etchings, the best with which we are acquainted is a folio landscape of the ruins of a magnificent English abbey, with sheep on the fore-ground: it is inscribed "Adrianus van Stalbert fecit in aqua forti."

James William Delft was the son of William James, of whom we have spoken in our account of the *Origin and Progress of ENGLISH Engraving*. He was born in the year 1619, at Delft, and died in the same city in 1661. He learned the elements of painting and engraving of his father, whose style he always copied, and which, with the similarity of their names, has occasioned their works to be often confounded. He engraved a set of portraits in ovals, of folio size, of which the following are the most remarkable: Charles I. of England; queen Elizabeth; Ferdinand II. emperor of Germany; Frederick, palatine, king of Bohemia; Frederick Henry, prince of Orange, count of Nassau Katzenellenbogen; Gustavus Adolphus, king of Sweden; James, king of England; Louis XIII. of France; Axel Oxenstiern, a Swedish minister; Philip III. of Spain; Philip IV. of Spain; Anabrotius Spinola; and Vladislas IV. king of Poland.

John Savary, or Savery, was born at Courtray in the year 1580. He studied engraving under Hans Bol, resided during most part of his life at Amsterdam, and was related to John and Roland Savery, who were both painters, and to Solomon Savery the engraver, of whom we shall next proceed to speak.

The following engravings are all we can specify by the hand of this artist, who was also a landscape painter: a set of six mountainous landscapes, with figures, in 4to., after Nic. de Clerc; a stag hunt, with a landscape back-ground, in folio; the story of Sampson killing the lion, introduced in a landscape, in large folio; and a woody scene, with a waterfall, in folio.

Solomon Savery is believed to have been a native of Amsterdam: the time of his birth we have not ascertained; but as his engravings were produced from the year 1620 to 1640, he was perhaps the son and pupil of John Savery, whom we have just dismissed. He is supposed to have passed some years of his life in England; a supposition which appears to

be confirmed by the circumstance of his principal works being portraits of the public characters of this country. But be this as it may, his merits were very considerable. He handled his graver with taste, and a degree of skill which had not then been exceeded; and expressed the textures of the various objects, which he represented, with nice discrimination; of which his portrait of John Speed the historian, among several others, affords a pleasing and satisfactory proof. His portraits are probably his best performances, though his historical subjects are not without a considerable share of merit.

Among these may be distinguished king Charles I., wherein Savery appears to have engraved the face from a picture by Vandyke, and to have added the high-crowned hat, and composed the other accompaniments; Thomas, lord Fairfax, and Speed the chronicler, of which we have spoken above, have also their heads covered with hats, to which circumstance our engraver appears to have been partial, as giving effect to the faces of his portraits, and affording scope for the exercise of his manual power over his graver.

His best historical works are, "Christ expelling the Money-changers, &c. from the Temple," in large folio, from Rembrandt; seventeen plates for Ovid's *Metamorphoses*; and a series of small plates of frieze proportions, of "The Entry of Mary de Medicis into Amsterdam."

James de Bie, or de Bye, was born at Antwerp in the year 1581, and not only distinguished himself as an engraver, but also as a draftsman and an antiquary. He studied engraving in the school of the Collaerts, and successfully imitated their style; finishing his plates entirely with the graver in a neat, clear, and determined manner.

De Bye drew correctly. The heads of his figures possess considerable accuracy of character and expression, and their hands and feet are well marked; but from his lights being so much scattered, and his shadows somewhat feeble, his chiaroscuro is by no means powerful. His prints, however, may rank with those of the best early Flemish masters. He, with his contemporary Battista Barbe, assisted the Collaerts in engraving "The Life and Passion of Christ," from Martin de Vos. The work consists of fifty plates, of which N. 18, ("The healing of Peter's Mother-in-Law.") and N. 30, ("The Resurrection of Lazarus.") are fine specimens of the abilities of de Bye, especially the latter.

He also engraved the medals of the Roman emperors, from the cabinet of the duke d'Arfehott, which were originally published in the year 1617, and of which an edition was reprinted at Berlin in 1705; a medallic history of the kings, queens, and dauphins of France; another set of the portraits of the kings of France, from Clovis to Louis XIII., consisting of sixty-four plates, of which fifty-eight are portraits; the genealogy and portraits of the house of Croix, on sixty-four plates; the portrait of Francis I. of France, in folio, after M. de Vos; and a set of metaphysical personifications from his own designs, published at Paris in 1643, with explanations by J. Baudouin.

Mark and Nicholas de Bye were of the same family with our artist, but are not worthy of much notice as engravers. Mark performed some etchings, after P. Potter and M. Gerard; and Nicholas engraved portraits, among the best of which is Charles IX. king of France.

Peter Lastman was born at Haerlem in the year 1581. He was an historical painter of merit, and is reported to have been one of the instructors of Rembrandt. Lastman etched several plates after his own compositions, in a very good taste, which are at present very rare: of these we can only specify two, the subjects of which are "Judah and

Tamar," introduced into a landscape, in small folio; and a female veiled, reclining in a bower, in 4to.

Nicholas Lastman was the son of Peter, and born at Haerlem in 1619. He was instructed in the elements of painting, and the general rudiments of art, by John Pinas; and it is probable he learned engraving from Saenredam. Among other things, he engraved the portrait of Carl von Mander, after Saenredam, in 4to.; "Our Saviour in the Garden of Olives," after his father, in large folio; "St. Peter delivered from Prison by the Angel," after J. Pinas; and its companion, "The Martyrdom of St. Peter," both in small folio; "The Good Samaritan," from a picture by himself, is probably his *chef-d'œuvre*. The story is introduced in a very picturesque landscape, towards the right side of which appears a stone-bridge over a river, along which the uncharitable priest and Levite are walking. "This print is very little known, though it deserves great attention from the taste and beauty of the execution." So says Huber: but what we have not witnessed, we cannot confirm; and what we have seen from the graver of Lastman, though neat, are tasteless productions.

For the biography and extraordinary merits, as painters, of the two Teniers, see the articles TENIERS, DAVID, the elder, and the younger. They each produced several etchings from their own compositions, which go to shew that very great painters may possibly make but indifferent engravers. By this is not meant that their etchings are devoid of fire and freedom; but that they fall short of what might naturally be expected from the high reputation which is justly attached to the name of Teniers, and particularly in that pastoral elegance of touch and handling, which confers poetic charms on their painted village festivities, in spite of the caprices of fashion, and the royal French taste of Louis XIV., who, when an admirable picture of the younger Teniers was placed before him, is reported to have turned round and said to his first valet-de-chambre, "Qu'on m'ôte ces magots!" which of course was echoed in the applauses of the whole French court.

The etchings of the Teniers find, however, a very proper and indeed indispensable place in the port-folios of those connoisseurs, who collect the productions in fine art of the Netherlands. As both the father and son marked their prints with the same cypher, which will be found in *Plate III.* of the monograms, &c. used by the engravers of the Low Countries, it is not easy to distinguish them; but the following are generally ascribed to Teniers the elder: "A Pilgrim, with his Staff and Chaplet," in 12mo.; "A Peasant seated, applying a Plaster to his Hand;" "A Peasant seated at Table, with a Crutch and Glass;" another peasant with a fur hat on; and one with a pipe; "An old Woman, with a Chaplet;" and "An old Man and Dog;" "A Man with a Staff;" a set of four, of peasant, half-length; "A German Kitchen;" another set of peasants, smoking and playing at bowls, all of octavo size; and a quarto print, called "The Bowl Players."

And to the junior Teniers are ascribed, "A Peasant smoking," he is seated on a chest, and in company with another; a landscape, with cottages and peasants conversing; another landscape, with four peasants conversing; "Villagers seated round a Tree, inside a Cabin," with the effect of moon-light, all in 8vo.; two prints of peasants travelling; "Peasants smoking at a Mark;" "The Temptation of St. Antony;" "A Flemish Festival;" "A Village Entertainment;" three heads, apparently portraits, namely, an old man with an hour-glass, an old man playing on a flute, and a lady holding a flower, small upright plates; "The Inside of a Cottage," with a dead calf hanging up.

and a man and a woman standing by the side of it, a small plate lengthways.

John Baptista Barbé was born at Antwerp in the year 1585. He studied engraving in the school of the Weirixes, and after attaining a competent mastery of the graver, and successfully imitating the dry and elaborate neatness of his instructors, he travelled to Italy for improvement.

No artist of that day, with genuine professional objects in view, could travel to Italy altogether in vain. Barbé made considerable improvement in his knowledge and taste of forms, but was not able to emancipate himself from the shackles of his earlier education.

Accordingly we find that in his latter engravings, though his figures are drawn with tolerable correctness, and his extremities well marked, his chiaroscuro is flat and powerless, and his manual execution painfully neat, dry, and insipid. He worked with the graver only; sometimes designing and inventing his own subjects; and at others, working after the originals of other masters.

Of the former kind are "The Annunciation," inscribed "Spiritus Sanctus;" "The Nativity," inscribed "Peperit Filium;" "The Arrival of the holy Virgin and St. Joseph at Bethlehem;" "The holy Virgin and Child," surrounded by a garland of flowers, and inscribed "Beatus Venter" &c.; "Jesus Christ on the Mount of Olives;" "Our Saviour with the Disciples at Emmaus;" "The Crucifixion," inscribed "Prote Fili mi," &c.; "St. Ignatius kneeling before an Altar;" and a set of four emblematical subjects, entitled "The Christian Virtue," all of small dimension.

After various other Masters.—Barbé engraved "The Holy Virgin sitting at the Foot of an ancient Monument, with the Infant Christ and Joseph," in small folio, after J. B. Paggi, (one of his best prints); another "Holy Family," in 4to. after Rubens, also in the improved style of our engraver, and certainly a meritorious work; the proof impressions of which (taken before the name of Rubens was inscribed on the plate), are rare, and bear a high price. A set of twenty-four in 12mo. of the Life and Miracles of Father Gabriel Maria, founder of the Annunciades, after Ab. van Diepenbeck; and "The Holy Virgin seated on a throne with the Infant Christ," after Francisco Frank, in small folio, and esteemed one of the masterpieces of our artist.

William van Nieuwant was born at Antwerp in the year 1585. He became the disciple of Roland Savery, but after quitting his master he went to Rome, and resided three years in that city with his countryman Paul Bril. He afterwards returned to the Low Countries, and took up his residence at Amsterdam, where his pictures were held in high estimation, and where he died in the year 1635.

Nieuwant etched several plates of landscapes, both from his own designs and those of Paul Bril. They are executed in a slight free style, and often worked upon afterward with the graver, to harmonise the lights, and strengthen the masses of shadow.

Among the etchings of this artist, the following are held in most esteem, viz. a set of sixty, of views in Italy, ornamented with figures. Two landscapes with ruins, into one of which is introduced the story of the good Samaritan, and in the other Tobit and the angel, both in folio, from P. Bril. Two marine subjects, one with shepherds on the sea-shore, and the other with vessels, and a fortress on a rock, from the same painter; "The Ruins of the Temple of Juno, in the Capitol;" "The Ruins of the Temple of Venus;" "A View of the Triumphal Arch of Septimius Severus," all in folio; and the three bridges across the

Tiber, with views of the city of Rome, engraved on three large plates, from his own drawings.

William should not be confounded with Adrian van Nieuwant, a landscape painter of some eminence, who was likewise a native of Antwerp, and who died at Amsterdam in the year 1601.

Peter Holsteyn was born at Haarlem in the year 1582, and resided in Holland at the commencement of the seventeenth century. He occasionally practised the art of painting on glass; but was chiefly an engraver of portraits, among the chief of which are a set of twenty-six of the plenipotentiary ministers of Munster; John Saenredam, and Jacob vander Burchius, both in ovals; Fabius Chili, a negotiator for peace from Westphalia, afterwards pope Alexander VII.; John Ernest Picotus, a counsellor of the elector of Saxony; all of 4to. size; John Huydecoper, burgomaster of the city of Amsterdam; John Reyner, historiographer for Munster; Constantius Sohner; and Albert Vukenbrink, a sculptor of Amsterdam; all in folio.

Cornelius Holsteyn was likewise born at Haarlem in the year 1620, and was the son of the preceding artist, of whom he learned the elements of art. He painted history with a moderate degree of success. He likewise engraved some subjects from his own designs, and several of the plates for the cabinet of Gerard Reynst, a magistrate and connoisseur of Amsterdam. Yet of his engravings we are able to name only the following: a bacchanalian subject, of children at play, forming a long frieze, engraved on six plates, a very rare print; and a female seated, ornamented with jewels, supposed to be the portrait of Isabella, marchioness of Mantua, from a picture by Correggio, or Julio Romano; engraved on a large folio plate for the cabinet of Reynst.

Peter van der Borch was born at Brussels in the year 1540. The period of his life has not been recorded, but he appears to have resided in his native city, except, perhaps, occasionally in that of Antwerp, till some years after the commencement of the succeeding century.

He acquired some reputation in landscape painting, but applied himself to etching with still greater assiduity, and produced a considerable number of prints, most of which may be properly termed historical landscapes. They are etched with little care, in a rough and licentious kind of style, and the figures which are introduced are by no means correctly drawn.

Though the works of this artist manifest great fertility of invention, they evince no very profound knowledge of composition, nor perception of the susceptibilities of the engraver's art, and, therefore, but little judgment. He usually marked his prints with his initials, or a monogram, which will be found in our third plate of those used by the engravers of the Low Countries.

Of the numerous works of this artist, it may suffice to mention the following:—The History of Elias and Elijah, in ovals of 4to. size. A set of landscapes, with subjects from the New and Old Testaments, in 4to. Rural festivals, in folio; a company of archers regaling; a peasant's wedding, both in folio. A landscape with the history of Hagar and Ishmael, in large folio; a folio print, entitled "Emblemata sacra e præcipuis utriusque Testamenti historiis concinnata;" and a set of one hundred and forty plates, from Ovid's metamorphoses, in 4to.; printed and published at Antwerp by Theodore Galle.

Henry van der Borch, the elder, was born at Brussels, A.D. 1583, and died at Frankfort in 1660, where his family were obliged to seek an asylum from the political troubles which agitated their native country. His father, on discovering

ing his taste for the arts, placed him under Giles Valkenbourg, from whom he learned the rudiments of art, and whom he afterward accompanied to Italy.

Italy was at that period at once the grave and conservatory of ancient art; and sculptural wonders were every day dug from the ruins of the classical ages. The knowledge and opportunities of vander Borcht during his residence in that country, enabled him to form a collection, which the English earl of Arundel had afterward the honour of purchasing.

From Italy our artist returned to Frankenthal, where he resided some time, and afterwards migrated to England, but finally returned to the Netherlands. His portrait was engraved by Hollar, from a picture by his son, who, being of the same name as his father, is often confounded with him; but the engravings which are most generally ascribed to the former, are "The Holy Virgin and Child," after Parmegiano, engraved at London in 1637, in small folio. "A Dead Christ, before the Entrance of the Sepulchre," in 4to. after a copy by Parmegiano from Raphael's original, in the Arundelian collection. And a set of twenty-two in small folio, of which the subjects display the entrance of the elector palatine Frederic, with Elizabeth, the princess royal of England, into Frankenthal. It was accompanied with descriptions by Miroulet, and was published in the year 1613.

Henry vander Borcht, the younger, was born at Frankenthal in the year 1620, and was the son of the preceding artist. At an early period of life he appears to have discovered talents both as an artist and an antiquary. The earl of Arundel, when on his travels, found Henry at Frankfort, and sent him into Italy to Mr. Petty, who was then collecting art and antiquities for his lordship, and hence he was retained in the service of that nobleman as long as he lived.

After the death of his patron, Van der Borcht was employed by the prince of Wales, (afterwards Charles II.) and lived in esteem at London, but afterwards returned to Antwerp, where he died at an advanced age. The portrait of Vander Borcht, the younger, was engraved by Hollar, after J. Meyfens, and his monogram will be found among those of our engravers of the Low Countries.

The following engravings, which are chiefly from the Arundelian collection, are attributed to him. "Abraham entertaining the three Angels," after Louis Caracci; "The Infant Christ embracing St. John," copied from a print by Guido; "A female Figure offering a Cup to another who is kneeling," after Correggio; and "Apollo and Cupid," in an oval; all of 4to. size. This artist used a monogram, for which see our *Plate III.* of those used by the engravers of the Low Countries.

Count Henry Goudt, of whom we shall next treat, is among the rare instances that art may boast, and that Fortune in her caprice has allowed us to exhibit, the tenour of whose life and pursuits is in direct hostility to an ungenerous and immoral maxim, which, promulgated by the proud and unfeeling among lax philosophers, has obtained but too much credit and currency throughout Europe.

The maxim to which we here allude, is, that the goadings of the iron (which sophistry has misnamed the golden) spur of necessity is indispensable to the due progress of genius. Count Goudt was born in affluent circumstances, and of a noble family, and yet became a great artist, as well as an exemplary man.

Among that class of society, toward which meritorious professors of the fine arts are allowed to look for patronage and encouragement, are some—always more considerable

from their rank and infectious example, than from their numbers—that would justify the perversion of riches and of reasoning, by perverting Nature also, and who, mistaking what might possibly be applicable to the exertions of mere manual industry, for the springs of mental expansion, imagine, and inculcate with all the luxurious languor of infinite complacency, that the plants of genius thrive best in a rugged soil; that the chilling damps of poverty supply the ardours of talent; that starvation is the very pabulum of ability; and that mind soars the higher for being chained to the earth. Before these intellectual arithmeticians of exquisite feeling and refined liberality, proceed to calculate by what inverse ratio of discouragement the apotheosis of genius may be consummated in the extinction of its final spark, it might be well for them to attend to the leading traits which mark the life of this distinguished engraver.

Henry de Goudt, knight of the palatinate, and usually called (but whether by courtesy or by right we are ignorant) count Goudt, was born of a noble family at Utrecht, in the year 1585.

Among the few professions which, from the state of European manners and philosophy, are allotted to gentlemen of a certain rank, young Goudt observed, that in the army officers were, by the very nature of the tenure by which they held their commissions, obliged to resign the noblest characteristic of their nature as men,—namely, the privilege of judging for themselves; and resign it too, in cases touching the lives and liberties of others, which of all possible cases are the most interesting and important to minds of feeling. Young, and active-minded, but tender-minded, as he was, he could not but perceive, that soldiers became at once, from the essential nature of military service, that degraded rank of beings, which philosophic patriotism itself reluctantly glances at, and almost fears to call the slavish instruments of the destruction of their fellow men. A state of society, and a principle of mental and corporeal occupation, which converts the horror of philanthropy into the basis of merit; which requires that men, for the sake of being termed military officers, and the false glory that accrues from it, should abdicate their own natural rights and powers of reasoning on the justice of the causes of national quarrel in favour of hereditary rulers, however feeble-minded, or ignorant, or ill advised, was not, could not be, the voluntary choice of a mind attuned to the harmonies of art and nature.

In the church, our uncontaminated youth saw, that though religion was not denied to be an affair between individual man and his Creator, yet that no public teacher might think and act for himself, unless he voluntarily embraced the trammels of episcopacy, without incurring the reproach and the penalties of heterodoxy.

The law was repulsive, inasmuch as principle was rather overwhelmed and endangered, than recognized and refreshed, and sustained, in acts of memory and the sophisms of rhetoric.

Of the study and practice of medicine, Goudt might with justice think much more favourably: yet, to produce good, was better than to remedy evil. But in preferring and following the proper objects of imitative art, to which it may have been, that the natural bent of his genius (still more inclined him than this process of ratiocination, he anticipated the lofty, and independent, and virtuous, satisfaction of contributing the utmost of his pleasurable exertions, free from the restraints of human tyranny, to the pleasure and improvement of his countrymen: and as he could do this with dignity and delight, he hesitated not long in resolving to become an artist; and with this view, and ample means of accomplishing his object, he set forth on his travels to Italy, at that

time the great hieropolitan temple, the sanctified centre of pilgrimage, where, from all parts of the civilized world, met the devotees of art.

The wonders of Rome, the miracles of art which he there beheld, called forth all his enthusiasm; but taught him to hope humbly. He applied himself with assiduity to the practical study of art; and drew diligently in the Roman schools: but under what master he learned the rudiments of engraving is not known. Nor is it surprising that the progress of his improvements was rapid: for this will ever be the case where the mind of a student is operated upon by pleasurable stimuli alone, and is free from the restraints and pecuniary obstructions by which the advancement of a large majority of artists is sadly retarded.

In this great metropolis, surrounded and pervaded as it is by an highly salubrious atmosphere of art, every mind devoted to such pursuits, freely inspires and imbibes what is congenial to its nature. Adam Elshiemer of Franckfort, of whom we have treated in vol. xiii., had been studying there for some years when our young artist arrived, and the admiration with which he beheld the works of that great painter, gradually brought them acquainted.

Another circumstance contributed much to increase their intimacy. The misfortunes of Elshiemer had been pitied, but not relieved. Goudt had the happiness of releasing him from prison, and of becoming at once the firm friend, pupil, and generous benefactor of the man in the world, to whom, of all others, he looked up with the most heartfelt reverence.

From this period he studied under the direction of Elshiemer, and appears to have exclusively devoted himself to the task of engraving after his pictures. We know not of a single work of Goudt's that is engraved after any other master.

From this period, too, his peculiar talent for engraving began to develop itself. By comparing nature with the exquisite productions of his master, he formed an original style of engraving, in most (though we think not in all) respects perfectly homogeneous with that of Elshiemer's painting, and which discovers deep and clear insight into the recondite energies of the engraver's art. No man before Goudt had produced those bright, sudden, and powerful effects of *chiaro-scuro*, which we behold with so much gratification in his fire, moon, and torch, light, from which the engravers of the present, and of after ages, may study with advantage. No man, like Elshiemer, had dipped his pencil in the depth of night, and in the dawn of morning. And no man before Goudt, and scarcely any since, has been able to suggest, in his engravings, the shades between dubious and positive colour which then prevail.

His "Aurora" is, in this respect, a perfect master-piece. The scene is a bird's-eye view, or rather a view from an eminence, over a hilly and extensive country: but the freshness of a summer's morning, at the early hour of day-break, is rendered with poetic felicity. It is, in the words of Gray, an

———"incense-breathing morn."

And the charmed spectator sees the mill: exhaling, and listens with a poet's ear to the hymn of inanimate nature.

All had hitherto been enjoyment with count Goudt. As Virtue beckoned him forward, Pleasure attended his steps, and strewn his path with flowers. But earth is not heaven, and sublunary happiness is rarely of long continuance. It was the ill fortune of our artist to live during the Aurora of rational philosophy, when sir Francis Bacon had not shone forth, and mystery and credulity were not dis-

sipated. He remained at Rome as long as Elshiemer lived; but on his return to Utrecht, a superstitious female, by whom he was beloved, the Medea of the town, believing in the occult virtues of herbs and minerals, when combined with judicial astrology, to controul or inflame the passions, administered, at an entertainment, what was termed a love potion, which she fatally believed would have the effect of fixing his affections on herself; and thus literally poisoned his cup of delight. He was from this time afflicted with a species of delirium, or idiotism, of the most melancholy character, under which he languished for some considerable time, and at length died in his native city, at the age of forty-five.

It has been remarked as extraordinary, but is probably only an ordinary denotation, and result of the master-passion, that though the mind of Goudt was lost to every other interest; yet, when fine art became the subject of conversation, he would discourse upon it in a very rational manner.

By those who do not narrowly examine his prints, it will scarcely be credited that the graver was the sole instrument of his art, so remarkably loose and free is his delineation of the forms of uncultivated objects. A striking instance of this, may be seen in the vine-leaves, and other foliage, near the door of the cottage where Ceres is drinking from a picher. His effects are always powerful, and his shadows produced by near and numerous cross-hatchings; so that in very dark recesses he sometimes has not fewer than five courses of lines. In commenting on the above print, Strutt observes, that, "considering the precision with which he executed his engravings, the freedom of handling the graver, which may be discovered in them, is very astonishing. The weeds, and other parts of the fore-ground in that admirable print of Ceres, are very finely expressed. The heads of the figures are correctly drawn, and the other extremities are managed in a judicious manner. The powerful and striking effect of this engraving cannot be properly described. The very deep shadows are perhaps rather too sudden upon the strong lights in some few instances; but in the fine impressions this is by no means so conspicuous as in those after the plate had been re-touched."

His engravings, from the elaborate neatness and care bestowed on them, could have been but slowly produced; when we reflect, too, that his object was to excel other men in the merit, not the number of his prints; that he followed this art only for the pleasure it afforded, and did not engrave when his mind was not attuned to the pursuit, it will not appear surprising that the number of his performances should be so small.

The following seven are generally enumerated as being the whole of his works; they are all after the paintings of his friend Elshiemer; but the collection of Mariette contained nine, which, at a public auction at Paris, were sold for two hundred and seventy livres.

1. The Ceres mentioned above, in small upright folio, which is by some distinguished by the title of "The Sorcery;"
2. The Flight into Egypt, in folio; and a landscape (with small figures) in which the effects of fire-light and moon-light are contrasted with great skill: the stars also shine forth, and the *via lactea* is faintly discernible.
3. Another landscape, in small folio, in which the angel and Tobit are introduced. The weeds on the fore-ground of this engraving, and the branches of the trees in front, as well as the foliage and weeds hanging from them, are beautifully expressed. On this print an observation has been made which is applicable also to several passages in the other engravings of Goudt; namely, that he fails in the distant woods, which graduate one from

from another, and require that freedom of determination which etching alone can give.

Of the subject of "Tobit and the Angel," there are two prints by this master. In the first, Tobit is dragging the fish along; in the second, which is of 4to. size, he holds the fish under his arm, whilst, with Raphael, he is crossing a stream of water by means of stepping-stones. 5. Baucis and Philemon entertaining Jupiter and Mercury, in 4to. dated 1612.

6. The Aurora, upon which we have commented above, and 7. A very small oval print of "The Decollation of St. John the Baptist," are all the engravings, by this master, with which we are acquainted, and the last, which is of the least intrinsic value, is by far the feeblest. Perhaps the additional two that were in the collection of Mariette were nothing more than juvenile attempts of our artist.

Of Robert Vander Voerst, the meritorious rival of Vorsterman, we have already treated at some length. (See *ENGLISH ENGRAVING, Origin and Progress of.*) He was a native of Arnheim, and born in the year 1596.

Michael Natalis was born at Liege in the year 1589. He was instructed in drawing by Joachim Sandrart, but learned the rudiments of engraving at Antwerp of Charles Mallery. From Antwerp he travelled to Rome, where he joined Cornelius Bloemart, Theodore Matham, and Regnier Persyn, (all artists from the Low Countries), and assisted them in completing the statues and busts of the Justinian gallery, consisting of one hundred and fifty prints. Stimulated by emulation, and assisted in his studies by Bloemart, Natalis now made considerable progress in his art. He engraved many other plates from the pictures of the great masters of Italy; and after his return to Flanders, was invited to Paris, where he resided a considerable time. Natalis engraved somewhat in the style of Bloemart: his prints have merit; yet the square-grained mode of execution, to which he was partial, does not happily express flesh or drapery, but is rather adapted to the representation of stone.

When he quitted this open square manner, which was very seldom, his prints were mellow and soft; but the heads of his figures want character, and the other extremities are but indifferently drawn. He frequently combined his initials in a monogram, for which, see *Plate III.* of those used by the engravers of the Netherlands. His portraits are the most esteemed productions of his graver, from which we shall select the following as being most worthy of the reader's attention.

Portraits.—Josephus Justinianus Benedicti Filius; Jacob Catz, a Dutch poet; Eugenius d'Alamond, bishop of Ghent, in large folio; Maximilian Emanuel, elector of Bavaria, after his first master; Joach. Sandrart; and Frederic, count of Merode, both in large folio; Gabriel Maria, theologian, from Abr. van Diepenbeck; Ernestine, princess of Ligne, and countess of Nassau, from Ant. Vandyke; and the marquis del Guast as Mars, with his mistress, in the character of Venus, after Titian, all in folio.

Historical, after various Masters.—"The Holy Family," from Raphael, in large folio; "The Virgin and Child, with Joseph seated behind, leaning his Head on his Hand," after Andrea del Sarto, in folio; "The Holy Family," a grand composition, from Poussin, in large folio: the first impressions are before the nudity of the infant was covered with linen. "The Extacy of St. Paul," from a picture by the same painter, belonging to the cabinet of the kings of France; "The Holy Family, with Angels scattering Flowers over the Head of the Infant Christ," from Seb. Bourdon; "The Marriage of St. Catherine," from the same painter, all in large folio; "St. Bruno at his Devo-

tion," after Bertholet Flemel; "The Assembly of illustrious Ecclesiastics," a large print, lengthways, engraved on four plates, from the same painter; "Mary washing the Feet of Our Saviour," from Rubens, a large folio plate; "The last Supper," in folio, from Diepenbeck; "St. Francis," in large folio; "St. Henry," and "St. Cunegonde," in folio; and an allegorical Thesis, dedicated to the emperor Ferdinand III., on two large plates, all from the same master.

John Valder was born at Liege in the year 1590, and resided during the greater part of his life at Paris. He does not appear to have been a man of any genius, or of much talent: he wanted that animation which is necessary to form a great artist; instead of which, in him was substituted a painful laborious attention to the neatness and precision of the mechanical part of his plates, and in this respect he has succeeded, so as in some instances to excite our surprise. In France he engraved part of the plates for a book, entitled "The Triumphs of Louis the Just," a work which consists of forty-nine engravings, and which was printed at Paris A. D. 1637, in one folio volume; the few following are likewise by his hand, all small upright plates; "Jesus filius Dei;" "Ecce Ancilla Domini;" "St. Catharine;" "Regnum Mundi;" "Jesu Christi;" "Virgo Gratia Valentina Miraculis Clara;" "The Head of St. Ignatius of Loyola," the face of which is so neatly executed, that the dots which blend the lights with the shadows, are hardly perceptible to the naked eye; and "A Holy Family reposing," in folio, from Herm. Swanvelt.

Cornelius Schut was born at Antwerp, A. D. 1590, and died in the same city in 1660. He was the disciple of Rubens, and painted historical and poetical subjects with much success. Schut likewise handled the point in a very free spirited style, resembling that of Castiglione, but bolder and more determined. The drawing of the naked parts of his human figures is often incorrect, but the characters of his heads are generally expressed in a masterly manner. From his numerous etchings we select the following:—A set of one hundred and thirty-three prints of various subjects and dimensions, from his own designs; four Virgin Marias, half-length figures, in 12mo.; "The Holy Family, accompanied by St. John;" "The Virgin and Holy Infant;" "Christ on the Mount of Olives;" "The Virgin surrounded with Rays of Glory, and worshipped by the Saints of Paradise," all in folio; "Mars, Venus, and Flora," a small upright oval; and its companion, "Bacchus, Ceres, and Pomona;" "A Sacrifice to Venus;" "The Triumph of Peace," and "The Triumph of Neptune," all of folio size; and "The seven Liberal Arts," a set of eight middling-sized plates, lengthways.

This artist is sometimes confounded with his nephew Cornelius Schut, who was director of the Academy at Seville, and a portrait painter of some reputation; but the latter is not known to have engraved at all.

Cornelius de Wael, or Waal, was born at Antwerp in the year 1594, and died at Genoa in 1662. His father was a painter, and he learned the elements of art under his paternal roof; but afterwards travelled to Italy, and studied under various masters. He painted battles, landscapes, and historical subjects, with great success; and was patronised both by Philip III. and the duke of Arschot.

De Wael engraved several of his own compositions in a very spirited style; his figures have much expression and are very correctly drawn, and his chiaroscuro is better than that of the majority of his contemporaries. Among his best etchings are, a set of seven, intitled "Ilbri. D. D. Gaielmo Vander Stradan, venustas hache imagines, C. de Wael"

Wael amoris dicat." 1. Represents a fountain playing on some figures who are running to avoid it. 2. Hunters halting at an inn door. 3. Peasants beating an overladen ass. 4. A quack doctor shewing specimens of his skill at the door of a tavern. 5. Peasants before an alehouse door. 6. A man on an ass, and spectators laughing at him. 7. An assembly of people of rank of both sexes; and a tennis-court with peasants fighting; a small plate lengthways.

Cornelius had a nephew, John Baptista de Wael, who engraved several of the pictures of his uncle, and among them "The Life of the Prodigal Son," in eight small upright plates.

Lucas Van Uden was born at Antwerp in the year 1595, and became a very distinguished painter and engraver of landscape. He was instructed by his father, who was also an artist, but, by his accurate observation of nature, Lucas soon surpassed him in merit. He particularly studied, and was happy in representing, the various effects of sun-shine, from the first dawn of morning till his light feebly glimmers in the evening horizon. Rubens saw his landscapes with admiration, and sometimes peopled them with figures, while Van Uden returned the favour by occasionally painting the landscape back-grounds of that great master. His skies and distances are beautifully clear and finely toned, while of his trees it has been said that their foliage was so loosely pendant, that it seemed swayed by the motion of the air.

Van Uden etched many of his own compositions, and some few plates from those of other painters, with great delicacy, spirit, and freedom. Huber thinks that his prints merit not less praise than his pictures. Among them may be distinguished three pairs of small, but beautiful, landscapes, consisting of village scenery adorned with trees and figures. A landscape of pastoral character, on the foreground of which is a piping shepherd with his flock. A landscape with a wooden bridge and two windmills. A landscape adorned with travellers, with a woody foreground, and the city of Antwerp in the back-ground. A landscape with figures carrying a litter, in folio. Four fine landscapes after Rubens, in small folio, the earliest impressions of which are without the name of the painter. 1. A landscape, and figures conversing. 2. Cows in a river, and a man bringing horses to drink. 3. A landscape, with water, cows, and figures. And 4. A landscape, in which are two women with baskets. A landscape, into which a holy family is introduced; and another with the good Samaritan, both in folio, after Titian.

Of that well-known and very distinguished artist, Jacques Jordaens, we have already treated as a painter in our nineteenth volume. (See JORDAENS.) His biographers have stated, that his early marriage prevented that journey to Italy, which was at the time esteemed an almost indispensable part of the education of an artist. Whatever cause kept him at home, taught him to depend less upon other men, and more upon nature and himself, and to this it is probable, that if we owe his low choice of subjects, we owe also the vigour by which his productions are characterized.

His etchings are hastily performed, but glow with the fire, and teem with the intelligence of a master. According to Hecquet, who has favoured the public with a catalogue raisonnée of the works of Jordaens, they are thirty-three in number, and Huber has justly regretted "that they are not more numerous, as they rank with the finest productions of the Flemish school."

In collecting these etchings, which are all from compositions by Jordaens himself, the connoisseur will bear in

mind, that the earliest and best impressions are inscribed with the words "cum privilegio."

Of the thirty-three prints mentioned by Hecquet, we are only able to enumerate "The Flight into Egypt," dated 1652; "Jesus Christ expelling the Money-Changers from the Temple;" "The Descent from the Cross;" "Mercury beheading Argus;" "Jupiter and Io;" "The Infant Jupiter suckled by the Goat Amalthea;" "A Peasant arresting an Ox by the Tail, amidst a great Concourse of Spectators." These are all in small folio, and engraved in the course of the same year, namely 1652. "Saturn devouring his Children;" a very rare 4to. plate, without any name or cypher, is also attributed by most connoisseurs to the hand of Jordaens.

John Percelles, the pupil of H. Cornelius de Vrooms, was born at Leyden in the year 1597. His son Julius was a native of the same city, and both excelled in painting and engraving shipwrecks, and other marine subjects. From the circumstance of the works of the father and son being marked with the same initial letters, some confusion has arisen; nor is it known whether to attribute the twelve small sea views which bear these initials, to John or Julius.

Another set of twelve in folio, of which the subjects are the Dutch navy, are etched in a somewhat broader style, and are most likely the performance of the elder Percelles, being inscribed "Notatæ a famosissimo Navium Pictore Johannes Percelles," without any separate mention of the engraver's name.

Roland Rogman, or Roghman, was also born at Leyden in the year 1597, and died there in 1685, or 1686. He was an original artist; he studied under no master, but formed his style, both of painting and etching, from the studious contemplation of nature only. His pictures are spoken of with great commendation, and he etched several landscapes, which consist chiefly of views in Holland and the Low Countries, in a sketchy, but masterly style.

Among them may be distinguished "A View of the Castle of Zuylen," in folio; a pair of ditto with bridges and canals, &c. in 4to. A set of four mountainous landscapes and figures, in 4to.; and another pair of town views, in folio.

Gertrude Rogman is believed to have been of the same family with Roland, after whose pictures she executed several engravings, among which is a set of four in small folio, of the domestic occupations of the fair sex.

The family of Van de Velde are of great celebrity in the annals of fine art. Esaus, or Isaiah, was born at Leyden, A.D. 1597. He became the disciple of Peter Deneyn. With what talent he painted landscapes and battles will be spoken of in our biography of VAN DE VELDE, as a painter. His etchings, which are executed with considerable firmness and intelligence, are rare, and, what is much better, are of intrinsic value. A landscape, with peasants drinking on the foreground, in folio. Another of quarto size, with a bridge and round-tower, in which is introduced a shepherd and shepherdess tending their flocks. Another, with cottages among ruined architecture; and another of pastoral character, with a shepherd's hut near the foreground, of folio dimensions, are all we are able to enumerate of the engravings of Isaiah Van de Velde. He sometimes combined his initials in a monogram, which will be found in *Plate III.* of those used by the artists of the Low Countries.

John Van de Velde, brother of Isaiah, was born in the same city, and in the following year; and though a painter of great merit, is, perhaps, better known by his excellent engravings;

engravings; which are numerous, and are executed in two distinct and very different styles.

The etchings he produced are very bold and determined. The lights are kept broad and clear; but perhaps the shadows may, in some instances, want strength: however, the hand of the skilful master is evident in all of them; and the small figures which are occasionally introduced, prove the goodness of his taste, by the spirited manner in which they are executed.

His other style of working was with the graver, assisted occasionally with the dry point; these prints are excessively neat and laboured, and resemble those of count Goudt in the vigour of their general effects; they consist chiefly of scenes by candlelight, and such subjects as require great depth of shadow; yet, with all the merits which they possess, they are not, on the whole, equal to his etchings; for whatever advantages may appear to be gained in neatness and toning, are lost in their want of that spirit, lightness, and freedom by which his etchings are characterised.

The following will probably be found most worthy of the attention of the connoisseur: beginning with his portraits: John Van de Velde, himself, in large quarto; Jacob Matham, from P. Soutmaus; John Torrentinus, a very fine and rare print, in large quarto; John Crucius, a clergyman of Haerlem, of the same size; Michael Middelhoven, F. Hals, pinx. in quarto; John Acronius, theologian, in folio; Jacob Zaffius, archdeacon of Haerlem, in folio, both from the same painter; John Oven, (engraved in mezzotinto); John Haccius Pontanus, historian, both in 4to.; Charles, duke of Troppau and Jaegerndorf, in folio; Oliver Cromwell, a very rare portrait, in large folio; and Lawrence Colter, of Haerlem, with a long Latin inscription, in 4to.

Historical Landscapes.—"The Adoration of the Kings," after P. Molyn. In this engraving the effect of night is well managed. "The Magic Lanthorn," after the same painter; "The good Samaritan;" "An Old Woman frying Pancakes, and Boys eating them," all in small 4to.; "A Peasant and his Wife going to Market, at Day break, with Cows and Goats," in folio; a landscape with ruins, and a cow-herd tending cows, in octavo; "The Mountebank exposing his Medicines," a capital print; "The Gamesters," with a striking candle-light effect, both in folio; "A village Festival," a very rich composition; two landscapes, one representing buildings and travellers by moonlight, the other sun rise, and travellers; two landscapes, one with figures fishing by moonlight, and villagers warming themselves by a large fire, the other travellers by sun-rise, in folio; four subjects from the History of Tobit, in 4to.; the four parts of the day, very beautifully finished plates; the four elements, after W. Bugtenwegh, in folio, with very fine effects; the four seasons, in large folio; a different composition of the same subjects, in large folio; the twelve months of the year, in quarto; another set of the same subjects, engraved in a broader style; a champaign country in Holland, with robbers attacking a coach at the entrance of a wood; a champaign in Italy, with buildings and water, after P. Molyn the younger, or the chevalier Tempesta, both in large folio; an open country, with ruins and travellers, in folio; the bridge of St. Mary at Rome, in large folio; a view of the cattle of Bruxelles, a very large and rare print; and a set of landscapes, intitled "Playfante Landshappen," all of folio dimensions.

Adrian Van de Velde was born at Amsterdam, A.D. 1639, and died in the same city in 1672. He was the nephew of John, whom we have just dismissed, and the disciple of Wynants. As a painter he will be treated of in a future volume.

To speak of him as an engraver, we have, by this master, a set of twenty etchings, executed in a very free and spirited style, of cattle and peasantry. Another set of ten plates of groups of cows and other domestic animals, with a bull for the title page; three plates of sheep; the return from hunting, in quarto; a large landscape, lengthways, and a smaller one of the same form, enriched with historical figures, both rare prints, but the latter by much the rarest.

John Miel was born in a village, near Antwerp, in the year 1599, and died at Turin in 1664. He learned the rudiments of art of Gerard Seghers, and afterwards travelled to Italy for improvement, where he studied in the school of Andrea Sacchi.

By contemplating the best works of the Italian masters, he by degrees emancipated himself from the trammels of his earlier education, and formed a style of art for himself, in which the general characteristics of those of Flanders and Italy, were happily blended.

The talents of Miel, and the reputation which followed and brightened their exercise, induced Charles Emanuel, duke of Savoy, to invite him to Turin. Under the patronage of this nobleman he remained five years, and the duke was so fond of our artist, that he invested him with the order of St. Maurice, and presented him with a diamond cross of great value; notwithstanding which favours, he languished in vain to return to Rome. Rome was the place where he had beheld those objects that first expanded his mind with the pleasures of art. Hence his wishes to return thither, and hence the regret which is by some supposed to have shortened his days. If he gained honours, he had sacrificed liberty and independence at their shrine, and did not, therefore, enjoy them.

Miel etched several plates from his own compositions in a very masterly style: and the figures which he occasionally introduced are drawn with great spirit and freedom.

Among these are "The Assumption of the Virgin Mary;" "The Holy Family;" four pastoral subjects, with shepherds and cattle, beautifully executed, in quarto, and an unknown number of battles and skirmishes for Strada's Wars of Flanders.

Philip Verbeck, or Verbecq, a Dutch engraver of slender talent, was born some time about the close of the sixteenth century. He is chiefly remarkable for having etched some plates in a scratchy manner, which bears inferior resemblance to the style of Rembrandt.

Inferior, as is this resemblance, it has led some collectors into the error of purchasing his works and placing them in their Rembrandt portfolios. Gerfaint first informed them of their mistake, and by comparing Verbecq's etchings with those of Rembrandt, not only the name or cypher of the former artist may be observed, but the dates also of his engravings, which shew that he was anterior to Rembrandt, and therefore, at least, not a copyist.

The following are all we are able to specify from the hand of this artist, and which are much sought after. "Esau selling his Birth-right;" "An eastern King, seated on his Throne, with a Suppliant kneeling before him," both in 4to; "A Shepherd, seated at the Foot of a Tree;" a bust of a young lady in a bonnet and pelisse; and a three-quarter portrait of a nobleman in a tartan and feathers, (companion to the above,) all in small ovals.

Rodermond, Rottermond, or Rottermans, with whose Christian name we are unacquainted, was also of Holland, and born in the year 1650. He etched several portraits and some other plates much in the manner of the preceding artist, and with at least equal freedom and spirit. Among these are sir William Waller, major-general of the parliamentary army, with a battle in the back-ground, after C. Janfen; John the fe-

cond, a celebrated Latin poet, a very rare print, inscribed "Johannes secundus Hagienfis Poeta. Rodermont fecit," in large 4to.; a three-quarter view of a man with a curly beard, (this print, which is not above mediocrity, is in the style of Rembrandt: by Gerfaint it is attributed to Verbecq, and by Bartsch to Rodermont); and "David praying," with his harp and turban beside him, in 4to.

Peter van Sompel, or van Sompelin, was born at Antwerp in the year 1600; and became the pupil of Soutman, whose style he always copied. He drew correctly, and treated the naked parts, and especially the extremities of the human figure, with intelligence. He engraved in a neat laboured style, especially his portraits after Vandyke and Rubens, among which the following will be found most worthy of notice.

Portraits.—Paracelsus, the celebrated physician, in folio; the emperor Adolphus of Nassau, in large folio; Marianna de Ravaria, wife of the emperor Ferdinand; Henry, count of Nassau, and Philip of Nassau, prince of Orange, both in large folio; and all from Soutman. The emperor Charles V., from Rubens; cardinal Ferdinand, brother of Philip IV. governor of the Low Countries, from Vandyke; Isabella Clara Eugenia, infanta of Spain; Gallon John Baptist, duke of Orleans, brother of Louis XIII. and Margaret his wife, all from Vandyke. Philip the Hardy, duke of Burgundy, from Van Eyk; Frederic Henry, of Nassau, from G. Honthorst; all of large folio dimensions.

Historical Subjects.—"Christ on the Cross," a large upright plate, arched at the top; "Christ coming with the Pilgrims at Emmaus," in folio, nearly square; "Erich-tonius in the Basket, discovered by Aglauros and his Sisters," all from Rubens, and "Ixion deceived by Juno," from the same painter; all in large folio.

William de Leeuw was born at Antwerp, A.D. 1600, and flourished in the Netherlands in 1650. He was a pupil of Soutmans, but did not engrave in his style; instead of which he employed short playful strokes, which produced a picturesque effect, united with a tolerably good chiaroscuro. Most of his engravings are from Rubens or Rembrandt, but in a set of large landscapes after Nieulandt he has quite altered his manner of execution, and engraved the ground and sky in a manner so delicate, that it requires good eyes to distinguish it from a tint of Indian ink.

De Leeuw commonly marked his prints with his initials, or a monogram, which will be found in *Plate III.* of these used by the engravers of the Low Countries. The following are a selection of his best works: "Lot and his Daughters," in folio (the best impressions of this plate are before the name of C. Dankerts was inserted); "Daniel in the Lion's Den," in large folio; the Holy Virgin kneeling, supported by angels, commonly called "The Virgin of Grief," a very rare print, in folio; "The Martyrdom of St. Catherine," a very fine and rare print, all after Rubens, and a set of four chases, from the same painter, namely, the chase of a lion and hounds; ditto of a wolf; ditto of a wild boar; ditto of a crocodile and hippopotamus; all in very large folio. "Tobit and his Wife," in folio, from Rembrandt. This print is executed in a very good taste, and has a fine effect. "David playing the Harp before King Saul;" a half-length profile of Rembrandt's wife, both in large folio: the portrait of a female veiled, at the bottom of the print "Marianne" is inscribed in capital letters; all after Rembrandt. A young man habited in a cloak, and a hat and feathers, in small folio; "St Francis meditating," a half-length profile, from Livens, in folio. And the following set in large folio, from Nieulandt, which are very rare and

beautifully executed. A view in the Tyrol, with water, cascades, and travellers. Another scene in the mountains of Tyrol, with travellers on horseback; to the right a high mountain is crowned with the ruins of a temple, and on the plain below is a hermitage and two figures. A landscape of the same character as the former, with wood and water; cows feeding on a plain and the effect of sun-set. And another with fishers, and men on horseback: on an eminence towards the right is a church, and on the plain below a village and sheep feeding.

John Louys, or Loys, was born at Antwerp, A.D. 1600, he was the disciple of Soutman, and engraved chiefly after the pictures of Rubens and Vandyke. There is a very fine engraving by him, with a powerful chiaroscuro, of "The Resurrection of Lazarus," from J. Livens, which is generally and justly regarded as his masterpiece. From among the works of this artist, the following are most worthy of selection.

Portraits.—Philip the Good, duke of Burgundy, from Soutman; Louis XIII. of France, from Rubens, and its companion, Ann of Austria; Philip IV. king of Spain, from Rubens, and its companion, Elizabeth of Bourbon, his queen; and Francis Thomas of Savoy, prince of Carignano, from Ant. Vandyke; all of large folio dimensions.

Historical, &c.—"The Resurrection of Lazarus," which is mentioned above; "The Repose of Diana, or the Return from the Chase," from Rubens; "The Inside of a Flemish Cottage, with a Woman scouring a Cauldron," after Ostade; "Peasants regaling," and "The Chestnut Seller," after the same master, all in quarto; and "The Interior of a Dutch Kitchen," in which the principal object is a dead pig hanging up; in folio, after W. Kalf.

Jonas Snyderhoef, of Leyden, was another of the disciples of Soutman, born in the same year with the preceding artist, but of very superior abilities.

Snyderhoef pursued the style of engraving which had been invented or adopted by his master, but, by degrees, far surpassed him in the softness and beauty of his finishing. He had the art of uniting great force, as well as harmony of chiaroscuro, with considerable neatness of execution, and, where his subject required it, with great exactitude of detail. His engravings are justly held in esteem by the experienced collector, and by all men of taste. His portraits, of which he executed a considerable number, are exceedingly beautiful, and probab'y, on the whole, superior to his historical works. His practice was, to bring them very forward in the etching, and afterwards strengthen them, where deeper shadows were required, with the graver; imparting to them, at the same time, amenity of tone, and greater accuracy of resemblance. Perhaps we ought to except from this general preference, his "Treaty of Munster," after Gerard Terburgh, which is truly an historical engraving, though it consists of an assemblage of the portraits of the most celebrated statesmen of Europe, and of the age when that important treaty was concluded. The exquisite picture, from which this plate was engraven, which form its rare merits, and its importance as a diplomatic and historical event, ought always to adorn a royal or a national gallery, was lately brought to this country, by Mr. de la Hante, and is probably still in his possession. Not only the person and dress of every plenipotentiary who was present on that memorable occasion, are here portrayed with the utmost delicacy of finish, but the place of meeting also, with every minutiae of costume.

The professional diligence of Snyderhoef was scarcely inferior to his extraordinary merit: this merit has, to a certain

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certain extent, been appreciated through Europe, and fine impressions of his best works are, in consequence, become extremely rare. Mariette's collection of his works amounted to one hundred and eleven: nor are we certain that Mariette had collected the whole. From among these, it may be useful to distinguish the following, as those which are more eminently worthy of the reader's notice.

Portraits.—Maximilian, archduke of Austria, in large folio; Philip III. of Spain, in smaller folio; Albert, archduke of Austria, and governor of the Netherlands; and his duchess, Isabella Clara Eugenia, infanta of Spain, in large folio, all after sir P. P. Rubens; Charles I. of England, and his queen Henrietta Maria; and Francis de Moncada, count of Orsonna, all in large folio, and after Vandyke; the emperor Maximilian I. and his empress Maria, both in folio, and after Lucas of Leyden; duke John, and duke Charles of Burgundy, after Soutman, of large folio dimensions; Aldus Swalmius, an old man with a long beard, from Rembrandt; René Descartes, the celebrated philosopher, from F. Hals; Van Bloemaerts, a half-length, seated at a table, with books and a crucifix; beneath is a long Latin inscription, after Van Spronck; Mark Zucius Boxhornius, of Bergenopzoom, professor at Leyden, from Dabor-dieu; Adrian Heerebond, professor of philosophy, from the same painter; Jacob Maestrius, juris consulte at Leyden, from Van Negre; Andreas Rivetus, professor of theology at Leyden; Claude Saumaize, a famous critic, both from the same master; Noah Smaltius, a celebrated surgeon of Haerlem, after Th. Pas; Albert Kuperus, doctor of medicine at Leyden, after D. Bailly; John Coccejus, professor of theology at Leyden, from De Vos; Constantine, tutor of prince Maurice of Nassau, after Bandrighen; Abraham Heydanus, a shepherd of Leyden, from Schooten; Daniel Heinius, a Dutch historian, from Marek; Anna Maria Schurman, celebrated for her taste and knowledge of the arts and sciences, from J. Livens; John Beenius, theologian, from J. Vliet; Julius de Beyme, professor of law at Leyden; and Pierius Winsemius, professor of history, both without the painter's names, and all of folio dimensions.

Historical, &c. after various Masters.—"The Fall of the Damned," a large upright print, engraved on two plates, from Rubens; "The Virgin Mary, with the Infant Jesus embracing her," in quarto; "A Bacchanal," a small plate, lengthways; "A drunken Bacchus, supported by a Satyr and a Moor," a small upright plate, half figures; "The Chase of the Lions," in large folio, very fine and rare, all after Rubens; a composition of "Satyrs playing with Tygers," the best impressions of which have a forcible and true effect, after De Laer, in large folio; "The Return from a Country Excursion," in large folio, after Berghem; "The Conclusion of the Peace at Munster," containing the portraits of all the plenipotentiaries who were there assembled, a large folio plate, after Terburgh, very fine and rare; "A Quarrel of Dutch Peasants," in large folio, after the same painter; another "Quarrel of Peasants," after Van Oltade, containing many figures; "The four Burgomasters of Amsterdam," a folio plate after Th. Keyser; "Three Old Women regaling," from the same master, in an oval of folio size; "Three Peasants seated, one of whom plays the Violin," a fine and rare print in folio; "Peasants gaming," in folio; "Peasants regaling at the Door of an Alehouse," in folio, all from Van Oltade; "The enraged Drinkers," in large folio, from De Witt; "Peasants quarrelling," in folio; and "Peasants dancing at an Alehouse," commonly called "The Ball," in large folio, all after De Wit.

William de Buytenweg, or Van Buytenweck, was born

at Rotterdam in the year 1605, and always resided in that city. He painted conversational subjects and landscapes. He likewise etched, in a good style, some few subjects from his own designs, of which we are able to mention only the following.

A pair, representing "Young Villagers carrying Poultry to Market;" a set of seven, of "The Costume of Noblemen;" a set of six, of "The Costume of Ladies," all in octavo; and a set of ten landscapes with ruins, trees, and figures, entitled, "Verscheide Landfchapjes." Buytenweg marked his plates either with a monogram, which will be found among those of the engravers of the Low Countries, or with his name at length.

George Henry Scheyndel, or Van Schiendel, was a native of Holland, the contemporary of Buytenweg, and we presume was, like him, established at Rotterdam. He engraved in a very neat, spirited style, very nearly resembling that of Callot. His landscapes possess great merit, and are ornamented with excellent little figures.

Scheyndel marked his prints with his initials G. V. S. We have, by him, "A Company of Peasants, seated before a House Door;" another "Company of Peasants, with a young Pig and Chickens;" "A Dentist, at a Fair;" "The Execution of a Criminal," all in 12mo.; "A Village Fair," in octavo; another "Village Fair, with a Conjuror," of the same size; a winter landscape, with skaters; a landscape, with a water-fall; another landscape, with a bridge, figures, and animals; a set of four views of a cattle, one of which has also a windmill; a set of eleven landscapes, with Dutch inscriptions, all in quarto; a set of the costume of the Grecians and Turks, in octavo; and a set of the habits of the countrywomen of the several cantons of Holland, twelve small upright plates, from Buytenweg.

Peter de Molyn was born at Haerlem in the year 1600. For an account of his merits as a painter, as well as those of his more celebrated son, see the article MOLYN, &c.

Molyn etched some few plates from his own compositions, in a good taste, which are chiefly remarkable for their striking effects of chiaroscuro, and are very much sought after by connoisseurs. A set of four landscapes ornamented with very good figures, in folio; another set of four fine landscapes, with cattle and figures, in large quarto; the star of Bethlehem, with a very fine night effect, and the same subject otherwise treated (though not less successfully,) both in folio; comprise perhaps the whole of his etchings. All, except the last, are marked P. Molyn fecit.; but by some writers the two latter are said to be by J. van de Velde.

This artist marked his engravings with his initials, in the form of a monogram, which will be found in our *Plate III.* of those used by the engravers of the Netherlands.

The works of this artist have been confounded by Strutt with those of his son Peter Molyn the younger, who is better known by his cognomen *Tempesta*.

The younger Molyn was also a native of Haerlem, born in the year 1637, and, according to some of his biographers, was the pupil of Snyders, whose manner of painting he at first imitated.

Either the whirlwind of his violent passions, or, as some have expressed it, his genius, which led him to the study of storms at sea and other dismal scenes, obtained for him the distinctive addition of *Tempesta*: he was otherwise nicknamed *Pieter Mulier*, for a much worse reason, but which still has reference to the ungovernable and tempestuous character of his mind. He caused his wife to be assassinated, in order that he might be at liberty to marry a young lady of Geneva, with whom he was passionately in love.

However villainous this crime, and however incompatible

with the pursuits of art, Molyn stands convicted of the full amount of its enormity. He was discovered, seized, imprisoned, tried, and capitally condemned. The greatness of his merit, however, as an artist, caused his sentence to be mitigated. He ransomed his life with the loss of his liberty, endured an imprisonment of sixteen years, and in all probability would have ended his days in captivity, but that the bombardment of Genoa by Louis XIV. afforded him an opportunity, which he failed not to embrace, of escaping to Placentia.

During his confinement, he consoled himself with his professional pursuits, and probably executed some of the engravings which have been ascribed to him. Of these we are only able to particularise one which is in a style resembling that of the elder Molyn and John van de Velde, the subject is a masquerade by candle-light, with a sort of mock procession in the back-ground. *Tempesta* died in the year 1710.

Albert Flamen was born in the year 1600, but in what part of Flanders we are unable to say. He acquired some reputation as a painter of landscape and still-life, but from the number of excellent prints he produced, is better known as an engraver. At one period of his life he resided at Paris.

His prints are for the most part etchings, performed in a masterly and spirited style, and finished with small assistance from the graver. They are marked with the monogram which may be seen in our *Plate III.* of those used by the engravers of the Low Countries, and consist principally of four sets of various fish, with landscape back-grounds, of sea-ports, &c. engraved on forty-eight plates; a set of seven landscapes and figures; a set of four views of Conflans, Pernay, Marcoussis, and the Port à l'Anglois, all in large quarto; and a folio print of the encampment at the Faubourg de St. Victor.

Claas, or Nicholas, Wieringen, was born at Haerlem some time about the commencement of the seventeenth century. He was sent to sea in his youth; employed much of his time in studying marine objects; and after making a few voyages, settled on shore, and became a painter and engraver of shipping and other marine subjects.

His prints consist of etchings which display much talent and feeling for art, and the subjects of which are sea views and landscapes, either drawn from nature or engraved from his own compositions; a set of six landscapes of village scenery, with rustic figures, &c. in quarto, are very excellent plates, and are all we are able to specify of the works on copper of this master.

Contemporary with Wieringen was Claas, or Nicholas, Moojaert, or Moeyaert of Holland, the happy imitator of Elshiemer, and the instructor of Berghem. Vander Does, Koningh, and Weenix. The name of this artist has been variously spelled, and his history is obscure; Bassan first calls him Nicolas Moojaert of Amsterdam, and afterward Claas Moyard, a Dutch painter.

He etched several plates in a style bearing some resemblance to that of Rembrandt, and as far as is known, worked entirely from his own compositions. Among his best prints are a set of six plates of animals, etched in apparent imitation of Swaneveldt; "Lot and his Daughters," in that of Elshiemer, and a landscape with cows and sheep, of various quarto dimensions.

Christian Louis Moyart was a native of the Netherlands, the time and place of whose birth are not known, but who was residing and practising engraving in the city of Amsterdam in the year 1630.

Among a few other works of no very extraordinary

merit, he produced a set of monstrous allegorical compliments, of folio dimensions, wherein Hercules and Minerva appear quite out of their element, and which is entitled "An emblematical History of Queen Mary de Medicis." Moyart marked his plates with a monogram which will be found in our *Plate III.* of those used by the engravers of the Low Countries.

Mathew Montagne, otherwise Plattenberg, was born at Antwerp in the year 1600, and died at Paris in 1666. He went at an early age to Italy, and made a long stay at Florence, where he engraved in concert with his countryman John Affelin. From thence he journeyed to Paris, where, for reasons which we are unable to state, he changed his name from Plattenberg, to Platemontagne, and afterwards to Montagne. He painted shipping, sea-views, and landscapes, in a very good style, and acquired great reputation.

Montagne likewise etched some few plates of landscapes and sea-views, from his own pictures, in a style resembling that of Fouquieres; of which the principal are as follow; a landscape with buildings and figures; a sea-port, with vessels and figures, both of folio size; a pair of circular prints, one representing vessels on the sea, and a light-house on a mountain; the other a landscape with wood and water; a pair of landscapes, one of which is ornamented with figures cutting wood; the other a canal with watermen, and a village, all in folio; and another pair, one of which has a village, trees, and three small figures on the fore-ground; the other consists of ruins and trees, without figures, in quarto; they are all marked M. Montagne in. et fec.

Nicolas Montagne, the son of Mathew, was born in the year 1631, and died at Paris in 1706. He studied painting under Philip Champagne, to whom he was related; and engraving under Morin, whose style he improved upon. He painted portraits and history with success, and in 1681 he was chosen professor of painting of the Royal Academy at Paris. The most considerable work he engraved was a set of portraits, on which we find his name inscribed, Nicolas de Platemontagne. He drew the human figure very correctly, and his plates possess a very agreeable effect; we shall mention the following only, "Oliver de Castella," a lieutenant-general, killed at the siege of Tarragone in 1644, in large folio; "St. Genevieve," a whole length figure, after Ph. de Champagne, in folio; and "A dead Christ," after the same painter; the figure is finely drawn, and the flesh executed with dots only, but the back-ground and drapery are finished with strokes in a bold and free style, and is altogether a print of considerable merit.

William Akersloot was born at Haerlem soon after the commencement of the seventeenth century. Under whom he studied is not known, nor are his works entitled to rank above mediocrity.

He engraved portraits and historical subjects, and among others the following; Frederic Henry, prince of Orange, in folio; Amelia, princess of Orange, between her daughters, with a castle and figures in the back-ground, both after A. van der Venne; "Christ in the Garden of Olives," after H. Hondius; "Christ loaded with Chains," after P. Molyn; "The Denial of St. Peter," after the same painter; and a large cartouche, with vessels on the sea, all in folio.

Moses Uytendroock, surnamed Little Moses, was born at the Hague in the year 1600. It is presumed he was the disciple of C. Poelenbourg, in whose style he composed, and sometimes so exactly imitated him, that his pictures have been fold for the works of that artist. He painted landscapes, which he usually embellished with subjects taken from the Greek and Roman poets. We have by this master many

many engravings of landscapes from his own compositions, they are executed in a tasteful spirited style, but the figures which he sometimes introduced are incorrectly drawn. We shall mention the following as being most worthy the notice of the collector: "Diana discovering the Incontinence of Calisto," in 4to.; and its companion, "A Female showing to her Child Tobit blind, seated at the Door of his House," very beautiful engravings; "Hagar in the Desert comforted by an Angel;" "Mercury and Argus," both in 4to.; a set of "The History of Tobit," in four landscapes; a set of six landscapes with historical figures; a set of six landscapes ornamented with buildings, figures, and animals, in the style of Poelenbourg; a set of four with ruins and figures, all of quarto dimensions; three landscapes with various animals, in quarto, nearly square; "The Flight into Egypt," a pastoral and poetic subject, of a shepherd and his flock entertained by a muse; a shepherd and shepherdess taking refuge in a cave, from a violent storm; another pastoral subject, with a shepherd in the antique dress seated, surrounded by animals, all in large quarto; and a folio print of Hercules preventing Cacus from stealing his cows and horses, the figures in which are in the antique style; these two last prints are very rare.

J. G. Bleeker, or Bleker, was born at Haerlem some time about the year 1626. He engraved a considerable number of prints, both from his own compositions and those of other masters, in an intelligent and spirited style.

Bleeker marked his plates in various ways, which has given rise to mistakes, for Heinneken calls him John Gaspar, and Florent le comte, Cornelius; which has led our countryman Strutt into the error of making two artists of the name of Bleeker, one of whom he calls Cornelius, and gives him the monogram, for which see our third plate of those used by the artists of the Netherlands. The following are among the best of his works.

From his own Compositions—A landscape with the meeting of Jacob and Rachael; a landscape, into which is introduced the meeting of Abraham's servant with Rebecca. He has, in this instance, worked upon the etching to harmonize it (especially upon the heads of his figures) with the point of the graver, scratching upon the copper, in a style something like that which Worlidge afterwards adopted; but he has by no means succeeded. "Two Peasants travelling in a Cart;" another engraving of the same subject; "A Carriage stopping before an Inn door, with Horses feeding;" "A Peasant seated, observing a Girl, who is milking a Cow," all of folio size; a landscape with animals; another landscape, with a woman on horseback, both in 4to.; and two others, in which animals and a piping shepherd are introduced, both in folio.

The following are after Poelenbourg.—"Jacob and Laban parting their Flocks;" "The Lyttians attempting to sacrifice to Sts. Paul and Barnabas" both in large folio; and "Christ on the Cross," at the foot of which appears the Virgin and disciples, in folio. three very capital engravings.

The Visschers, whom we now approach, were a very distinguished family of artists, and who, by the number and extraordinary merits of their engravings, have conferred much honour, and no small advantage, on their country.

Cornelius Visscher was born in Holland, A.D. 1610, he was the disciple of Soutman, but soon surpassed him in merit. M. W. let truly says, (in his Dictionary of Engravers,) that very few artists combined etching and engraving with so much taste, or so well imitated with the graver alone, all the playful picturesqueness of the point, as Cornelius Visscher. He drew with great taste, and the compositions which he made for many of his engravings, suffi-

ciently prove the extensiveness of his genius, and his powers of combination. His etchings are free and delicate; but his works with the graver must excite the admiration of every tasteful beholder. His mode of performance with that instrument was as singular, as the effect he produced was picturesque and beautiful. Among the engravings from his own compositions that of "The Rat-Catcher," "The Bohemian Woman," "Gellius de Bouma," and "The Cat," deserve the preference; in the Bohemian, the rough freeness of the etching needle is finely contrasted with the shaving smoothness of the lines produced with the graver. The portrait of Bouma is yet more exquisite and surprising, his old and wrinkled skin being engraved in a manner which is peculiarly characteristic of the laxity and feebleness of the decaying muscles and shrivelling integuments of old age, particularly about the cheeks and temples; the nose (says Huber) appears like flesh itself, and the mouth, which is partly concealed by the beard, seems to be alive, as do also the eyes, the execution of which is beautifully clear, and expressive of the dimmed brightness of a mind which time is eclipsing. The same nice feeling, accuracy of discrimination, and power over the instruments of his art, marks the execution of his celebrated Rat-catcher, in which the shining face as well as negro features and complexion of the young African, are admirably depicted, and the master rat-catcher with his furred cap, and highly characteristic habiliments, rat cage, &c. and, above all, his animated physiognomical countenance, which together mark the profoundest of adepts in the mysteries of his craft, are expressed with that broad and general, and therefore strong, resemblance to nature, which all eyes must have seen, and is finished with the utmost vivacity of touch.

Cornelius was an engraver of truly original powers; he was a man of a self-willed character of mind, and perhaps should not have endeavoured to copy the feelings, and transmute the forms, which had originated in the minds of other artists. It is acknowledged that his engravings after the Italian painters, are of inferior merit to those which are after nature and his own compositions; the plates which were executed for "the cabinet of Reyna," are among his earlier performances, nor did he succeed so well as Vorsterman, Pontius, and the Bollwerts, in engraving after Rubens; yet he claims to be ranked among the first artists of his country, for genius always should be estimated, not by its freedom from defects, but by the dimension of its merits.

Among his best works, the collector may reckon the following; those who would see a more copious catalogue, may consult Baffan's Dictionary of Engravers.

Portraits.—Cornelius Visscher, in a sugar-loaf hat; another portrait of Visscher, with the same kind of hat, and a cloak, both in 4to.; Andrea Deonyfzoon, called among print dealers, "the man with the pistol," because a small carbine or pistol with several gun locks appears in the background; this print is one of the finest, and the most rare, of the engravings of this master, but perhaps the very rarest of all, and certainly the most intrinsically valuable of his portraits, is that of Gellius de Bouma, minister of Zutphen, aged seventy-seven years; William de Ryck, an oculist of Amsterdam; this portrait, and the preceding, are sometimes called "The great Beards," and are uncommonly fine, all of folio size; a bishop seated at a table, with a crucifix, &c. half length; John Merius, the pastor of Spanbroeck, both in large folio; Cornelius Vosberg, the pastor of Spaerwouw, in folio, a very fine and rare print; John Wachtelaer, an ecclesiastic of Utrecht, in large folio; William van-den Zande, theologian, in an oval border; Adrian Motman,

Motman, accompanied by cherubs, a skull, and a censer; John Boelenfz, in an oval border, with "Sanctitate et Doctrina" inscribed on a streamer; Adrian Pauw, knight of the order of St. Michael; David Peiterz de Vries, chief master of the artillery in the Dutch States, very rare; Joshua Vondel, a Dutch poet, half length, all of folio size; Jacob Weiterbaen, lord of Brandwick, &c. half length, in an oval border, octavo size, very rare; Alexander VII. sovereign pontiff, with the motto "Iustitia et Veritate" on a cartouch supported by children; Coppenol, commonly called the writer, because he holds a pen; Peter Scriverius, a philosopher of Haerlem, (of this engraving it is uncommon to meet with a good impression); John de Paefs, holding a purse, and a cartouch, on which is written his occupation of an exchange broker, all in folio; an etching of an old woman, commonly supposed to be the mother of Visscher; another portrait of the same person, with a bonnet on, both of quarto size; Robert Junius of Rotterdam, a clergyman, in an oval border, "Palmidas pinx." in folio; Constantine Huygens, nobleman of Zuylichem, father to the celebrated mathematician of that name, a fine and rare print; a bust of Peter Gassendi, in an octagon border, with Latin verses; both in 4to.; William of Nassau, son of Frederic Henry, prince of Orange; Mary, eldest daughter of Charles I. wife of the former, both in large folio, from Hondthorst; Christiana, daughter of Gustavus Adolphus, and queen of Sweden; Frederic William, elector of Brandenburg; Charles Louis, palatine of the Rhine, and elector of Bavaria; Charles II. of England, all after Hondthorst; Janus Douza, lord of Northwick, and of some celebrity as a philosopher, all of large folio dimensions. And two very rare portraits, which we do not find specified in the catalogue of Heequet, viz. Francis William, bishop of Osnabruck; and Louis Cutz, theologian, both in ovals, of 4to. size.

Historical, &c. from his own Compositions.—"The Four Evangelists," half lengths, with attributes, in folio; "The Pancake Woman," a large folio plate, the best impressions of which are before the name of Clement de Jonghe was affixed to it; the second best, before that of John Visscher. It was afterwards retouched by Bassan, and the name of John Visscher erased; but the last impressions are easily distinguished from the first by their palpable inferiority. "The Rat-Catcher," the first impressions of which were taken before the name of Clement de Jonghe was affixed to it; "The Bohemian or Gypsie Woman," with three children, to one of whom she gives the breast, all in large folio; the name of Visscher, in the earliest impressions of the latter plate, is upon the margin at the bottom. It was afterwards obliterated to make room for the inscription, and affixed to the upper part of the plate; "The Interior of a Cabaret," with a party of five men smoking and drinking, in folio; "The Antiquary," representing an amateur, in his cabinet, looking over his curiosities, in large folio. By some this is mistakenly said to be from a picture by Reynil, and others attribute it to Correggio. Charles Gustavus, king of Sweden, and his queen, accompanied by a great crowd of persons, and an old man reading a paper; "The Coronation of the Queen of Sweden," inscribed "Carolus Gustavus:—Hedwig Eleonora;" all of large folio size; a boy holding a candle, and a girl with a mouse trap, in which is a mouse; this print is usually called "The Mouse Trap," in 4to. A figure lying on a tomb, above which Christ appears with cherubs, beneath is a bas-relief with two genii placing a serpent on a skull crowned with laurel; above is inscribed "Fortiter, fed suaviter," in large folio. A cat sleeping, with a rat before her, in 4to; a cat sleeping upon a napkin, a very small plate lengthways. This print is exceedingly rare, and at the auction

of Mariette's collection, it sold for the sum of three hundred and sixty-one livres.

Historical, &c. after various Italian Masters.—"The Angel commanding Abraham to quit his Country, and sojourn in the Land towards which he points," from Bassan; "Abraham at Sichem, and God appearing to him in a Dream," from the same painter; "Sufannah and the Elders," from Guido. The bust of a woman with her hand upon her breast, a very fine print, thought to be from Parmegiano, all in folio; "Christ carried to the Tomb;" "The Resurrection," after P. Veronese, inscribed "Ego et Pater meus sumus," in large folio; "The Holy Family," where the infant Christ is on the lap of the Virgin, and St. John presents fruit; thought to be from Palma; "The Holy Family," in which the infant Christ is playing with flowers on the lap of his mother, and in the back-ground is Tobit brought by an angel; and another "Holy Family," where St. John presents a pear to the infant Christ, both without the painters names, and all of folio dimensions.

Subjects from Flemish Masters.—"The Last Judgment," after Rubens, a fine engraving, on two large folio plates; "The Holy Virgin and Infant Christ surrounded by Angels," after the same painter, in large folio; "St. Francis d'Assise receiving the Infant Christ from the Virgin," in large folio; "Achilles discovered by Ulysses at the Court of Lycomedes," in large folio. At the time Visscher engraved this plate he was under the direction of Soutman. A boy lighting his candle from that of a woman with a basket, in large quarto; all from Rubens. A man playing the violin, accompanied by five children, from Van Oltade, a very fine engraving, of which it is very difficult to find a good impression. An etching of the same subject, marked "A. Van Oltade pinx. C. Visscher fecit. aq. a. forti." The interior of a smoking-room, with six men, a woman, and two children; all in large folio. The best impressions of this plate are before the names of Visscher and Oltade were inserted. A smoking-room, with two men and a woman drinking; a man and woman in a public house, on whose faces drunkenness and vulgarity are depicted most admirably; both from Oltade. A party of five men in an alehouse, one of whom plays the violin, whilst the others sing, from Ad. Brouwer, both in folio. A surgeon performing an operation on a man's foot, in folio; from the same master. Three very fine prints, after P. van Laer; viz. 1. The pistol-shot, or the coach robbed; in folio. 2. An attack on a convoy. 3. The lime-kiln; both the last in large folio. A party of hunters on horseback, with hounds, &c. from P. de Laer; and its companion, a man seated on the banks of a river, in which women are washing. A landscape with a moonlight effect, which exposes two robbers making off with their booty, after having knocked down a man; and its companion, a rural subject of a man and woman tending sheep, both in large folio, from de Laer; and two sets of four folio plates, each after Berghem, of which the subjects are landscapes, adorned with ruins and rustic figures.

The merits of John Visscher, as an engraver of landscape, cattle, and rustic figures, were not less original and extraordinary than those of his brother Cornelius. He was born at Amsterdam in the year 1636, and has been spoken of as a painter as well as an engraver. His pictures we have not seen, and his engravings alone are sufficient to entitle him to the fame he so justly enjoys.

With artist-like regard to the demands of the class of subjects which chiefly engaged his abilities, a much larger portion of his engravings is performed with the etching-point than in those of Cornelius, which instrument he handled

with the utmost freedom and picturesque playfulness. Berghem, of whom we shall presently speak, and of whom we have treated in vol. iv. was a pastoral painter, and no man to this hour has translated the poetry of Berghem's painting, with more success than John Visscher, unless Laurent, an English engraver, who died young at Paris, might be excepted.

Trees, especially those of thorny-charactered foliage, such as Berghem painted; broken ground; the rough sides of cattle, in all their wild varieties; mossy rocks, and the crumbling surfaces of ruined edifices, he treated with singular feeling and felicity, blending a painter's and almost a naturalist's knowledge of the details of the forms of such objects, with an engraver's taste and manual power of execution. Shallow brooks, in which, disturbed by fording cattle, the sunshine glitters, as long as prints can be preserved, will continue to sparkle with the merits of Visscher, while his deeper streams and lakes reflect the meridian glow of his reputation.

Middiman, as well as many other modern engravers, appear to have formed their styles of etching grassy ground, and rocks patched with lichens, from contemplating the prints of this master, and no man better than he imparted truth of character and animal expression to cows, horses, asses, goats, sheep, and all the various tribes of domestic animals which his great master Berghem delighted to paint, and therefore painted so well; or displayed on paper with a reader hand the rusticities of Ostade.

The portraits of John Visscher, which we shall commence our list of his superior performances, shew that he occasionally handled the graver with scarcely less freedom and taste than the etching-needle.

Portraits.—John de Witenbogaert, from a drawing by Visscher himself, in quarto; Peter Proclius, a minister of Amsterdam, after Van Noort; Thadeus Lautman, pastor of La Haye, after J. de Bane, both in folio; Abraham vonder Huilt, vice-admiral of Holland, in large folio; Petrus Paulus Rubens, an etching from Vanduyke; Michael de Ruyter, admiral of Holland, H. Berckmans pinx.; both in folio; a man with his hair dressed, after C. Visscher, in quarto; and a negro shooting an arrow from a bow, after the same master, in folio.

After Ostade.—A company of peasants under a trellis-work, gaming; "Rustic Economy," where a man is winding off cotton, and his wife spinning it; "A rustic Party," composed of two smokers, and an old woman and child; "Peasants rejoicing;" "A Skirmish before the Door of a Tavern;" "A Peasant's Wedding," inside of an alehouse; and a drunken peasant putting his hand on the bosom of a woman, all of folio dimensions.

After Berghem.—Several peasants dancing in a cottage, commonly called "The Ball," in large folio; a beautiful landscape, ornamented with figures and animals, and its companion, a mountainous landscape, with a man and horse travelling; "Summer," in large folio; a landscape, with a man clad in goat's-skin, on horseback, in folio; and its companion, a girl milking a goat, in a landscape; and a pair of pastoral subjects, in one of which is a shepherd meditating, in the other a woman milking a goat, and a piping shepherd. The four parts of the day, Aurora, Meridies, Vesper, and Nox, beautiful landscapes, in large folio. A set of four large folio etchings of landscapes, in which the figures introduced are; 1. A man on a mule. 2. A woman. 3. A shepherd guiding his flock. And 4. A mule loaded with pease-hens. A set of six landscapes; 1. Men shoeing an ass. 2. Two women and a dog, one of whom is carrying a flock. 3. A shepherd on an ass, driving his sheep.

4. A woman carrying faggots, and a peasant on horseback. 5. A peasant on an ass leading a cow. 6. An old man with a beard, sitting against a wall, in folio. A set of four, the title-page of which is a monument or tomb. 2. A shepherd playing the bag-pipes. 3. A shepherd and his dog fording a brook. And, 4. A boy carrying faggots; in folio. Another set of landscapes, of which the title-page is a fountain or watering-place for cattle, with a woman milking a goat. 2. A shepherd wrapped in his cloak, with a sick. 3. A shepherd seated on a lullock, and another in pastoral conversation. 4. A woman on an ass, and a girl standing beside her; all in folio. Four other sets, of various number, of landscapes, with similar rustic figures introduced; all of folio dimensions. And the ornamental decorations of various geographical charts, for which Berghem supplied the designs.

From other painters of cottage scenery, he engraved a set of eight prints of figures and animals, after H. du Jardin; a set of four large folio prints, after P. de Laer, which have been attributed by some to Cornelius Visscher, though with better foundation, by others to John. They consist of 1. A party of beggars playing at cards, surrounded by a crowd of spectators. 2. A woman on horseback guiding cows, near whom is a man who has dismounted to drink out of his hat. 3. An hostler busied at an inn-door; near which is a stable with horses feeding. 4. A forge, with a man shoeing a horse, and others conversing.

After P. Wouwermans.—A victualling tent, and horsemen stopping to drink; another victualling-tent, with men carousing; horsemen diverting themselves before their tents, and, as usual in the compositions of Wouwermans, a white horse with trappings; all in large folio. A set of four in folio, of 1. The marshalling of an army, with a horse on the fore-ground. 2. A victualling tent. 3. A party of travellers. 4. A riding-school.

A set of twelve after G. van Goyen, of landscapes and sea-pieces, enriched with various buildings and figures, in quarto; and another set of twelve wild landscapes, and marine subjects in Italy, after Herman Swaneveldt, which are very interesting, and adorned with figures; must conclude our list of the works of this meritorious artist.

Lambert Visscher, the brother of Cornelius and John, was born at Amsterdam in the year 1634, and died at Rome, whither he had travelled for improvement or employ, and where he engraved in conjunction with Bloemaert, Spierre, and others, from the pictures of Pietro da Cortona, in the palace of Pitti, at Florence. He engraved both portrait and history, working with the graver alone, but did not possess any very great share of merit. The following are a selection of the best of his productions.

Portraits.—Stanislaus Lubienitz, M. Scheitz pinx.; J. In Rutgerlius, counsellor of Guittayus Adolphus, both of quarto size; Christopher de Kannenberg, privy counsellor to the elector Frederic William of Brandenburg; Maria Theresa of Austria, queen of France, from Van Loo; all in folio. Charles Rabenhaupt, baron of Sucha, and lieutenant-general of Holland; John de Witt, the distinguished pensionary and patriot of Holland; and Cornelius Tromp, vice-admiral of Holland, F. Bol pinx.; all of large folio dimensions.

Historical, &c.—"The Generosity of Silienus to Antiochus," from P. da Cortona; and "Virtue delivering a young Man from the Embraces of Voluptuousness," in large folio, from the same painter.

Nicholas John Visscher was of the same family as the preceding artists, and born at Amsterdam some time about the year 1580. We have by him a considerable number of etchings, executed in a free agreeable style; he particularly

succeeded in small landscapes, with figures and animals. He likewise engraved a few portraits, which he marked with his name at length, or sometimes with a monogram, composed of C. and V. for Claus or Claas, being the Dutch abbreviation of Nicholas, and which will be found in *Plate III.* of those used by the engravers of the Low Countries.

The following of his engravings are most worthy the attention of the collector. William Laud, Archbishop of Canterbury; Charles I. of England, in a large round hat, both in 4to.; John Calvin, in folio; Didier Erasmus of Rotterdam, from Hans Holbein; James II. of England, and James, duke of Monmouth and Buccleugh, both in large folio.

Etchings.—"The Table of Cebes," an allegorical subject on human life, in large folio; "The Execution of the State Criminals, of the Sect of Arminians, at the Hague," in folio; two landscapes with Dutch castles, in large folio; and a view of the castle and environs of Lovensleyn, which was used as a prison. At the bottom of the print is a perspective view of the castle in the form of a frieze; and on each side a medallion. This is a folio print, very rare, and beautifully executed.

Peter Nolpe was born at the Hague, A. D. 1601. The circumstances of his life are rather obscure, but his works prove him to have been a man of talent. He is spoken of as a painter; but apparently his engravings are far more numerous than his pictures. He worked with the point and graver, and generally united them; but some of his plates are executed with the graver only, which instrument he handled with much more facility than taste. He engraved portrait, history, and landscape, but excelled most in the latter, for he was but imperfectly master of the human form, whereas his landscapes possess a certain air of boldness and freedom, which manifest a practised hand, though not a mind of profound information.

The most valuable of his works are the portraits of John Adler Salvius, a minister plenipotentiary to the court of Sweden, in 4to. A set of eight horsemen, in 8vo.; very rare etchings. A set of eighteen etchings of beggars, in 4to. after Quast, of whom we shall speak anon, and treated in his manner. "The Angel delivering St. Peter from Prison," after J. V. Vucht, in folio; "Judah and Tamar," in a landscape of large folio size. The same figures he afterwards introduced into a landscape of a much smaller scale. "An Inundation," occasioned by the bursting of a water-bank. This is a very scarce print, executed with much force. "Daniel in the Lion's Den," after Blanchard; "The Voyage of his Majesty, the King of Great Britain, to the Coasts of Holland." An emblematical print on the marriage of the prince of Orange, with the princess Mary of England. A set of six landscapes, after Van Nieulant. Six ditto, which are esteemed beautiful, after Rogman, all in folio. The remainder are of larger folio dimensions. A view of the guard-house at Amstel, near Amsterdam; eight of the months of the year, which are very beautiful, with fine effects. A set of the four seasons; another of the four elements, from Peter Potter; "The Prophet Elias, with the Widow of Sarepta;" "St. Paul the Hermit fed in the Wilderness by an Eagle," both in large folio; and a very capital print, engraved on five plates, after C. Molyn the younger, of "The Cavalcade made by the Citizens of Amsterdam, on the Entrance of Mary of Medicis;" some of which he marked with a monogram which is copied in *Plate III.* of those used by the artists of the Netherlands.

Peter Quast. There is a certain fanciful quaintness about this artist, of a diverting kind. The grotesque quirks of his morrice-dancing beggars are perfectly homogeneous with

the twirling Q's in his various monograms, and makes us anticipate something entertaining in the history of his private life, of which alas! we know nothing, but that he was born at the Hague in the year 1602, and was the intimate friend of Nolpe, whom we have just dismissed.

He designed and engraved groups of peasants, battles, beggars, and barbers' shops, and even in his battles there is something allied to drollery. His talents, in many respects, were but little inferior to those of Callot, with whom he was contemporary, and to whom, in the management of his tools and style of engraving, he bore a remarkable resemblance.

The monograms of Quast may be seen in *Plate III.* of those of the engravers of the Netherlands, and his principal works, are, "Fyf limen te Koop," (or the five senses) in octavo, dated 1638; the four seasons, personified by grotesque figures, in quarto. A set of twelve plates of Capriccio and grotesque figures, in 8vo. Another set of Capriccio, of which the subjects are beggars, old women, and oddities, supercribed on the title page "Tis all ver-vart Gaeren;" this set consists of twenty-six plates in 4to. Another set of ten quarto plates of beggars, with quizzical names and corresponding landscape back-grounds; and a set of twelve plates in 4to. of whimsical modes and fashions, in the taste of the noblest of Callot.

Francis Vander Steen was born at Antwerp, A. D. 1604, and having in his youth lost the use of one of his legs by an accident, his parents thought of fine art as a profitable or pleasant occupation; and if a correct judgment may be formed by his success, most probably the former; for he obtained high patronage, though he possessed not much merit. The archduke Leopold assigned him a pension, which was continued by Ferdinand III.

His engravings, however, of which the following are the chief, find their way into the portfolios of those who collect the productions of this school, either on account of their subjects or supposed merits.

Portraits.—Cornelius Cort, in 8vo.; Theodore Coornaert, in 4to., both celebrated engravers; Andrea del Vaux, or Vallenis, professor at the academy of Louvain, in 4to.; and George Sebastian Lubomirski, count of Wisnietz, Herdt, del.; in folio.

Historical, &c. after various Masters.—"The Holy Family," where the infant John presents flowers to Christ, from Titian; "The Holy Family," with St. Joseph seated on a sack. This subject is called in Italy "La Madonna del Sacco," from Andrea del Sarto, and has since been engraved by Bartolozzi and by Raphael Morghen. "The Dream of Michael Angelo," from Michael Angelo; "Soldiers playing at Cards," from Manfredi, all in folio; "A Man holding a Flaggon and a Cup, in company with another Man," in 4to.; "A Peasant seated, reading the Newspaper, whilst an old Woman caresses him with one Hand and holds a Pot of Beer in the other;" "A Village Party," of quarto size; "The Miser and his Wife counting their Gold," in folio, all after Teniers; "A drunken Silenus supported by Satyrs and Bacchanals," from Vandyke; "A Cupid forming a Bow from the Club of Hercules," after Correggio, in folio. At the bottom of the print are two children, one of whom cries and the other laughs. "Jupiter and Io;" "The Rape of Ganymede." These three engravings are very rare, from the pictures of Correggio in the gallery of Vienna, and at the sale of Mariette's collection were sold for two hundred and fifty livres. "The Martyrdom of eleven thousand Virgins," engraved on four plates from the drawings of Van Hoo, after the original pictures by Albert Durer; "St. Pepin and St. Begue," half-length figures on the same plate,

plate, from drawings by Rubens, after the pictures by Van Eyck; and the portico of the picture gallery at Brussels, commonly called "The Gallery of Teniers," from Van Hoy, all of folio size.

Hans or John Witdoeck, Withouck, or Witdouck, was born at Antwerp, A. D. 1604. He was among the number of artists who enjoyed the friendship and instructions of Rubens, and seems to have entirely devoted himself to engraving the pictures of that great master. Witdoeck did not well understand the human figure, for the naked parts are but indifferently expressed, the extremities are heavy, and the markings of the joints are not properly determined. Neither is the mechanical part of his engraving less exceptionable. It proves that he had very little command of the graver, or did not sufficiently study that part of the art to produce a clear and agreeable effect. Notwithstanding these faults, Bassan has praised him, and the prints which he executed under the eye of Rubens in chiaroscuro, possess a tolerable effect.

The following engravings from the hand of this master, are those which are most worthy the notice of the collector. A pair of bulls of "Cicero" and "Demosthenes," in folio; "Melchizedeck presenting Bread and Wine to Abraham and his Followers;" "A Nativity," both in large folio, from Rubens. This latter plate underwent several alterations, chiefly to add to the effect. The first impressions are without the address of Corn. Coeberch, the second have the address; after which the plate came into the hands of S. Bolwert, who engraved on, and improved it very much. He effaced the name of Coeberch, and inserted his own. "The Adoration of the Kings," in large folio, from Rubens. This print likewise underwent several alterations in the effect. "The Elevation of the Cross," a large print lengthways, from Rubens, on three plates; "Christ at Table with his two Disciples at Emmaus," a large folio plate, nearly square. There are some few impressions of this plate, with the addition of a tint from a wooden block; but these are very rare. "The Assumption of the Virgin," a very fine and rare print, in large folio, of which those impressions that are marked C. Van Molen are retouched. "The Virgin and Infant Christ," in an oval border; "The Holy Family," where the Virgin is represented suckling the Infant Jesus. The best impressions of this engraving have the address of Moermans. Another "Holy Family," here the Holy Infant is represented asleep on the bosom of his mother, all of folio size; "St. Ildefonso receiving a Chasuble from the Holy Virgin," a very fine and rare print, in large folio; "The beheading of St. Justus;" and "St. Cecilia," both in large folio, and all after Rubens.

After *Cornelius Schut*.—"Judith and Holofernes;" "The Holy Family;" "The Virgin on a Crescent;" "The Virgin seated in a Landscape, surrounded by Angels;" "The Virgin and Christ, accompanied by St. John and Angels," all in folio; and "St. Nicholas appearing to the Emperor Constantine, and delivering three Tribunes from Prison," in large folio.

Remoldus, or Rombaut Eynhouedts, was born at Antwerp in the year 1605, in which city he always resided. His plates are executed with a firm dark point, and in a style which he had the art of varying and adapting to those of the several painters after whom he engraved. His drawing, though not always equally correct, is very spirited, and his masses of light and shade very well preserved. His principal engravings are after Rubens and Schut, but he likewise engraved some subjects for "The Cabinet of Teniers."

We shall specify the following from the hand of this artist:

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"A dead Christ," after Palma the younger; "Christ rising from the Tomb," after the elder Palma; "The Adoration of the Kings," after Rubens, very rare; "The Resurrection of Christ," from the same painter; "The Fathers of the Church," and "St. Clare holding the Holy Sacrament;" all of folio size. "The Virgin seated, surrounded by Saints;" "The Chapel where Rubens was entombed," in 4to.; "St. Gregory, between Prudence and Courage, leaning on a Staff;" above is a picture of the Virgin and Christ, and angels holding wreaths of fruit, after Rubens, in large folio. "St. Christopher," in folio, after the same painter; "St. Peter" and "St. Paul," in folio; "Cambyfes, King of Persia," who having ordered an evil judge to be slayed alive, caused his skin to be spread upon the seat of justice, and placed the soul of the culprit upon it, making him judge in his father's stead: a small square plate. "Peace and Happiness," Peace is crowned by Victory, and is supported by Power and Justice, accompanied by other allegorical figures, all after Rubens; "St. Ann," in folio; "The Assumption of the Virgin;" and "The Martyrdom of St. George;" both in large folio, after Schut.

Peter Clouet, Clowet, or Clouvet, was born at Antwerp, A. D. 1606; he learned the elements of art in his native country, and afterwards went to Italy for improvement, where he studied under Spierre and Bloemaert. He returned by way of Paris, where he remained and exercised his profession for some time, but finally settled at Antwerp.

He worked entirely with the graver in a clear firm style, not a little resembling that of P. Pontius. His prints are generally deficient in middle tints, and therefore in harmony, and though full of colour, and boldly engraven, from too equal a distribution of the shadows, and the lights being too much scattered, they lose a great part of their effect. However, his prints, especially those after Rubens, are much sought after. He exercised his art both on portraits and history; and the following is a selection of his most meritorious engravings:

Portraits.—Peter Aretin; Nicolas Coffin; Thomas à Kempis; Ferdinand Cortez; Amerigo Vespucci; and Francis de Malherbe; all of quarto size, and without the names of the painters. Michael Boudwys, a physician of Antwerp; William Cavendish, duke of Newcastle, on horseback, both in folio, from Diepenbeck; Christopher Vander Lamen, a painter of Antwerp; Theodore Rogiers, a goldsmith of Antwerp; Charles Scribanus, a Jesuit of Antwerp; Ann Wacke, holding a plume of feathers; and Henry Rich, count of Holland; all after Vandyke, in folio.

Historical, &c. after various Masters.—"The Descent from the Cross," from Rubens, in large folio; "The Epitaph of Rubens," in folio; "The Death of St. Antony," a fine and rare print, in large folio; "St. Michael vanquishing the Devil," in folio; "A Conversation between several Lovers in a Garden:" the best impressions have Flemish verses beneath, but those with French are likewise much sought after. This conversation piece is a very fine and rare print, in large folio. A standing female figure, in folio; a winter scene, with a cottage, and the snow falling, belonging to a set of six, the other five of which were engraved by S. Bolwert, all after Rubens. "The Virgin suckling the Infant Christ," after Vandyke, in large folio; and "A Party at Table," where the master and mistresses are crowned with laurel; "The Family of the Duke of Newcastle," after Diepenbeck, in folio.

Albert Clowet, or Clouet, was born at Antwerp in the year 1624. He was nephew to the preceding artist, and went to Italy to study under C. Bloemaert. During his residence at Rome he engraved a considerable number of

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plates, and among them several of the portraits for the *Lives of the Painters*, by Bellori, which were printed in that city, A.D. 1672. He always worked with the graver in a neat style, imitating, in his historical works, with tolerable success, that of C. Bloemaert. His portraits are sometimes in the style of Mellan, at others in that of F. de Poilly, and sometimes in that of Nanteuil; though by no means equal in merit to the works of those great masters, either in drawing, effect, or mechanical execution.

Among various other *Portraits*, he has executed a collection entitled "*Effigies Cardinalium viventium*," which were published at Rome by J. Rossi. The following are likewise by him.

Nicolas Poussin; Antony Vandyke; the cardinal Azzolinus, from Vouet; cardinal Jacob Rospigliosi, from J. M. Morandi; cardinal Charles Rosetti; cardinal Francis William de Wartenberg; Maximilian, count of Wolfegg; and the medallion of pope Alexander VII. supported by the cardinal virtues; all of quarto dimensions.

Historical, &c.—"St. John de la Croix," the first instructor of the order of Carmelites; Lazaro Baldi, *prix.* in large folio; "The Statue of the Happy Umiliana," after a drawing by Baldinucci; "The Sepulchral Monument of Pope Paul III." from Dom. Barriere, both in folio; "The Obelisk placed on an Elephant, erected on the Place of Minerva," after G. L. Bernini, in large folio; "The Mysterious Conception of the Virgin," after P. Cortona, engraved on two plates, very fine and rare; "A Combat of Horse-Soldiers," after Jac. Courtois; and a large print, engraven on four plates, of "The Battle of Joshua," after William Courtois, brother to the preceding artist.

A much more extraordinary artist is now to be introduced to the reader's notice. Of wild, vigorous, and original powers, both as painter and engraver, Paul Rembrandt Gerretz, or Van Rhyn, gave a new impetus to art, and effected a revolution in taste, of which the effects will long continue to be felt.

The professor Fuseli, by a grand metaphor, which speaks whole pages in praise of the talents, powers, and influence of our artist, says, that the frantic pilgrimage of painters to Italy ceased at the apparition of the two meteors of art, Peter Paul Rubens and Rembrandt Van Rhyn. Both Fuseli and the professor Opie (who was too soon, alas! lost to his country) have justly estimated and deservedly praised the merits of Rembrandt as a *painter*, and they will doubtless be not less faithfully reported in this work, when the writer, to whose pen is confided our biography of painters, shall arrive at his name. In this place he will be treated as an engraver; yet if the present writer should any where be thought to trench on the province of painting, let it be recollected, that of two arts so intimately connected as painting and engraving, and which call forth and exercise the same energies of mind, how difficult, how almost impossible it is, to write separately and to write well.

Rembrandt was the son of Herman Gerretz, a miller of the neighbourhood of Leyden, and was born A.D. 1606, in his father's mill, which stood on the banks of the Rhine, between the villages of Leyerdorp and Koukerk. A spot which became interesting from being the birth-place of so great an artist as Rembrandt, became doubly interesting when brought to our view by the magic of his pencil. A picture of this mill, which was once in the Choiseul Collection, is now in the gallery of William Smith, esq. M.P. for Norwich. It represents a very early hour of morning, and perhaps the figures which are introduced may have other local allusions, of which the meaning is now lost, to the time and circumstance of his birth.

Finding that he possessed an enquiring and capacious mind, Herman sent young Rembrandt to the college at Leyden, where his reigning passion for fine art, and his disinclination for all other studies, were soon manifest. Other masters were accordingly provided to instruct him in the elementary principles of art; and Rembrandt studied successively under Van Scootens, Peter Lallmann (an engraver of whom we have already treated), James Penas, and James Van Zwannenburg.

How a man of so great genius came to seek instruction from so many masters, it were difficult to say, and still more difficult to think that they did not encumber his progress: but, perhaps, to the variety of their advice, we may in part owe the originality of Rembrandt. He did not, probably, remain long enough under the direction of any one of them, to trammel his habits, or overwhelm or stultify those feelings and perceptions of nature, which are the genuine and free inlets to lofty and original attainments in art.

Hence Rembrandt has been compared to Shakespeare; and hence, like another wild poet whom "*Leyden aids no more, with many-linguaged lore*," and who voluntarily

"——— leaves the lofty Latian strain,
Her stately prose, her verse's charms,
To hear the clash of rusty arms;"

he allowed that the ancients were "pretty fellows in their day," but would point with sarcastic air to the walls of his study, which were hung round with suits of armour, rich stuffs, and the picturesque dresses of various ages and nations, and say "these are *my* antiques."

Both Rembrandt and his wife have been accused of an over-weening fondness for money. She sold his engravings that he might not be interrupted in his professional pursuits; and understanding the "tricks" of print-sellers, was too much of a "traveller" to allow herself to be imposed upon by them. It is said that a considerable fortune was thus acquired, which devolved to an only son, Titus, to whom nature was as niggardly in her gifts, as she had been prodigal to the father. The mean propensities of Titus have been mentioned, and his inability to avail himself of his father's instructions in art; but the amount of his fortune has never been stated, and has probably, by unreflecting readers, been much over-estimated.

One of the most valuable paragraphs in Strutt's Dictionary of Engravers, is that which he has written on the prints of Rembrandt; because while it describes their merits with the fellow feeling of an engraver, it marks the difference, which cannot be too strongly marked, or too often repeated in the public ear, between mere rarity and intrinsic worth; the want of which discrimination, more, perhaps, than any other cause, has been the bane of engraving; retarding its progress, by keeping us too intent upon nominal and extrinsic value, and too regardless of those intrinsic qualities, which, as men of taste, should alone engage our attention.

He says, "His prints, which are partly etchings, and partly engravings, performed with the graver in a singular manner, have all that freedom of touch, spirit, and greatness of effect, discoverable in his paintings, supposing them to be assisted by the variety of colours. Considering the great quantity of etchings he made, we cannot suppose they should be all equally well executed, or equal in value. However, (according to the common course of things, on which an imaginary value may be raised by accidental causes,) they are not always his best prints which produce the greatest prices; but those that are the scarcest. Thus we frequently see a print of great intrinsic worth in itself, if considered

considered as a beautiful specimen of the abilities of an artist, thrown aside for no other fault than that of being too easily obtained; whilst another, which perhaps is rather a disgrace than an honour to him, is purchased at an extravagant price, and anxiously preserved because it is unique. It is merely owing to this caprice, that so many trifling alterations in the prints of Rembrandt, rather than a proper examination of their real merit, increase or diminish the worth of the same print. I myself, commissioned by an eminent collector, gave six-and-forty guineas for the great Coppenol, with the white back-ground, that is, before it was finished; when, the same evening, at the same sale, I bought a most beautiful impression of the same print finished, distinguished by having a black back-ground, &c. which had an address to Rembrandt at the bottom, written by Coppenol himself (for he was a writing-master of Amsterdam, and this print is his portrait,) for fourteen guineas and a half. In the second instance, I exceeded my commission by the half guinea; in the first, I did not reach it by nearly twice ten guineas. It cannot be reasonably supposed, that such a difference could exist between two good impressions of the same plate; and, speaking as an artist, I should certainly have taken the last in preference to the first."

The "singular" manner of which Strutt speaks, appears to have been shrewdly guessed at by Watelet and Barthelemy, who say, that "it would be difficult to discover the way in which Rembrandt worked: he certainly made great use of the dry point, which he sometimes scraped but slightly, and the burr partially stopping up, or blending with the lines, resembled a wash," yet possessed more warmth and richness. The dry point which Rembrandt used was either, as Strutt has supposed, the point of a graver, or it was such a dry point, as has since, in our own country, been much used by Worlidge, namely, cylindrical steel wire, whetted to a triangular point.

But the great wonder of his art, as an engraver, is his chiaroscuro. He seems to have been born to shew us how much interest could be excited in a print without drawing, or any attempt at rendering local colour in the abstract, by mere dint of composition and chiaroscuro, and chiefly of the latter. Or, more strictly speaking, to shew us with how little drawing, and how entirely without the refinement of selection, in regard to forms, a powerful chiaroscuro may be kept together, and brought to operate on our imagination and judgment.

In the disposition of his lines, he seems to have been guided by no principle, but the spontaneous feeling of the moment; yet a certain tact of mind always attended him, and imparted style to his works.

It was probably from this spontaneousness of feeling, which in his prints stands instead of study, that we see so many variations in some of his plates; which appear to have been suddenly thought of, and promptly executed from time to time, just as his muse inspired. At least, this is a more artist-like, as well as natural supposition, than that his own avarice, or that of his wife, prompted these alterations (which have become so great objects of connoisseurship) with the sole view of obtaining the money which the additional sale produced. What man who maintains the contrary opinion, has proved that Rembrandt altered his plates for the worse? Yet this is absolutely necessary to the support of the mercenary side of the argument.

The genius of Rembrandt was universal, and whatever the subject of his engravings, whether history, landscape, or portrait, are marked by the same energetic truth; the same wild graces; the same forceful chiaro-

scuro. He painted and engraved what he saw, and did not attempt to generalise his objects by any process of abstraction, or accommodate or qualify them, by what he might suppose others had imagined. The learned precepts of his predecessors, such as that art should render men as they ought to be, not as they are, were disregarded or despised by Rembrandt, and so strong is the internal evidence of his works, or so persuasive his powers, that no spectator can entertain a doubt that his portraits, whether of persons or places, are transcripts of Nature, executed under a firm conviction that where she was picturesque, according to his view of the capabilities of art, she was as she ought to be.

The prints of this master are dated from the year 1628 to 1659: their number, when added to that of his pictures, is surprising, and attests at once his professional diligence, and the rapidity of his powers. Mariette possessed three hundred and seventy-five subjects: Yever, of Amsterdam, and Germain of Paris, in a descriptive catalogue which he formed, have enumerated more, and Mr. Daulby, of Liverpool, as the present writer has been informed, more still: so that their precise number is probably not known. It is scarcely necessary to add that no engravings, in their rare stages, or fine impressions, have been sought after with more avidity.

Of himself, Rembrandt has engraved no fewer than twenty-seven portraits, to distinguish which from each other, by means of words alone, might not be easy. One holds a pencil, and is more carefully finished than the rest: another is in a sort of Persian habit, with an oval border; in another, his wife also is introduced, and most of them are of quarto dimensions.

From the rest of his works, the following may be selected with advantage.

Subjects from the Old Testament.—"Adam and Eve in the terrestrial Paradise," rare; "Abraham sending away Hagar and Ishmael;" "Abraham and Isaac," arched at the top, all in quarto; "Joseph recounting his Dreams to his Father, in the Presence of his Brethren;" "Jacob mourning for the Loss of Joseph;" "Joseph solicited by the Wife of Potiphar;" in octavo; "Mordecai conducted in Triumph by Haman;" and "The Angel Raphael disappearing before Tobit and his Family," both in large quarto.

Subjects from the New Testament.—"The Annunciation of the Shepherds," with a very mysterious sentiment and powerful chiaroscuro, in folio; "The Adoration of the Shepherds," in large quarto; "The Circumcision of Christ," with an extraordinary good effect; "The Presentation in the Temple;" "The Flight into Egypt," both in 12mo.; another "Flight into Egypt," executed in his more scratchy style, in quarto; another "Flight into Egypt," in the style of Elsheimer, in folio, a very much esteemed print; "The Holy Family," where the Virgin is represented seated in an easy chair, and she and the Infant appear asleep; "Jesus preaching to the Multitude," all in quarto; "Cesar's Tribute Money," in 12mo.; "Christ turning the Money-Changers out of the Temple;" "Christ and the Woman of Samaria," a circular print; another of "Christ and the Woman of Samaria," in quarto, a very fine brilliant-toned engraving; "The Resurrection of Lazarus," a circular print, with a powerful effect, in large folio; "The Resurrection of Lazarus," a smaller print than the former; "Christ healing the Sick," a famous print, known by the name of "The hundred Florins;" an "Ecce Homo," a very grand composition, and a very capital engraving; "Christ taken from the Cross," attended by the Magdalen and the Holy Virgin. (4

companion to the former print;) "Jesus Christ presented to the People by the High Priest;" and its companion, "The Crucifixion of our Saviour," all of large folio size; (there are many impressions of this engraving, with various alterations;) "The Entombing of Christ," in quarto; "Christ with his two Disciples at Emmaus," in folio; engraved with broader strokes than is common in his prints; "The Good Samaritan arriving at the Inn with the wounded Man;" a very fine engraving, in folio; "Saints Peter and John healing the paralytic Man;" "St. Philip baptizing the Eunuch of Queen Candace;" and "The Death of the Virgin," a very fine forcible engraving, both of folio size.

Pious Subjects.—"St. Stephen stoned;" "St. Jerome," engraved when Rembrandt was in his meridian; "St. Jerome at Devotion," all in octavo; "St. Jerome writing," with spectacles on, in quarto; "St. Jerome," an unfinished plate, the composition of which is rich, and the finished part admirable; "St. Francis at Devotion;" great part of this plate is unfinished, and the prints are very rare.

Historical and Allegorical Subjects.—"The Hour of Death," an allegory on the vanities of the world; "Youth surprised by the Arrival of Death," represented by a young man and girl walking together, and a figure of death starting on them; "Medea, or the Marriage of Jason and Creusa," representing the interior of a temple and the statue of Juno, a very careful engraving, in folio; "The Star of the Kings," a ceremony used in Holland on certain nights, during which a lantern is fastened to the end of a long stick. The print is in quarto, and has a striking effect of night. A pair of "Lion Hunting." A chase of lions, in one of which a Turk is combating a lion, and another hunter is overthrown; "The Wandering Musicians," commonly called "The Blind;" it represents an old man and boy playing the bagpipes. "The little Spanish Gipsy," representing an old woman in a wood, conversing with a young person of distinction; "The Rat-Catcher," representing an old man with a stick, accompanied by a boy with rats in a trap, all in quarto; "The little Goldsmith," a man occupied in forming a small figure of Charity, in 12mo. with a very fine tone; "The Pancake Maker," an old woman frying pancakes, surrounded with children, one of whom is crying at a dog, in octavo, engraved in a very delicate style; "The Jew's Synagogue," representing two doctors of the law conversing; in the back-ground is a synagogue. "The Nail Cutter," a young woman seated, and an old woman on the ground cutting her toe-nails, a very rare print; "The Schoolmaster," in octavo; "The Quack Doctor," taking drugs from a basket, in 12mo., a very sparkling engraving; "The Peasant, with his Wife and Child," an unfinished print; "The Jew with the Large Hat," leaning on a stick, engraved in a free, but decisive manner; "The Onion Woman," representing a miserable old woman, with her feet on a chaffing-dish, anxious to sell a rope of onions, all in octavo; "The Astrologer," an old man in a profound sleep, sitting at a table with a candle, a globe, and books; in his right-hand he holds a pen, and his spectacles in the other; a quarto plate, with a very fine effect. "The Philosopher" in his apartment, contemplating a globe by candle light, has a very brilliant effect, in 12mo.; "A Man meditating," seated at a table, above which a lamp is fixed against the wall, which throws a glimmering light on all around, in quarto; "The Persian," a man in a hat and feathers, with a cloak on, in octavo, engraved in a very delicate style; "The Skater," a man skating with a bundle across his shoulder, in octavo, a very free, delicate engraving, rare.

Beggars.—A beggar in rags, leaning on a stick; the profile of a beggar, in the style of those of Callot; another in the same style; an old beggar woman soliciting charity. Lazarus Klap, a dumb beggar, seated on the ground, with his stick between his legs, in 8vo.; this is engraved in a broad style, and is very rare; a beggar seated on the ground, covered with rags, in his countenance is pictured extreme misery; beggars at the door of a house receiving charity: the group is composed of an old man, a young woman with an infant at her back, and another child, in 4to. This print is the most interesting, and the best executed of the whole set.

Furious Figures, academical, &c.—A young man and female in bed, surrounded with curtains, very rare; a shepherdess seated at the foot of a rock, making a garland of flowers, and a young shepherd lying near her, playing the flute, in 4to., a very rare engraving; "The Draughtsman," representing a man drawing from a cast of a female, surrounded with other models: this print in Holland is known by the name of "The Statue of Pygmalion;" and if it had been finished as well as it was begun, would have been very fine, in folio; "The Bath," representing figures bathing, in 4to.; "The Woman and the frying Pan," in folio; "Venus at the Bath." It has been remarked, that Rembrandt was not very happy in drawing naked figures; but here he has given his Venus the character of a goddess, in large 4to.

Landscapes.—A small landscape, engraved with great freedom, of trees and a house; "The Bridge of Six," with figures on it, in folio; a view of Amsterdam, a very good engraving; a landscape, with a village and spire, on the fore-ground of which is introduced a hunter with two hounds, very rare, in folio; a very rich and celebrated landscape, known by the name of "The three Trees," with the effect of rain, in folio; a very highly finished landscape, into which is introduced a girl with pails, and a dog; a landscape, with wood, water, and buildings: this engraving is very rare and singular, being washed with Indian ink, which gives it the appearance of a drawing. A pair of landscapes, one with a coach in it, with a view of a city and two windmills; the other is a mountain scene, with wood and water, in 4to., in the form of friezes, both washed with Indian ink; a landscape, arched at the top, of a village, with peasants before a cottage in the fore-ground: it has a very grand effect. Another village scene, arched at the top, with a square tower introduced, and two small figures seated on the ground; a landscape, with two cottages, and animals feeding on a meadow; on the fore-ground a figure is introduced drawing: this engraving is known by the name of "The Landscape Painter." A landscape, executed with the dry-point, called "The Cluster of Trees," among which is introduced a soldier's hut; a landscape, arched at the top, known by the name of "The Hay Stack," towards the right is a village and wood, and a flock of sheep guided by a shepherd, all in 4to.; a large landscape of an oblong form, representing a cottage with a stream running before it, over which is a wooden bridge, and a country girl crossing it: in the back-ground is a town, and a river, which winds to the fore-ground, where a man is introduced angling, with a child beside him; its companion is a landscape of the same size and form, of a canal and a large tree, by the side of which a cottage is represented with two children at the door: in the back-ground is a village and a windmill. "The Obelisk," a very well finished landscape, of a circular form, of an obelisk and a village, with water, in 4to.; "The Windmill, or Birth-place of Rembrandt," with his father's house; a view of the champaign of the re-

ceiver Utenbogaerd: towards the right hand of the print is a canal, with buildings, and two villages in the back-ground, both in large 4to.

Portraits of Men.—An old man, with a long grey beard, a very fine portrait, though left unfinished at the death of Rembrandt. G. F. Schmidt purchased the plate and finished it. A man with a chain and cross, in the act of writing; John Antonides vander Linden, professor and doctor of medicine at the university of Leyden, in his robes of ceremony, a very fine portrait; James Silvius, clergyman of Amsterdam, in robes trimmed with fur, seated at a table, all in 4to.: a young man seated, meditating: he has on a robe trimmed with fur, in 8vo.: the Jew Manassch Ben Israel, a commentator on many of the visions of the prophets: he is represented with a pointed beard, and a hat with a large round border. Doctor Faustus, (whom Gerfaint calls Fautricus,) a profile, down to the waist, is dressed in a robe, and wears a white hat: he is in the act of examining magical characters, a very rare portrait. Renier Anslou, an anabaptist, seated before a table, writing, with a hat on: his gown is bordered with fur. This is the most finished and the finest portrait we have from the point of Rembrandt. Clement de Jonge, a print-seller, seated in an easy chair, with a hat on, and his hair plaited: this plate is arched at the top. Abraham France, an amateur of engravings, seated at a table, examining a print; the elder Haring, with a leathern cap on; the younger Haring, son of the preceding, seated; John Lutma, a famous goldsmith of Groningen, one of the finest portraits of Rembrandt: he holds in his hand a little figure of metal, all in 4to. John Affelin, a painter of Antwerp, known in Holland by the name of "Crabbetje," or little John: it is a half-length portrait, with long hair, and a hat on: before him is a table, with a palette and books, in folio. Ephraim Bonus, a Jewish physician, with a hat on, in the act of descending a stair-case. This is one of the best of Rembrandt's portraits, all in 4to. Utenbogaerdus, a minister of Holland, in an oval, on an octagon plate: he is seated at a table, with an open book before him, and has on his head a leathern cap, in folio. John Cornelius Silvius, in an oval, around which is inscribed "Spes mea Christus. Johannes Cornely Sylvius. Amstelodamo bat. functus S. S. Minib. aos 45 et 6 menses. In Frisia, in Tyemarum et Phirugum aos 4." &c. Utenbogaerd, the banker and receiver of the states of Holland, commonly called "the gold-weigher;" the little Coppenol, the Dutch writing-master; the great Coppenol, both very rare prints, all in folio; the lawyer Tolling, a very fine and rare portrait: he is represented seated at a table with books, in large 4to. The burgomaster, John Six: this celebrated portrait is very rare, and sold at Mr. Grosse's sale, some years since, for five-and-thirty guineas. It is said, there is an impression of this plate without the names of the burgomaster or Rembrandt, in folio.

Ideal Heads of Men.—An eastern figure, with a little cap on, and short hair, covered with a fur gown; a profile, with a turban on; an eastern figure, with a long beard, in a turban, very rare. These are all marked "Rembrandt Venetiis, 1635:" and it is said that he so marked them, to make the amateurs believe that he had been at Venice. Bust of a man with a short curly beard, in a black gown: bust of an old man, with a long beard, whose head is reclining as if he slept; an old man, with a long grey beard, and very little hair on his head, habited in a long robe, in 8vo.: a young man, half-length, in profile; bust of an old man, with a square cut beard, with a velvet cap on; a man, with mustachios, half-length, with a hat on, and a gown trimmed with fur; a half-length portrait of a man seated, at an easel

painting, inscribed "W. Droft," most probably the portrait of Rembrandt's pupil, Droft, very rare; the bust of a young man, with long hair, engraved on a white ground, supposed to be Titus, the son of Rembrandt, in 4to., rare; a half-length profile of a man, with the physiognomy of a negroe, with a turban on, in 4to.; a philosopher, with a fable, a long square bearded head, with a fur cap on.

Female Portraits.—A three-quarter view of a young Jewess, seated, in folio; the little Jewess, newly married, three-quarter, with long hair hanging on her shoulders; two portraits of old women, in black veils, very highly finished, in 4to.: "The Reader," a young woman seated at a table, reading, a very good engraving; and its companion, an old woman, reading, in 4to.; a half-length profile of a lady with her hair dressed with beads, in 8vo.; an old woman, with her hair dressed in the eastern style, seated. It is engraved in so delicate a style, that a clear impression is seldom met with. A bust of the mother of Rembrandt, with her hair dressed, in a black veil; an old woman asleep, resting her head on her hand, dressed in a turban; bust of an old woman, three-quarters, in a black veil, engraved in a broad style, in 12mo., very rare; the profile of a young girl in a hat: she holds a basket across one arm, and a purse in the other hand. A nearly profile head, in a veil turned up, and a feather, in 8vo.; an old woman with spectacles, a half-length profile, reading, a very spirited engraving, and very rare.

Studies and Sketches, &c.—Several studies engraved on the same plate, among others we discover a head of Rembrandt himself; a clump of bushes, surrounded with a wall, a horse, and several heads, very rare; study of six heads, among which is the wife of Rembrandt; ditto of five heads of men; ditto of three female heads, a very spirited engraving; a plate of studies of various heads and figures; set of ditto, among which we distinguish the head of Rembrandt, with other figures: this is very freely engraven, and is one of the rarest of the studies of Rembrandt. A very tasteful unfinished engraving of various objects, and a tree, very indefinite, in 12mo.; profiles of three old men's heads, in 8vo. All the preceding are of quarto size.

Doubtful Subjects.—"King David kneeling, at Devotion, crowned;" "A Repose during the Flight into Egypt," with the effect of night; the Holy Family are seated on a bank at the foot of a tree, to which is fastened a lantern, which casts a glimmering light over the whole scene, in octavo. "Jesus Christ taken to Calvary," a very rich composition; "A Skirmish, or Village Fair," a very fine engraving, in a slight style; on the fore-ground is a ratcatcher holding a basket on the end of a long stick, with rats in it. A bust of a man, with a bandolier on his shoulder, with a double clasp of precious stones; "The Pen maker," an old man seated at a desk, with spectacles on, mending his pen: "The young Scholar," seated on a stone at the foot of a tree writing, very rare; bust of an old man laughing, with a little hat on: this is executed entirely with the dry point, and finished in a very good style, all in 4to. Klaas van Ryn seated, with a long beard, inscribed on the margin with his name, in 12mo.; and three dromedaries, followed by two camels, with eastern trappings, engraved in a free spirited style.

John Lievens, Livens, or Lyvyas, was born at Leyden in the year 1607. He became the pupil of George van Schooten, and afterwards of Peter Laitman. He excelled principally in painting portraits, but likewise executed some historical pictures with great success. In the year 1630, he came into England, where he resided three years, and painted the portraits of Charles I., the queen, the prince

prince of Wales, and several of the nobility. Lievens made a considerable number of engravings and etchings, somewhat in the style of Rembrandt, scarcely less picturesque, but coarser, and in general less finished; but he always managed his chisello to as to produce a very good effect.

Adam Bartsch informs us, that Lievens drew more correctly than Rembrandt, (which he might easily do,) but did not engrave in so picturesque a style; those plates which he meant to finish highly he executed with a very delicate touch, and sometimes he used to hatch so close, that the aquafortis bit his lines nearly into a blot; for instance, those which are on the fore-ground of "The Resurrection of Lazarus." It does not appear that this artist made much use of the dry point, but frequently used the graver to strengthen the strokes. His print of St. Jerome is strongly retouched with that tool, and two of his finest portraits, those of Daniel Heinsius, and Jacques Gouter, are wholly executed with the graver; they are in a very picturesque style, and bear some resemblance to etching. He marked his prints either with his initials, or his name, which he sometimes spelled *Lyvyns*. The following are a selection of those engravings by this master, which are most worthy the notice of the collector.

Portraits and Heads.—Doctor Ephraim Bonnus, a half figure seated; Joost, or Justus Vondel, a Dutch poet; Daniel Heinsius, professor of history and politics at Leyden; Jacobus Gouter, the English musician, a half figure, with a lute, all in folio; an old man with his head shaved and a long beard, taken for the portrait of Conrad Leonard, an early preacher of the gospel in Greece; the profile of an old man, with a long beard; bust of a man with a turban on, very fine, after Rembrandt; ditto of a man, with long hair; half-length figure of a woman, with long hair; bust of a young man, with an open robe, in the style of Rembrandt, all in quarto; ditto of a man, with a bonnet on, in the taste of Rembrandt, in 12mo; profile of an old man, with a short beard; profile of an old man, with a long and pointed beard; a half-length portrait of an old man seated, all in quarto; bust of an old man, with a short beard and bald head, in octavo; ditto of a Persian, with a cap and robe; ditto of a man, with curly hair; profile of a man, with a hat on; ditto of an old man, with a little cap on; ditto of an old woman, with a veil on, in the style of Rembrandt; ditto of a young woman, with a pearl ornament on her head; profile of a woman, with her hair falling on her shoulders; head of a young woman, with the character of a negro, all in 12mo.; bust of a Capuchin, with a long pointed beard, and a hat and mantle, in folio.

Historical, &c.—"The Virgin and Infant Christ," with St. Joseph, and various other figures, in octavo; "The Virgin and Infant Christ," to whom she presents a pear; "The Resurrection of Lazarus," a grand composition, in folio; "St. John the Evangelist seated at the Foot of a Tree, with a Book," in quarto; "St. Jerom seated in his Cell, holding a Crucifix and a Skull," in folio; "St. Francis in his Cell, meditating," in large quarto; "The Anchorite," or St. Francis, differing very little from the preceding engraving, in quarto; "St. Anthony seated, with a long beard, and a Capuchin Cowl," in folio, very rare; "Mercury and Argus," in large quarto; "Jacob performing a Sacrifice," an eastern figure in a cloak; bust of a man in eastern attire, with a chain round his neck, in folio, both on shadowed grounds; bust of a man with long curly hair falling on his shoulders, in large 4to.; an engraving of three trees, without any back-ground, in folio: both these engravings are executed on wood, but do not possess

any great share of merit. "Death striking two Peasants," who are represented gaming and quarrelling, of folio size.

Erasmus Quellinus was born at Antwerp in the year 1627, and died in the same city, in the cloister to which he had retired in 1678. He shewed an inclination early in life for the arts, and studied under Rubens: he became an historical painter of considerable merit, and likewise executed some landscapes in a very masterly style. Quellinus etched some plates from his own compositions and those of Rubens, of which it may be sufficient to specify the following: Erasmus Quellinus, which was published with an account of his life in the French language, in quarto; a folio landscape, with a dance of satyrs and children, rare; "Samson killing the Lion," in quarto, from Rubens; and "The Holy Virgin and Child," in folio, after Rubens.

Hubert Quellinus was born at Antwerp in 1608; he was of the same family as the preceding artist, and brother to Artus Quellinus the sculptor. Hubert engraved somewhat in the style of Soutman, bringing his plates very forward in the etching, and finishing them with the graver in a very neat pleasing style.

He usually marked those plates which he engraved from the sculpture of his brother with the initials of Artus, as well as his own. The following are selected from the works of this artist as being most worthy of attention.

A set of the statues which his brother Artus executed in marble, for the Stadthouse of Amsterdam, after the drawings of John Bannokel, in a folio volume. The portrait of Artus Quellinus, also in folio; a handsome piece of adulation offered to Philip IV. of Spain, who is represented on his throne, surrounded by allegorical virtues, &c.; "The Judgment of Solomon;" "The Legislator Zaleucus redeeming the Penalty of his Son;" "The Province of Holland," personified and surrounded with emblematical figures; and a set of twelve plates of naval and military triumphs, and other decorative ornaments of the Stadthouse at Amsterdam, all of folio dimensions.

Theodore van Thulden, of Dutch ancestry, was born at Bois-le-Duc in the year 1607; but became the disciple of Rubens, whom he accompanied to Paris, and assisted in his grand undertaking of the Luxembourg gallery.

He painted a few other pictures which are deservedly held in esteem, and etched a considerable number of plates in a firm, clear, and determined, but slight style.

In his praise as an engraver, much cannot be said. His chisello is but feeble; to expression of the textures of substances, he gave little heed, and his drawing is so mannered, that the spectator of observation easily traces in his prints the same hand, though working after very different masters.

He engraved the principal events in the life of St. John of Matha, in a set of twenty-four small folio plates, from pictures with which he adorned the church of the Mathurins at Paris; "The History of Ulysses," on fifty-eight small plates, from the pictures of Primaticcio at Fontainebleau; "The triumphal Entry of the Infanta Ferdinand into the City of Antwerp," on eight folio plates, after Rubens; a set of six smaller plates, from the parable of "The Prodigal Son," after the same master, beside other works of inferior importance.

Janus, or John Lutma, was a goldsmith of Amsterdam, who distinguished himself by the invention of a new mode of art, which had its day of novelty, and was for a time popular among superficial connoisseurs; it was termed *Opus Mallei*, being performed with a hammer, and small pointed punches, which made an impression upon the copper, and by being repeated as occasion required, the shadows were

formed either darker or fainter, at pleasure. The burr, which was necessarily raised upon the surface of the copper by such an operation, was not entirely removed by the scraper; and in the early impressions, is the means of producing a soft and agreeable effect. He engraved four plates in this style, which are as follows: Janus Lutma; John Lutma, his father; the poet Vondel; and P. C. Hooff, the historian, all of them in folio, and apparently from his own drawings.

John Lutma, the son of the preceding artist, was born at Amsterdam, A.D. 1609. He was likewise a goldsmith, and executed some few plates; among others the following: the portrait of John Lutma the father, habited in a robe bordered with ermin, holding spectacles and a pencil; portrait of himself, seated at a table, drawing; he has on a broad brimmed hat, which overthrows his face: this print is very rare, both in folio; and a view of a large fountain with statues, and the Antonine column, with some other ruins at Rome. It is first etched in a coarse, bold style, and the shadows are worked upon with a fine mezzotinto tool. The effect produced by this mixture is confused and heavy, but not altogether disagreeable to the eye.

James Lutma was of the same family, and also resided at Amsterdam; by this artist we have a set of twelve middling-sized upright plates of ornamental shields and foliage, etched in a neat style and finished with the graver; likewise the portraits of the three Lutmas, marked "John Lutma of Oude inv. James Lutma fecit, aqua forti."

Adrian Brouwer, celebrated for his attainments in art, and his wild and immoral habits, executed a few plates about this period, of such subjects as he usually painted. (For his biography, see the article BROUWER.) His principal etchings, which are executed with much spirit, freedom, and taste, and are generally subscribed with his initials, are, a party of four peasants inscribed "T'fa orienden," &c.; a rustic dance, where a female is playing the flute, inscribed "Luttig spel," &c. both in folio. Three peasants smoking, inscribed "Wer aent smoken," in small folio; a drunken party of four rustics; two peasants in conversation; a droll smoking party, consisting of a man, a woman, and an ape, inscribed "Wats dit voor en gedoocht," &c.; a rustic baker making cakes, a circular print; a peasant lighting his pipe, and a set of six of male and female peasantry; all of quarto dimensions.

Solomon Koninck was born at Amsterdam in the year 1600, and was the son of Peter Koninck, a celebrated connoisseur and jeweller of that city, who at the age of twelve placed his son under David Colyn, to learn the rudiments of drawing; he afterwards studied successively under Francis Vermeulen and Nicholas Moyart, and became a painter and engraver of some eminence. He etched several subjects in the style of Rembrandt, after his own designs; of which the following constitute the more estimable part. A head in profile, of an old man with a long beard; ditto of an old man, in eastern attire, with mustachios; a companion to the preceding, but engraved in a much more delicate manner; a three-quarter bust of an old man with a furred hat; an old man seated in an easy chair, at devotion, a very fine engraving; bust of a venerable looking old man, with a beard; and a landscape with cottages, all of quarto size.

Nicholas Berghem also performed some etchings about this time, which consist chiefly of what may be termed Italian and Dutch pastorals, and beam with taste and intelligence. It is believed that all his prints are solely the result of aquafortis and the etching-point, and that his plates were never touched with the graver. They are all from his own com-

positions, and for the most part appear like transcripts from the sketch-book, wherein he drew as in all from nature.

The etchings of Berghem, like his pictures, delight by the found and intimate knowledge of drawing and chiaro-scuro, which they display or imply; and the exquisite feeling which every where attends his touch, and which seems almost, speaking without figure or hyperbole, like actual contact between mind and its object.

These are the qualities which impart such truth of texture and character to his various domestic animals, whether rough or smooth-coated; such picturefqueness to his grassy grounds and earthy and rocky banks, and such importance to his trifles.

For the biography of this artist, see BERGHEM, NICHOLAS. In conformity with our general plan, we shall here add some account of his principal engravings, referring those who may wish for more particular information, to the catalogue of Henry de Winter, which was published in Holland in the year 1767.

Six sets in small quarto, of six prints each. These are performed with all the fire and fervour of Berghem, and each set consists of five plates of animals, and an appropriate title page, by which the set is known, *e. gr.* there is "The Milk-man" set, "The Shepherdess" set, "The Goatherd" set, &c. &c. The title-pages are all inscribed with the following words, which shew that they are as we have before furnished, the probable contents of the sketch-book in which our artist was accustomed to draw from nature; *viz.* "Animalia ad vivum delineata et aquaforti ceri impressa studio et arte Nicolai Berchemi." A set of five folio landscapes, which are distinguished from each other by the figures and cattle which are introduced, and which are as follow: 1. A Peasant seated playing on the Flute. 2. A Group of Cattle, with a Woman and Child crossing a Rivulet. 3. A Shepherd, with Sheep and various Cattle. 4. A rustic Girl on an Ass, stopping for Refreshment at an Ale-house Door. 5. A Shepherd on horseback, reading to a Woman on an Ass, as they slowly travel. A set of four, in quarto, *viz.* 1. A Landscape, with Oxen, and a Woman milking a Cow. 2. Another with three Horses and two Cows, with a Shepherd in the Back-ground. 3. Another with two Cows, and some Goats. 4. Another with an Ass, Goats, and a Shepherd; and a set of six small plates, which are very rare, and uncommonly fine, of heads of rams and goats.

Detached Subjects of Berghem.—A cow, in folio, the earliest impressions of which have the name of Berghem in italics; a famous print of a cow watering, in folio; a landscape with two cows lying down, and another standing on the foreground; a landscape with cows, and a man on an ass; a landscape, with a shepherd on an ass, driving goats, in the back-ground a woman is introduced with a basket on her head, all in folio; a woman washing her feet in a brook, and a man behind her leaning on a stick, with other rustic figures and animals, in large folio; a landscape, with a man standing playing the flute, and a woman seated on the ground near him, a rare print, in folio; and its companion, a shepherd, and his wife seated suckling her child, a very rare print; and a boy seated on an ass, speaking to another boy, who holds a pair of bagpipes.

The beauty and value of the works of this master depend much upon the impressions, and early, good, and well preserved impressions are now become very scarce.

The author of the Abecedario, misled by the cypher of Berghem, which the reader will find in our *Plate III.* of the monograms of the engravers of the Netherlands, has

fallen into the error of calling him Cornelius Berchem. Florent le Comte has also supposed that there were two artists of this surname, one of whom he calls Cornelius; whereas the letter C in Berghem's cypher stands for Claus, the common abbreviation of Nicholas among the nations of the continent.

Herman Zacht-Leeven, or Sachtleeven, was born at Rotterdam, A.D. 1609, and died at Utrecht in 1685. He was the disciple of John van Goyen, and became a landscape-painter of great celebrity. He etched some few plates in a free and intelligent style from his own compositions, of which the following are the best; a landscape and cattle; a mountainous landscape, with figures and water; both in quarto. A set of six landscapes, the first of which is executed by Ag. Winter, and the remainder by Sachtleeven, in quarto; and a landscape, with two elephants, in folio.

Cornelius Sachtleeven was the younger brother of Herman, mentioned in the preceding article, and was born at Rotterdam in the year 1612. He painted in the style of Brouwer and Teniers, commonly selecting such subjects as village parties, soldiers regaling, &c.

This artist likewise etched several plates from his own compositions in a slight spirited style; amongst which the following are those which are held in most esteem. "The Five Senses," intitled "De vyf Sinen, wt ghebelt door Cor. Sachtleeven." A set of twelve small plates of animals; and a landscape, with animals and a goatherd, of quarto size; executed in a broad and picturesque style.

John George van Vliet was born at Delft in the year 1610; and was one of the most successful of the disciples and imitators of Rembrandt. He executed a considerable number of etchings, some of which possess great merit, particularly those from the drawings and pictures of his great master. They are exceedingly powerful in effect; the shadows being dark, and the lights broad and clear; but his figures in general are very incorrect, the extremities badly marked, and the draperies heavy.

Van Vliet usually etched his plates with a very delicate point, afterwards strengthening them with aqua-fortis and the graver. His plates are well worthy the observation of such artists as wish to make a proper distribution of light and shade an essential part of their study. At the sale of Mariette, a complete set of his works was sold for one thousand and seventy-five livres. He commonly marked them with his name, or a monogram, which will be found amongst those of the engravers of the Netherlands. The following are the most worthy the attention of the connoisseur.

Portraits and ideal Heads.—Bust of a man, from Rembrandt; an Oriental head, dressed in a turban, and diamond ornament; head of a warrior; profile of an old man, with his hands clasped, looking upwards; ditto of an old man with a grey beard and a leathern cap; ditto of a man with mustachios, and a fur bonnet and mantle; all in folio. Bust of an old man with mustachios, habited in a mantle; Profile of an officer, with a hat and feathers, both in quarto; and a beautifully finished plate of an old woman reading, her head is covered with drapery which falls on her shoulders, in folio; all from the pictures of Rembrandt.

Historical, &c.—"Lot and his Daughters," a folio print, in which the chiaroscuro is remarkably well managed. "The Baptism of the Eunuch of Queen Candace," a grand composition, of which good impressions are very rare, in large folio; "St. Jerom kneeling, at Devotion," a very fine print; all from Rembrandt, and in folio. "St. Jerom reading," from a picture by Van Vliet himself; "Isaac discovering his Mistake in having given his Blessing to Jacob;"

"Sufanna surprised by the Elders," both from Livens, in large folio; "The Resurrection of Lazarus," from his own composition, in large folio. John Louys copied this print, and his copy is superior to the original. "The Ballad-finger," who is represented in a village street, surrounded with rustics, in folio; "The Rat Seller," in quarto; four figures in Spanish attire, playing at trictrac; a woman and child listening to a man who is seated on a basket turned upside down; "The Philosopher reading," with a remarkably fine effect; "The Mathematician writing by Candle-light," all in quarto; "An Orgie of Peasants," a very good composition, of six figures, in folio; all from his own designs.

Ferdinand Bol was born at Dordrecht in the year 1610, but lived and died at Amsterdam, where his parents came to reside when he was but three years old. He studied in the school of Rembrandt, and attained great celebrity as a painter of history and portraits. He executed a considerable number of plates in a bold free style; the lights and shadows are broad and powerful, which renders the chiaroscuro of Bol particularly striking; but his prints want that lightness of touch and admirable taste which those of Rembrandt possess in such high perfection. The following are a selection of the best engravings of Bol, and are nearly, if not quite, as much sought after as those of Rembrandt.

Portraits and Heads.—Half-length portrait of a young man, with a hat on; portrait of an officer, both in 4to. Half-length portrait of a man, with a hat and feathers; a young woman with a cap and feathers, in an oval; both in 8vo. The woman and the pear, being a portrait of a young female in a veil, presenting a pear, a very fine print, in 4to. An old man seated, habited in a fur robe, in large 4to., a rare print. A very spirited half-length engraving of an old man, with a cap on. And a bust of an old man habited in a fur robe, in an oval of quarto size, very rare.

Historical, &c.—"A Philosopher in his Study," with globes, books, &c. and a very fine effect; "A Philosopher reading." An old man seated before a table, on which are placed globes and books. This print is commonly known by the name of "The Astrologer," all in 4to. A family in a room, consisting of a man, woman, and child sucking, known by the name of "The Chamber of the Accoucheur" in folio; "Abraham's Sacrifice," arched at the top, in large folio; "Hagar and Ishmael in the Desert," in folio; "The Sacrifice of Gideon," represented at the moment when the angel lights the sacrifice, in the back-ground is the altar of Baal, in 4to.; and "St. Jerom contemplating a Crucifix," in a circle of folio size.

The events of the life of Dirick or Theodore Stoop are very obscure. He was born somewhere in Holland in the year 1610, or thereabouts, but how he acquired his great ability in painting and etching is not known. His etchings are from his own compositions, are performed in a very neat and picturesque style, and are much and deservedly celebrated, and highly valued.

His principal work is a set of twelve plates in small folio, of which the subjects are horses, dogs, and peasantry, engaged in various rural occupations, and marked D. Stoop, fec.

Rodrigo Stoop was the younger brother of Theodore, and was born in Holland, A.D. 1612. According to the author of "An Essay towards an English School of Painters," the baptismal name of this artist was Peter, but he always placed the initial R before his family name, and is called Rodrigo by the continental writers. He came into England

England with queen Catherine, and resided here till the time of his death, which happened in 1686.

This artist engraved several plates, after his own compositions and those of Barlow. They are executed with great spirit, in a style which does him much credit, but we can only specify the following: A set of eight, views of Lisbon, dedicated to queen Catherine; another set of eight, representing the procession of queen Catherine from Portsmouth to Hampton Court, dated 1662; and several of the plates for Ogilby's edition of *Æsop's Fables*, published in 1678, after Barlow. These are slight hasty performances.

Anthony van der Does was born at the Hague in the year 1610. He chiefly engraved portraits; if he was not the disciple of Paul Pontius, he imitated his style; and although he never equalled that great master, yet his best engravings possess a considerable share of merit. He engraved most of the plates for a collection of portraits of the illustrious men of the seventeenth century, published at Amsterdam, many of which are dated 1649. Among his best portraits are those of Gerard Cock, a plenipotentiary to the court of Osnabruck; George Wagner, plenipotentiary to the court of Osnabruck, both in folio, after Anselm Van Hull; Ferdinand, cardinal infant of Spain, and governor of the Low Countries, after Diepenbeck, in large folio; the marquis of Castile-Rodrigo, after Rubens, in large 4to.; Francis de Mello, small folio; Francis de Mello, on horseback, in folio, from J. Boffart.

And of his *Historical Prints*, the most esteemed are "A Magdalen," half figure, in 4to., from Vandyke; "A Miracle performed by St. Francis," after Diepenbeck; "A Madonna and Child," after Erasmus Quellinus; and "A Holy Family," from the same painter, both in folio. The Holy Family is accompanied by two angels, one of whom is strangely employed in warming linen for the child, whilst the other makes its bed. Of the remainder of this family of artists, we have already treated in vol. xii. See DOES, JACOB and SIMON. VANDER.

An account of the lives and works of CORNELIUS BEGA, and LEONARD COOGHEN, (which should else have been introduced in this place,) will also be found under those heads respectively. The plates of the former, impressions from which are much sought after by connoisseurs, have recently been purchased and republished by a foreign print merchant, with descriptions in the French and Dutch languages. They amount to thirty-four plates of humorous and vulgar rusticity.

Edward Eckman, or Eeman, was born at Mechlin in the year 1610. He was a most excellent engraver on wood, and copied many of Callot's prints, even imitating the free style of that master with great success. The distant parts of his engravings are very neatly executed; and the perfect forms of the smallest figures exceedingly well preserved. Among other engravings by him, is the representation of the fire-work upon the river Arno, from Callot, which Papillon, who has certainly judged well in this instance, calls an admirable print, adding, that it is impossible to find a more delicate engraving on wood.

Eckman engraved also from Louis Buisinck, Abraham Bosse, and others. The number of his prints is said to be one hundred and five.

John Thomas was a native of Aspres, and born in the year 1610. He was a successful pupil of Rubens, and afterwards, in company with his fellow student Diepenbeck, went to Italy, where he met with great encouragement from the bishop of Merz. In 1662 he was entitled first painter

to the emperor Leopold, and had a considerable pension allowed him by that prince.

Thomas etched several plates, in a bold, free, and spirited style, which are much sought after by collectors, among which the following may be reckoned the best. "Mercury conducting a Ghost before Hecate;" "A Lady at her Toilette;" "A Shepherd caressing a Shepherdess;" "A Satyr offering Violence to a Shepherdess;" all of 4to. size, from his own designs; and a pastoral subject, composed of six figures, three men and three women, one of the former is playing upon the bagpipes, in folio; likewise from his own invention. The two latter are composed so much in the style of Rubens, that some authors have attributed their invention to him, but without foundation.

John Troyen, or Van Troyen, was a native of the Low Countries, and born A.D. 1610. He produced several etchings from the pictures of Italian masters, collected by D. Teniers, for the gallery at Brussels. They are executed in a slight, coarse, incorrect style, but his prevailing tones of light and shade are tolerably good.

The following are the best part of them. "Salome presenting the Head of St. John to the Daughter of Herod," after L. da Vinci; "The penitent Magdalen;" after Correggio; "The Adoration of the Kings," after P. Veronese; "Jesus Christ healing the Sick," from the same painter; four subjects of "The Seasons," after Bassan, all in folio; and a grand composition, in large folio, after L. Pordonna, of "The Entombing of Christ."

Peter Leybetius, or Van Leybetten, was the contemporary of Van Troyen, and, like him, was employed in engraving part of the gallery of Teniers. His plates are executed in a coarse and incorrect style; among them are a portrait of David Teniers, senior, in 4to., from Van Mol; "Diana reposing," attended by an old woman, after Titian; "The Marriage of St. Catherine," after P. Veronese; "The Visitation of Elizabeth," after Palma the elder; "The Virgin at Prayers, and St. John caressed by the Infant Saviour," after the younger Palma; "Cupid presenting Venus with Fruit;" and "Diana and Endymion," after Paris Bordonna, all of folio size. The two last are remarkably ill drawn, and the rest reach not above mediocrity.

John Meyssens, or Mytens, was born at Brussels in the year 1612. He learned the principles of painting from Anthony Van Obstal, and afterwards became the disciple of Nicholas vander Horst. He painted both historical subjects and portraits, but was most successful in the latter. He resided at Amsterdam, where he published several collections of engraved portraits, not only from his own paintings but those of Vandyke, and a variety of other masters. Meyssens engraved and etched, and we have by him a collection of portraits which he published in 1649. Prosper Merchand, in his historical dictionary, mentions a book of portraits by this artist, (likewise published by himself,) which is become very rare, on the frontispiece of which is the name of "Speckkraemer." They are in general greatly inferior to what might have been expected from his hand, and do not do him much credit as an artist. Of these mediocre performances, it may be sufficient to specify the following, which are rather valued on account of the pictures from whence they are engraven, than on account of the merits of the engraver.

Portrait of himself; Henry de Kyser, architect and sculptor; Guido Rheni; Daniel Seghers, Jesuit, and flower painter, from Livens; Cornelius de Bie, from Erasmus Quellinus; William de Nieulandt, painter, from the same master; Mary Ruten, the wife of Vandyke, "The Virgin and Child," half figures, from Titian, all in 4to. A A

"Meleager presenting the Boar's Head to Atalanta," from Rubens, in folio.

Cornelius Meyfless was the son of John, and born at Antwerp, A. D. 1646. He learned the elements of art under his paternal roof, but removed from thence to Vienna, where he remained some years. He seems chiefly to have been employed by his father in engraving portraits, which he executed entirely with the graver in a stiff, tasteless style. His best prints have no great merit to recommend them, and the rest are mere slovenly performances, evidently executed in a hurry. The most considerable work we have by this artist is a set of portraits of the emperors of the house of Austria, in folio, entitled "*Effigies Imperatorum domus Austriacae, delineatae per Joannem Meyfless, et aeri incisae per Filium suum, Cornelium Meyfless.*" This proves, beyond contradiction, that he was the son of John, and not the nephew, as Baffan affirms. His work of next importance is in folio, and entitled, "*Les Effigies des Souverains Princes et Ducs de Brabant.*" In these he was assisted by Peter de Jode, Waumans, Van Schupen, and other artists. Octavius, duke of Aresburgh; Antonius Barbermus, Cardinalis Camerius, both in 4to; Rinaldo Principe Estense, cardinale protettore della Corona di Francia, in folio; Giovanni de Witt, Signor di Linschoten, &c. Pensionario di Olandia; Casparus Keitwerdus, Pastor Ecclesiæ Vefala, from B. D. Meys; and David Conte di Weissenwolff, Signor di son et Eusegg; S. B. Van Dryweghen delt. all of folio dimensions, may also be admitted into collections of the school of the Netherlands.

Marc de Bye was born at the Hague in 1612, of a noble family: he passed some of the years of his youth in the army of the Dutch republic, and became a member of the Academy of Arts in 1664.

He learned the principles of painting of James vander Does, painted animals with all the truth and taste of that master, and etched several sets of plates, of which the subjects were wild and domestic animals, in a very neat spirited style, after Paul Potter and Marc Gerard.

The following may be selected with advantage from the rest of his works: Two sets of eight quarto plates, each of horned cattle, after P. Potter; another set in quarto, from the same painter; a set of eight, of goats and sheep; a set of sixteen, of goats; a set of sixteen, of lions, bears, wolves, leopards, &c. after the same painter; and a set of sixteen, of "*The Natural History of the Bear*," in different countries, after Marc Gerard, very rare prints, in quarto.

Francis vanden Wyngaerde was born at Antwerp in the year 1612, and established himself in that city as an engraver and print-merchant. His works prove him to have been a man of ability; his etchings are executed in a slight and free, but masterly style, and are much sought after by connoisseurs. Among those which are the most worthy of attention, are the following:

"Sampson killing the Lion," from Rubens, in 4to.; "Jesus Christ appearing to Mary Magdalen in the Garden," in folio; "The Marriage of Thetis and Peleus," in large folio; a bacchanalian subject, where Bacchus is represented drinking from a cup, into which a bacchante is squeezing grapes, a fine and rare print, in large folio; "Soldiers regaling in an Alehouse," all after Rubens. "The Entombing of Christ," after A. Vandyke, both in folio; "Achilles discovered at the Court of Lycomedes," after the same painter, in folio; "The Return from Egypt," in which the Holy Virgin appears in a straw hat, from J. Thomas, a fine engraving, in large folio; "Peasants smoking and drinking before an Alehouse Door," from Teniers; "The

Temptation of St. Anthony," from his own composition, a very rare print; two women, one of whom is contemplating a sleeping infant by candlelight, after Callot; and its companion, a female leaning on a skull before a looking-glass, after the same master, all of folio dimensions.

Reynier, or Remigius Nooms, better known by his cognomen Zeeman, was born at Amsterdam in the year 1612. He was originally a tailor, but having an innate love and natural talent for fine art, he accustomed himself to imitate on paper what he saw, and by pursuing this mode of study in the school of nature alone, gradually became a marine painter and engraver of considerable rank and ability.

It should be known that the Dutch word *zeeman* is synonymous with seaman, or mariner. As the imitative powers of the sailor discolored themselves, his countrymen could not but behold his productions with some degree of pleasing wonder, nor was due encouragement withheld. At one period of his life he accepted an invitation to Berlin, and if we may judge from twelve of his engravings of shipping, &c. which were published here by Tooker, he resided for a time in London, but finally returned to Amsterdam, where he executed a considerable number of plates from his own designs, in a bold and intelligent style. They consist of shipping and marine views, ornamented with good figures, and closed by back-grounds, which are often beautifully executed and appropriately introduced.

Of these, the most important are, a set of eight naval subjects, entitled "*Quelques Navires*," &c. dated 1632, in 4to.; another set of six, of views of public edifices on the sea-shore, and the yacht which travels between Haarlem and Amsterdam, in folio; a set of twelve, of shipping, naval arsenals, &c. in folio, published in London by A. Tooker; four Dutch sea-ports, in folio, entitled "*Raan Poortie*;" "St. Antoni's Poort;" "Regiers Poort;" "Saagameulins Poortie;" dated 1636. Another set of four, of Dutch sea-ports, also in folio; "The Four Elements," in 8vo.; a pair of "The Faubourg of St. Marcan;" and "The Porch of St. Bernard," at Paris; a sea-fight with ships on fire, and another marine subject, with two ships engaging, all of folio dimensions, and from compositions by the engraver himself.

Henry Snayers, or Sneyos, was born at Antwerp in the year 1612, and always resided in his native city. Of whom he learned engraving is uncertain, but he evidently imitated the styles of P. Pontius and the Boffwerts. His prints, as is believed, are the sole production of the graving tool; he drew correctly, and much of the character, expression, and spirit of the original pictures after which he worked, are infused into his translations.

When engraving after Rubens, his prints, of which the following are the best, bear strong resemblance to those of Scheltius a Boffwert.

The portraits of Adam Van Oort, after Jordaens, and prince Robert, count palatine of the Rhine, after Vandyke; "The Holy Virgin and Infant Saviour appearing to St. Alanus of Rupe," a rare print, in large folio, and presumptively after a composition by Snayers himself; "The Holy Virgin seated and surrounded by Saints," in large folio; "The Fathers of the Church debating the Question of Transubstantiation," of very large folio dimensions; "St. Francis d'Assise receiving the Sacrament of Extreme Unction," all after Rubens; and "Sampson delivered to the Philistines," after Vandyke, also in large folio.

Alexander Voet, or Voert, the younger, was a native of Antwerp, and born in the year 1613. He was probably the disciple of Paul Pontius, whose style he frequently imitated, but not with any very great success. There is a want of

of effect, and an incorrectness of outline, even in his best works, though engraved very neatly. He executed a considerable number of plates, after Flemish masters, but more particularly after Rubens; the best of which are as follows: "Judith and Holofernes," in large folio (the earliest impressions of which are before the name of C. Galle was inserted); "The Return from Egypt," in folio; "The Virgin and Child," to whom angels present a basket of fruit, in folio; "The Martyrdom of St. Andrew," a fine print, in large folio; "St. Augustin," rare, in large folio; "St. Agnes with a Lamb," in folio; "Seneca in the Bath, bidding Farewell to his Friends," "Roman Charity," both in folio; "A Satyr with Fruit," accompanied by a bacchante, in large folio, all after Rubens; "Folly," after Jac. Jordans; "The Card-Players," after Corn. de Vos, both in large folio; and "Christ bearing the Cross," a capital print after Vandyke, engraved on three plates.

Peter Baillu, or Balliu, was born at Antwerp in the year 1614. He learned the rudiments of painting in his native country, after which he went to Italy for improvement, where, in conjunction with other artists, he was employed in engraving the Justinian Gallery. On his return to Antwerp, in the year 1635, he was much patronized, and his engravings are, by many collectors, held in no small esteem. Huber classes him among the first engravers of his age. His works exhibit some talent in the art of expressing the textures of various surfaces, and his chiaroscuro possesses considerable force; yet his heads are seldom expressive or beautiful; and the extremities are heavy and not well marked. He engraved both portrait and history, and executed his plates entirely with the graver. Among his most esteemed works are the following:

Portraits.—Louis Pereira, and Claude de Chabot, envoys to Munster, both in 4to. without the name of the painter; John Leuber, confessor of Dresden, from A. van Woelbergen; pope Urban VIII. giving his benediction; the four heads of the church—St. Jerom, St. Augustin, St. Ambrose, and St. Gregory, all in folio; Jacob Backer, a painter of Holland, in 4to.; and John Bylert, a painter of Utrecht, both from his own pictures; Albert, prince and count of Arenberghe, in large folio, from Vandyke; Lucy Peraye, countess of Carlisle; Anthony of Bourbon, count of Morel, son of Henry IV.; and Honorus Urphée, count of Novi Castellie, &c. all in folio, from Vandyke.

Historical Subjects after various Italian Masters.—"Heliodorus chased from the Temple by Angels," a very large upright print, engraved on two plates, after a drawing by Van Lint, from Raphael's picture in the Vatican; "A dead Christ lying on the Knees of the Virgin Mary;" a large upright plate from An. Carracci; "The Archangel Michael overcoming the Demon," after Guido; "The Reconciliation between Jacob and his Brother," after Rubens, all in large folio; "Christ in the Garden of Olives;" "The expiring Magdalen," supported by angels, both in folio; "The Rape of Hippodamia, or the Combat of the Centaurs and Lapithæ," in large folio, all after Rubens; "A Holy Family," after Theodore Rombout, in folio; "Mary Magdalen and St. Francis at the Feet of Christ;" "The Virgin in the Clouds," both in large folio, from Vandyke; "Rinaldo and Armida," in large folio, after the same painter (the companion was engraved by P. de Jode); "Suzannah at the Bath," after Martyn Pepyn; "The Flagellation," after Diepenbeck; "Christ crowned with Thorns," after the same painter; "The Invention of the Cross, before St. Helena," after Van Lint; "The Emperor Theodosius holding the Cross before St. Ambrose," after the same painter, all in large folio; "Jesus

Christ fastened to a Column," attended by angels, with the instruments of the passion, after John Thomas, in folio; and "St. Anastasius seated in a vaulted Apartment reading," after Rembrandt, a folio print, with a fine effect of light and shadow.

John van Aken was born in Holland, A.D. 1614, and was the fellow-student of Bamboccio. He has frequently been mistaken for John van Aachen, of Cologne, the latter of whom did not engrave.

The following etchings, from the hand of Van Aken, are free and masterly, and in a style much resembling that of J. Both.

A set of six horses, with landscape back-grounds, in 8vo. marked J. V. Aken, fecit. M. de Heineken likewise cuts the two following: a landscape, where a horse appears in the fore-ground saddled, and a man seated on the ground behind it, with only his back seen, and towards the left, another man with his hat on. This is very scarce; and four fine mountainous landscapes, ornamented with figures, wood, and buildings, in folio, both marked with his name, to which is added fecit; and in the latter H. L. inventore.

John Almeloven was born in Holland in the year 1614. He was a painter as well as an engraver; the latter profession he exercised chiefly for the bookellers, but with great credit to himself. His etchings, of which the subjects are principally landscapes, abound with freedom and intelligence. Of these it may be sufficient to mention, in this place,

The *Portrait* of Gisbert Voetius, marked J. Almeloven, inv. et fec.; a set of twelve views of towns and villages, ornamented with figures; a set of six mountainous landscapes, with figures, and the four seasons, from Herman Saftleven, all in quarto.

Matthew Borrekens, or Borekens, was the contemporary and friend of the preceding artist, and resided at Antwerp. He worked chiefly with the graver, in a neat style, resembling in manual execution that of P. Pontius, but his drawing is far less correct.

The principal parts of his works are the copies he made from Bollwert, and other eminent engravers, for Vanden Eaden, of which the best are as follows:

Portraits of Augustus Carpzon, plenipotentiary of Frederic William, duke of Saxony, Anselme van Hulle pinxit, in folio; Gerard Schepeler, plenipotentiary of the peace of Osnabruck, from the same painter; the prelate Christopher Butkens, after Diepenbeck, all in folio.

Historical Subjects, &c.—"Mary Magdalen embracing the Crucifix," accompanied by the Virgin and St. John, after Vandyke, in very large folio; "The Virgin standing upon a Globe, treading on a Serpent," in folio, after Rubens; "St. Francis Xavier," and "St. Ignatius of Loyola," all in folio; "St. Barbara," in large folio, a very rare print; all from Rubens. "Jesus Christ bound," surrounded with angels bearing the instruments of the passions; "The good Shepherd," "The Mystery of the Mats," both in large folio; and the frontispiece to "Butkins's Trophies of the Duchy of Brabant," in folio; all after Diepenbeck.

Andrea Stock was born in Holland, A.D. 1616, and resided the greater part of his life at Antwerp. He was the pupil of Jacques de Gheyn, and imitated his style with tolerable success. His professional talent was of a general nature. He engraved portrait, landscape, and historical subjects, but can scarcely be said to have risen above mediocrity.

His best prints are, the *Portraits* of Albert Durer, in 4to. after Thomas Vinidor de Bologne; Hans Holbein, from a picture by that master, in 4to.; Lucas of Leyden, from a picture

picture by himself, in 4to.; Peter Snayers, after Vandyke, in folio; "Abraham sacrificing Isaac," a large upright, after Rubens; "The twelve Months of the Year," after John Wildens; and a set of eight landscapes, after Paul Bril, all of quarto dimensions. These, with the "Académie de l'Épée" of Thibault, which was published at Antwerp, will probably afford sufficient specimens of the various talents of this engraver.

Antonio Waterloo was born among the scenes which he so admirably represented, in the suburbs of Utrecht, in the year 1618. The events of his life are very little known, but none who have taste and sensibility to appreciate his merits, can read and reflect on that little, without wonder and regret. Though born to a comfortable patrimony, and blessed with an excellent genius, he died in a miserable state, as is reported, in one of the hospitals of Utrecht, at the age of forty!

This seems reproachful either to society or to Waterloo himself: but reproaches may well be allowed to sink in silence, when we know not where they ought to attach. Great talent is often eccentric, and, to all but the eye of philosophy, will seem to shoot madly from the social orbit: that the undeviating sons of Commerce should turn from a bright prodigy to a barometer or a weather-cock, is perfectly natural; meanwhile the meteor glares and expires. Earth is illumined, but are the merchants enriched?

Hundreds of dealers have amassed fortunes, and others will for centuries continue to amass fortunes by selling the works of an artist of our own country, who kept school in Bunhill row, and disposed of his Paradise Lost for almost nothing. Hundreds have in like manner enriched themselves by dealing in the works of Waterloo, who languished and died in an hospital.

"Father forgive them, for they know not what they do," is a divine prayer, which intelligent Christians, in pity to ignorance, cannot too often repeat. Neither know they whom, nor what, they neglect.

Availing our attention, then, from the private life—the frail and mortal part—of this great artist, to works that will live and be admired as long as engraving shall endure, we have to observe, that he was rather an engraver who occasionally painted, than a painter who occasionally engraved; for while his plates are numerous, his pictures are very few. For an account of his merits in the latter art, the reader is referred to the article WATERLOO.

If he had any tutor in engraving, it has escaped record. The woods, the winding roads, and villages in the environs of Utrecht, appear to have been his study, and of many of these his etchings are faithful portraits, rendered with a master's hand and poet's sensibility. The frankness and beauty of his style, shew that he read the book of nature with intuitive readiness; and that the character which was occult to others, was to him easy and familiar.

Gilpin says, that "Waterloo is a name beyond any other in landscape. His subjects are perfectly rural. Simplicity is their characteristic. He selects a few humble objects. A coppice, a corner of a forest, a winding road, or a straggling village: nor does he always introduce an obelisk. His composition is generally good, and his light often well distributed; but his chief merit lies in execution, in which he is a consummate master. Every object that he touches has the character of nature; but he particularly excels in the foliage of trees."

But Waterloo sometimes composes ideal landscapes of a grand and impressive character, though still under the influence of the same presiding simplicity. The scenes to which classic romance, or the solemnities of holy writ have stimu-

lated his imagination, appear to have been produced with a little effort, as the forest glades, or rushy and secluded pools, overhung with alders, or picturesque knolls, which he doubtless drew and etched, just as he saw them in nature.

Of this, his "Tobias and the Angel" may serve as an instance, of which the reverend writer above quoted has, in another place, written as follows. "The landscape I mean is an upright, near twelve inches by ten. On the near ground stands an oak, which forms a diagonal through the print. The second distance is composed of a rising ground, connected with a rock which is covered with shrubs. The oak and the shrubs make a vista, through which appears an extensive view into the country. The figures, which consist of an angel, Tobias, and a dog, are descending a hill, which forms the second distance. The print, with this description, cannot be mistaken. The composition is very pleasing. The trees on the fore-ground, spreading over the top of the print, and sloping to a point at the bottom, give the beautiful form of an inverted pyramid, which, in trees especially, has often a fine effect. To this form, the inclined plane on which the figures stand, and which is beautifully broken, is a good contrast. The rock approaches to a perpendicular, and the distance to an horizontal line. All together make such a combination of beautiful and contrasting lines, that the whole is very pleasing. The keeping is well preserved. The second and third distances are both judiciously managed. The light is well disposed. To prevent heaviness it is introduced upon the tree, both at the top and at the bottom; but it is properly kept down. A mass of shade succeeds over the second distance, and the water. The light breaks in a blaze, on the bottom of the rock, and masses the whole. The trees, shrubs, and upper part of the rock are happily thrown into a middle tint.

"Perhaps the effect of the distant country might have been better, if the light had been kept down; leaving only one easy catching, light upon the town and the rising ground on which it stands.

"The execution is exceedingly beautiful. No artist had a happier manner of expressing trees than Waterloo; and the tree before us is one of his capital works. The shape of it we have already criticised: the bole and ramifications are as beautiful as the shape. The foliage is a matter-piece. Such a union of strength and lightness is rarely found. The extremities are touched with great tenderness; the strong, masses of light are relieved into shadows equally strong; and yet ease and softness are preserved. The fore-ground is highly enriched; and indeed the whole print, and every part of it, is full of art and full of nature."

These remarks from the pen of Mr. Gilpin, on the Tobias of Waterloo, are so pertinent, and so applicable to the generality of his works, that it is only necessary to add that the mode in which these extraordinary prints were produced, is simply *etching*, which he is supposed to have worked up to so powerful an effect of chiaroscuro with his etching needle, by mere dint of drawing and the various pressure of his hand, as to render all *flossing out* (as it is termed) of his lighter tints, unnecessary. His plates are believed to have been *bit in* (or corroded) at one operation of the aquafortis, and not to have been touched afterward with either graver or point.

Some of the foreign writers on art, to whom we are indebted for descriptive catalogues of the works of Waterloo, are, however, of a different opinion, and assert, that after the process of corrosion, he strengthened and enriched his tones, and especially the boles and branches of his trees, with the graver.

The present writer, from the comparisons which he has been

been able to make between various impressions, and his knowledge of the manner in which engraved plates wear under the hand of the printer, is inclined to believe, that the darkest parts of Waterloo's plates, which are generally the overshadowed boles and branches of his trees, would of course begin to wear first, (from the ridges of copper in such parts being either exceedingly minute, or entirely corroded away) and would consequently want retouching before any other parts began perceptibly to wear, which retouching was at that time always performed with the graver, the art of *rebiting* being unknown.

Hence, in collecting the works of this master, it is of the utmost importance to attend to the goodness of the impressions; for the demand for them has been so great, and the plates have in consequence been so frequently retouched, that the latter prints are altogether unworthy of the name of Waterloo. You see in them, indeed, the general forms of the objects, but every trace of the elegant freedom and spontaneous grace of the master, is irrecoverably gone: back-grounds and fore-grounds are jumbled together, and in some instances nothing is left but a few strong, stiff, unmeaning lines on a faint and unintelligible ground.

The high estimation in which the works of this justly celebrated landscape engraver has ever been held, have occasioned frequent republications of his plates, and Huber, Rodt, and Adam Bartsch, of the imperial library at Vienna, have written descriptive catalogues of them, of which the following list is an abridgment. The cypher which Waterloo sometimes affixed to his etchings, may be seen in *Plat. I.* of the monograms, &c. of the engravers of the Netherlands.

Views and Compositions.—A pair, of a ruined building, and a woody recess with two peasants. A set of four, *viz.* the hermitage; the passage of the rocks; the little waterfall; and the mountain bridge, all in octavo. A set of twelve, in quarto; *viz.* the fisherman's return; the arrival of travellers at a country inn; the rustic well; the village mill; the village church; the cattle on the bank of a river; the little bridge, with three anglers; the four peasants; view on the road to Schevelingen; the fisherman, (a river scene); the two towers, (another river scene); and a pastoral landscape, on the fore-ground of which are a goat, ram, and ewe, which Bartsch has attributed to Marc de Bye. The mill dam, and the entrance to a forest, a pair in quarto, are two of Waterloo's early performances, coarsely executed, and evidently done before his powers had attained to maturity. Another set of twelve, of which the subjects are, 1. The fruit trees. 2. The church-yard. 3. The cottage. 4. A view on the sea-shore, on the middle ground of which is a village spire. 5. Another view, with two fishermen. 6. Another view, with cattle and figures in a boat. 7. The traveller and two trees. 8. A pastoral scene, with sheep and a shepherd crossing a bridge. 9. The deserted village. 10. The inhabited village; three peasants are here reposing on a fore-ground hillock. 11. The sentry box. And 12. The stone bridge. Another set of six, in quarto; *viz.* 1. A forest scene, with travellers. 2. A river scene, called "the little bridge." 3. Sheep fording a stream. 4. The boys and a dog, drinking at a brook. 5 and 6. Pastoral landscapes, with shepherds reposing under trees, &c. A pair of cottage scenery, in quarto, with the effects of moonlight and twilight, of the upright form. A set of six, in quarto; *viz.* 1. The rock bridge, over a mountain torrent. 2. The travellers converging. 3. A cottage surrounded with trees. 4. The oak, (under which a male and female peasant are conversing.) 5 and 6. Views from nature, with travellers and their dogs. Another set of six, of the same dimensions; *viz.* 1. The hermit's chapel. 2. The

loaded ass. 3. The sleeping peasant. 4. The streamlet. 5. The mountains. And 6. The wooden bridge. Another set of six, denoted as follows: 1. The forest traveller. 2. The cottage, overshadowed with trees. 3. The entrance of a wood. 4. The gate. 5. The knotty tree. And 6. The forest river. Two other sets, in quarto, of six subjects, each consisting chiefly of rural and forest scenery. [It is to be remarked of these, and of Waterloo's works in general, that while their real merits and beauties reside in the landscape, collectors have, with little justification or reflection, denominated them from the figures which they contain, (which are the worst parts of Waterloo:) so that a grand mountain scene with rocks and cataracts, is sometimes known by the silly title of the *Loy and dog*, or the *milk-maid*.] A set of six grand landscapes of larger dimensions, entitled, 1. The double cascade. 2. The castle and cataract, or triple cascade. 3. Rocks and mountains, with three figures on the fore-ground. 4. A wild mountain scene. 5. The grand waterfall. And 6. C stagers at the foot of a mountain. Another set of six, *viz.* the temple, with a cupola and waterfall in the middle ground. 2. The rock bridge. 3. The large tree, with four figures. 4. Huntsmen in a forest. 5. A pastoral scene, with a shepherd and his flock. 6. A watermill, with a cowherd and cattle. Another set of six, in large quarto; *viz.* 1. A plain, with clumps of trees. 2. The wildfowl hunter. 3. The return from the chase. 4. The traveller by twilight, a forest scene. 5. A river scene, with boys bathing. 6. A forest glade, with figures reposing. Another set of six, in large quarto, all of which are views from nature, chiefly of villagers, but the names of the places have not yet been mentioned. A set of twelve beautiful landscapes in small folio; *viz.* 1. A garden scene. 2. Ruins of a city, with figures and cattle on the fore-ground. 3. The two bridges, (one of which is of stone, and the other of wood.) 4. The castle and rock. 5. The two travellers. 6. The city gate. 7. A river scene, with two stone bridges. 8. A shepherd conducting his flock across a stone bridge. 9. A water-mill in a wood. 10. The skirts of a forest, with a falconer and greyhounds. 11. The pointed tower, a forest scene, with sportsmen reposing. 12. Another forest scene, with three large trees on the fore-ground. Another set of six, in large folio, of forest scenery, with rivolets and rustic bridges, all of which are believed to be views from nature, of places not named. Another set of six, in large folio, and of great beauty, which are numbered and named as follows: 1. A country-inn, with peacocks reclining. 2. A champaign country, with figures in conversation. 3. A woodland scene, with two very small figures. 4. Two trees on the bank of a stream, with an open gate. 5. Another woodland scene, viewed from a corn-field. 6. A plantation of young trees, with a sleeping shepherd on the fore-ground. A set of six large upright landscapes; *viz.* 1. The large windmill, so called, but the mill itself is at a distance, and the near objects are an old house surrounded with trees, and on the left a wooden chapel. 2. A woodland scene, with two peasants and a dog. 3. A mountain scene, with a road winding over a wooden bridge, towards a forest. 4. A village scene, with a woman and children reposing on the fore-ground. 5. The entrance of a wood, with two travellers reposing, and a horseman advancing from among the trees. 6. Another woody scene, with a church spire in the distance. A set of six compositions, in large folio, and of the upright form, with poetical subjects introduced from the heathen mythology; *viz.* 1. Alpheus and Arethusa. 2. Apollo pursuing Daphne. 3. Mercury charming Argus. 4. Pan pursuing Syrinx. 5. Venus and Adonis. And 6. The death.

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of Adonis. Another set of six historical landscapes, in large folio, with subjects from the Old Testament; viz. 1. Abraham dismissing Hagar and Ishmael. 2. Ishmael languishing in the desert, is comforted by an angel. 3. The death of the disobedient prophet. 4. Tobias and the angel, upon which we have commented at length. 5. Zipporah kneeling, executing the divine commands on the son of Moses. And 6. The prophet Elijah fed by ravens in the wilderness; all of which are very grand compositions, and executed in the highest taste of Waterloo.

Egbert van Panderen was born A.D. 1606. He resided, during great part of his life, at Antwerp, but he often added the word *Haerlemensis* to his name, from which we may infer that he was a native of Haerlem. He worked entirely with the graver, in a stiff formal style; and his prints have neither harmony of effect, nor correctness of drawing to recommend them. The following are selected from those most worthy of notice: God, an angel, a man, and the Devil, or "The History of Sickness and Medicine," from Henry Goltzius, in quarto, very rare; "The Virgin Mary interceding with Christ for the Salvation of Mankind," after Rubens, in folio; "The Four Evangelists," half figures, after P. de Jode; "St. Louis, Bishop of Thoulouse," after the same painter. Part of the plates for a large folio volume published at Antwerp, 1628, entitled "*Academie de l'Epee*," by G. Thibault, all of folio size; six engravings of quarto size, of horses, from Ant. Tempesta; "Maurice, prince of Orange, on horseback," after the same painter, in large folio; and "Pallas," "Juno," and "Venus," after Spranger, in circles of folio size.

Theodore van Kessel was born in Holland, A.D. 1620, and, it is probable, was related to the Kessels, who were painters of no small repute in that country. His works, which are rather numerous, consist chiefly of etchings; and (when he did not attempt to draw the human figure,) are by no means devoid of merit, but frequently are executed in a firm and free style. He etched a small folio volume of vases and ornamental compartments, consisting of eight parts, from the designs of Sir Adam de Viane, with his portrait at the beginning. They were published at Utrecht by his son, Christopher de Viane; and almost all the plates are marked with the monogram of the inventor, formed by an A and V joined together, and the initials of the engraver's names, T. V. K. to which F. or fec. is sometimes added: these initials are commonly joined together in a manner represented in *Plate III.* of those used by the engravers of the Low Countries. Several of the plates for the gallery of Teniers, and also the following, were executed by Van Kessel; viz. an etching of the portrait of the emperor Charles V. after Titian, in quarto; "St. Gregory meditating," a half-length figure, executed with the graver, T. Wilbortius inv.; "A Repose during the Flight into Egypt," after Giorgione; "Christ and the Woman of Samaria;" "The Woman taken in Adultery," both from Caracci; "Susannah and the Elders," after Guido; "The Holy Virgin worshipped by Angels," after Van dyke, all of folio dimensions; an allegorical subject, representing "Abundance," in large folio; the companion to which was engraven by P. de Jode, both after Rubens. A set of four bas-reliefs, after the same painter, representing 1. The triumph of Galatea. 2. A Triton embracing a sea nymph. 3. A nymph in the arms of a sea god. And 4. A faun seated near a rock, with two children and a goat. "The Hunting of the Caledonian Boar," a large plate lengthways, is from the same master: a man wheeling a barrow of peas and beans, with a man and woman driving cows, in the back-ground. A landscape, the companion

to the preceding, into which is introduced a girl with milk-pails, both in large folio, are also from Rubens. A set of battles and skirmishes of banditti, after P. Snayers, in folio, dated 1656, must conclude our selection from the works of this engraver.

Abraham Conrad, or Conradus, was a native of Holland, and born in the year 1620. Under what master he studied is not known. He engraved history and portraits, but chiefly the latter; many of which are from his own drawings, and prove him to have been an artist of considerable ability.

His mode of engraving is various, and free from bigotry to any particular style: sometimes he imitated that of Lucas Vorsterman with great success, and at others, a style somewhat resembling some of the heads by Rembrandt, but still more resembling that which has since been adopted by our countryman Worlidge; employing etching, or the work of the graver, or dry needle, as occasion appeared to him to require.

The *Portraits* of Christopher Love; Jacob Triglande, a professor of the university of Leyden; Thomas Mouris, of Canterbury, after D. Boudringeen; and Godefroid Hottot, pastor of the French church at Amsterdam, after H. Mourmans; generally esteemed the very best of the engravings of Conrad, all of folio dimensions.

Of his *Historical* works, "The Flagellation," and "The Crucifixion of our Saviour," both in folio, and after Diepenbeck, are all we are able to specify.

Having already treated of the biography of Bartolomeo, see BREEMBERG; it remains only to mention in this place, that the style of his etchings is scarcely less masterly and intelligent than that of his pictures. They are much sought after by collectors, and good impressions are by no means common. His mark, when he did not sign his name at length, was B. B. F. and sometimes two B's, in the way shewn in *Plate IV.* of monograms used by the engravers of the Netherlands.

We have by the hand of this artist, a set of twenty-four landscapes, with figures and animals, entitled "*Verhuden versallen Gebonden*," with an etching of the portrait of the artist, published in octavo, and also in quarto. Another set of twelve, entitled "*Antiquités de Rome*." A landscape, marked with his cypher. "Joseph distributing Corn, during the Famine in Egypt," in large folio; and its companion, "The Martyrdom of St. Lawrence." There are many good copies from the two last subjects, particularly those etched by Bishop.

Henry Nainwex, Naiwynex, or Naiwikex, of Utrecht, according to some authors, was the disciple of Bartolomeo. He was a landscape engraver of considerable merit: he painted also, and in the cabinets of the connoisseurs of Holland, are drawings in Indian ink by this artist, which are performed with much care, and also with feeling and taste.

His reputation, however, was chiefly founded on his etchings of landscape. He caught the mantle of Waterloo: he was, perhaps, somewhat less free and painter-like, but with regard to evenness of tones, and what is termed engraver-like execution, improved on his prototype.

His works are faithful representations of Nature, and the feeling and delicacy which every where accompanies his etching-needle, has occasioned his prints to be much sought after both by artists and collectors.

Of his etchings we are only acquainted with sixteen, of which the earliest and best impressions are known to dealers by

by their having been taken before the name of Clement de Jonghe was inserted as the publisher; they form two sets in large quarto.

The first set contains, 1. A forest-scene with a fore-ground of oaks. 2. A river-scene with trees, &c. 3. A rocky scene with wood and water. 4. A mountainous landscape with a wooden bridge towards the left. 5. Another mountainous landscape with wood and water. 6. A canal, or river, winding through a rocky country. 7. A river-scene with a village church in the back-ground. 8. Trees and water, with a mountainous distance.

The second set consists also of eight subjects of similar general character, chiefly of mountain scenery.

Naiwinck always etched from his own pictures or drawings, and very rarely introduced any figures into his landscapes.

Herman Swanevelt, or Swaneveld, surnamed Herman (*i.e. the Hermit*), of Italy, was born at Voerden, in Holland, A.D. 1620, and died at Rome 1690. He was the disciple of Gerard Douw, but soon quitted the school of that master, and migrated to Italy, where he placed himself for a while under the instructions of Claude of Lorraine.

But like all artists of original powers, he was much less indebted to any instructor for his acquirements, than to his own unremitting studies from nature.

The recluse life which he led in Italy, and the long and solitary rambles which he took in that classical and romantic country, for the sake of enjoying nature, and contemplating landscape at its purest sources, obtained for him the cognomen of *the hermit*, which, generally speaking, is well sustained in his works, by the retired gloom of his choice of subjects.

For an account of his merits as a painter, the reader is referred to the article SWANEVELT. As an engraver, he was original, bold, and free, always working from his own pictures and drawings, which are either compositions or views from nature, and which he enriched with figures and cattle, that for drawing and appropriate introduction far exceed those of his master Claude.

The general characteristics of his landscapes are wildness and sublimity. He has more of breadth and ordonnance, or the studied graces of landscape composition, than Waterloo, and more of mechanism in his mode of execution, but less of fine feeling and taste. His chiaroscuro is grander, but he possesses less sensibility to the simple graces of nature when viewed in detail. Swanevelt is more symmetrical and wisely arranged, Waterloo more spontaneous. If Swanevelt is more epic, Waterloo is more pastoral. The latter etched what was before him without any seeming effort; the former went abroad to *study*, and studied with effect.

The engravings of Swanevelt are somewhat numerous, and are much sought after; so that good impressions are by no means common. Those most worthy of the attention of the collector are as follows:

A set of eighteen rural subjects, with figures and Italian buildings, in ovals, entitled "*Varie campestri fantasie a Hermano Swanevelt invent. et in lucem editæ*;" a set of thirteen Italian landscapes, including a dedication to Gedeon Tallement, in small quarto; a set of twelve Italian landscapes, enlivened with figures, and entitled "*Diverses Vues dedans et dehors de Rome, dessinées par Herman van Swanevelt, dédiées aux Vertueux*," in quarto; a set of seven, of domestic animals, with landscape back-grounds, in small quarto; a set of four mountainous landscapes, enriched with figures of nymphs and satyrs, in 4to.; four landscapes,

into which are introduced historical subjects, *viz.* "Abraham receiving the three Angels;" "The Angel conducting Tobit;" "Elias in the Wilderness comforted by an Angel;" and "The Angel encouraging Tobit to take the Fish," all of quarto size; a set of six Italian landscapes with figures; another set of the same number, with remarkable buildings and figures; four landscapes, in each of which the Flight into Egypt is variously represented; four views of the Apennines, with rustic figures, all of folio dimensions; a set of four landscapes with figures and animals, in small folio; six landscapes, forming a series, into which the history of Venus and Adonis is introduced, in large folio; and a set of four wild landscapes, with legendary subjects, in large folio, *viz.* "St. Jerome meditating before his Cell;" "A Saviour offering Fruit to St. Anthony in the Desert;" "St. Anthony regaling his Friend St. Pacome;" and "The Death of the Magdalen."

Albert van Everdingen was born at Alkmaar, in Holland, A.D. 1621, and died in the same city in 1675. He frequented successively the schools of Roland Savery and Peter Mlyn, both of whom he soon surpassed. During a voyage in the North sea, he was thrown by a tempest on the coast of Norway, where he resided upwards of twelve months, and employed his time in studying the wild and romantic character of the landscape scenery of that country. He etched with the same picturesque feeling and taste with which, as we have already stated (*see EVERDINGEN*) he painted, and among his works are a set of one hundred small views in Norway, executed with admirable variety, peculiar characteristic wildness, and as much vigour of genius as the cascades of Tivoli, by Salvator Rosa. Most of his engravings are of Norwegian subjects, and are marked sometimes with his initials, and at others with his name at length.

Believing that there is, in our language, no descriptive catalogue of the works of this artist, we shall proceed to specify those most worthy of admiration.

A pair of small oval landscapes of rural character; a pair of very small uprights, one representing a forest with four figures in the Norwegian costume, the other a champaign country with a cottage; four small mountainous landscapes with figures and water; four, in octavo, etched in a very free style, of cottages and figures.

Another set of four, in octavo, of cottages and figures; three marine subjects with vessels and figures, in 4to.

Six mountainous landscapes, with figures, trees, windmills, cottages, &c. in 4to.

A set of three, in quarto, one representing a windmill and sluice; the second a perspective view of a village and church; the third is of wild character, with three peasants and a dog on the fore-ground.

A pair, in quarto, one representing a mountainous scene with fir trees and a hermitage; the other cottages and trees, with a swineherd and two hogs in the fore-ground.

Two woody landscapes, of quarto size, in one are rocks on the fore-ground and cottages; the other is a cottage-scene, with a man and woman in conversation. The four last are (contrary to the custom of Everdingen) lengthways.

A pair of landscapes, in quarto, of rocky character, with fir trees and figures; in the second two figures are seated at the foot of a rock, one of whom writes on a stone the name of Everdingen.

A pair of mountainous landscapes; in one of them is a wooden bridge communicating from one rock to another; the other is a stone bridge communicating with very lofty rocks,

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rocks, across which a pedlar is travelling, in the middle-ground a man is seated, who appears to be drawing.

A pair of woody landscapes, in quarto, with cottages; on the road towards the left hand are two figures and a horse; the other is a rocky scene with trees, in the background is a view of the sea.

A pair of ditto, with the effect of night; one of them is a rocky scene with a cottage and figures; the other is an immense pile of rocks crowned with wood, all of quarto size.

A pair of ditto, one of which represents a monument; the other a cottage and peasants.

A pair of ditto, one is a farm-yard with poultry and figures; the other consists of piles of various trees cut down for building, with two peasants, all in quarto.

A forest scene, a river is winding through the fore-ground, over which an old oak spreads its horizontal arms. Of this engraving there are two sets of impressions, one being less than the other by a third part.

A woody scene with cottages and figures, in the fore-ground is a waterfall with figures angling.

A beautiful cascade formed down the side of a mountain by water which turns a mill; towards the right a peasant is seated on the stump of a tree.

A large wooden bridge with a peasant crossing it; in the middle distance is a cottage and church spire, with a perspective view of a town.

A mountainous landscape with a watermill; on the fore-ground are three figures.

A mountainous scene; on the middle plain is a cottage with oaks and fir trees.

A landscape ornamented with very tasteful figures; towards the right is a monument in the antique style, with columns of the Doric order.

And a landscape, on the fore-ground of which is a Gothic temple, towards which a great number of figures of both sexes are crowding; towards the right is a chapel surmounted with a statue of St. Nicholas, all of large quarto size.

These last eight prints are the most capital of the engravings of Everdingen. He likewise published a set of one hundred views in Norway, and a set of fifty-six octavo plates, from his own designs, from a book entitled "The Tricks, or Deceits of the Fox," which was written by Henry d'Alkmaer.

Nicholas Lauwers was born at Leuse, in Hainault, in the year 1620, but established himself and published his engravings at Antwerp. He emulated the merits of the school of Rubens, and, as Strutt thinks, studied under Paul Pontius, whose style of engraving he for the most part imitated, working with the graver alone. He was, however, by no means equal to that great master, either in his knowledge of forms, powers of delineation, or excellency of handling.

Lauwers engraved after several of the Flemish masters, but his best prints are decidedly those which are from the pictures of Rubens, of which the chief are as follow.

"The Adoration of the Eastern Kings," of the upright form; "The Ecce Homo," of the same form. (Note.—In the latter impressions of this plate, the name of Lauwers is erased, and that of Scheltius a Borswert substituted in its stead, which is probably the trick of some Dutch dealer, which has been put in execution, in order to enhance the nominal value of the impressions.) "The Descent from the Cross," of the same form, and "A Dead Christ on the Lap of the Virgin Mary," all of folio dimensions. "The Triumph of the New Law" is a very large and fine print, lengthways, which Lauwers has engraved on two plates; and

is also after Rubens, as well as his portrait of Isabella, infant of Spain.

There are, however, some few exceptions to our general assertion that the best works of this master are after Rubens. His large print of "Baucis and Philemon entertaining Jupiter and Mercury," (which Strutt has mistakenly attributed to his brother Conrad,) is after Jordāns, and may certainly be classed among his very best productions. His "Holy Virgin and Child," and "St. Agabus," after Diepenbeek, and his "St. Cecilia," and "Interior of a Cabaret," after Seghers, have also considerable merit.

Conrad Lauwers was the elder brother of Nicholas, and worked much in the same style, with the graver only, but with somewhat inferior powers. He was born at Leuse in the year 1613, but resided principally at Antwerp.

The *Portraits* of Aëtius Quellinus, an architect, after J. de Decort; Peter Verbrugghen, a sculptor, after E. Quellinus; Marinus Ambrosius Capello, both of Antwerp, after Diepenbeek; and Father Antony Vinder, after J. Coëffiers, may be reckoned among the best works of Conrad. And his

Historical prints of most reputation are, "The Prophet Elijah visited by an Angel in the Desert," a large upright folio; and "Christ bearing the Cross," both after Rubens; "The Papist of the Emperor and Empress of Morocastapa;" "The Great Crucifixion," after J. Coëffiers, in large folio; and "The Holy Family," in a landscape after Schiavone.

Coryn or Querin Boel, descended from Cornelius, and was related to Peter Boel, the painter. Probably, as there is only three years difference in the dates of their birth, he was the elder brother of the latter.

Coryn was born at Antwerp in the year 1622. He went to Brussels to work for the publication which is commonly called the Gallery of Teniers, which was produced under the patronage of the archduke Leopold. He worked with the graver and etching needle, but chiefly with the latter, his style of handling which, was coarse, heavy, and by no means correct with regard to the forms of his objects.

Yet he had the address to select good originals to engrave from, and his works are *therefore*, we presume, held in some request. The most important of these are, "The Eagle of Jupiter transporting Ganymede through the Air," after Michael Angelo; a landscape after Giorgione, in which are introduced a knight armed with a poignard kneeling before a female; "The Adoration of the Shepherds," after Titian; "Adam and Eve sitting within an Arbour of Paradise," after Paduanino; "Venus and Adonis," after Schiavone; "The Rape of Europa," after Titian; "The Resurrection of Lazarus," after the elder Palma; "Diana and her Nymphs bathing," after the same; "Perseus delivering Andromeda," after Domenico Fetti, all of folio dimensions. And, after Teniers the elder, "The Barber-surgeon Apes," and "Cats performing a Concert;" "The Village Fête," with Dutch peasantry playing at ninepins; "The Interior of a Flemish Cabaret," with a joyous company of drinkers and smokers, all in folio; and a pair of 4to. size, of half-length figures of Dutch peasantry.

Wallrant Vaillant, (who is slightly mentioned in our account of ENGLISH ENGRAVERS as the collector of prince Rupert,) was born at Lille, in Flanders, A.D. 1623, and died at Amsterdam in 1777. He was the eldest of five brothers, of all of them attained some reputation in the arts. Wallrant went to Antwerp, and studied under Erasmus Quellinus; he excelled in portrait painting, and met with great encouragement; for having successfully painted the portrait of the emperor Leopold, his occupation increased so rapidly that

that he soon acquired a competent income. He accompanied the Maréchal de Grammont into France, where he completed his fortune, and after a stay of four years returned to the Netherlands, and settled at Amsterdam. He was an engraver of merit, particularly in mezzotinto; and made some considerable improvement in that branch of art, but the grounds of his plates, when compared with modern productions in mezzotinto, were indifferently laid, and the lights uneven, particularly where they were much scraped. The most important of his works are as follow.

Portraits and Subjects from his own Designs.—His own portrait, and that of his wife, in oval borders, both in folio; prince Rupert; another half-length of prince Rupert, reading, both in 4to.; John Frobenius, a printer of Basle, after Holbein, in folio; sir Antony Vandyke, seated, in large folio; Siniae, a miniature painter, in small folio; Hardouin de Perelx de Beaumont; archbishop of Paris; Cornelius Stadius, rector of the Gymnase at Amsterdam; Conrad Hoppe, a reformer of Amsterdam; a young man seated, reading, supposed to be the portrait of Andrea Vaillant, (a fine and rare engraving); Baarent Graat, a painter of Amsterdam, all of folio dimensions, (the first impressions of the latter plate were printed in brown); Humphredus Henchman, episc. Lond. "An old Woman shewing a Letter to a young One;" "A young Man returned from Hunting, with a Hare and Wild Fowl," both in large folio; "Our Saviour kneeling, surrounded with Angels bearing the Instruments of his Passion," in 4to.; "St. Christopher carrying the Infant Christ across an Arm of the Sea," with the effect of night, in large 4to.; Leopoldus, Dei gratia, Roman; Joannes Philippus, Mogunt; Carolus Ludovicus, comes palat. Rheni et elect.; and Sophia, comit. palat. Rheni, all in folio; these four last portraits are executed with the graver, and are very rare.

Historical, &c. after various Masters.—"St. Barbara," a half figure, after Raphael, in 8vo; "Judith," after Guido, in large folio; "The Holy Family," after Titian; "The Temptation of St. Anthony," after C. Procaccini; built of a warrior, after Tintoretto; "St. Jerome," after a picture by Jac. Vaillant, all of folio size; "Venus lamenting the Death of Adonis," in large folio, from Erasmus Quellinus; a group of three figures, after Terburgh, in folio; "A young Man painting at his easel," after Metz; "Two Boys," after Fr. Hals; "A Child caressing a Dog," after Vandyke; "A Peasant and his Wife," after Teniers; "The Prodigal Son," after Marc Gerard; "A Party of Gamblers," after the same painter; "Judith," and "Jael," from Gerard de Lairesse; "A Party of Peasants," one of whom is smoking, from Corn. Bega; "A Company of Peasants," with a woman and child, after the same painter; "A Party of Peasants singing," from Ad. Brouwer; "Two Peasants smoking," from the same painter; "A Trumpeter Pigeon, delivering a Letter to a Lady," after Wil. Mieris; and "The Gold Weigher," after Rembrandt, all of folio dimensions.

Bernard Vaillant was born at Lille, and was the pupil of his brother Wallerant, whom he accompanied in his travels to Frankfurt and to Paris. He gained considerable reputation as a crayon painter, and scraped some of his own compositions and portraits in mezzotinto, which he signed with his initials. Among them are the

Portraits of John Lingelbach, from Schwarz; Paul Dufour, after a picture by his brother; Eneas Clement, minister at Rotterdam; Charles de Rochfort, minister of the French church at Rotterdam; Paul Dufon, a preacher at Leyden; and heads of St. Peter and St. Paul, all from his own drawings.

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Andrea Vaillant was the youngest of the five brothers, and studied engraving at Paris, after having learned the elements of art of his eldest brother. He engraved but few plates, among which are the portraits of Abbot B. Eltopa, patriarch of Alexandria, in large folio; and John Ernest Schrader, inspector of the Gymnasium at Berlin, in 4to.

Francis Poelt was born at Haarlem in the year 1624, and learned the elements of art of John Poelt a painter on glass. In 1647 he went in the suite of prince Maurice of Nassau to America, where he resided for some years, employing a large portion of his time in painting and drawing from nature. After his return to the Low Countries, he made a considerable number of etchings, in a masterly style; among which is a set of views of Brazil, from his own drawings; "View of the Gulf of All Saints in America;" "View of Cape St. Augustin;" and "A View of the Island of Thamarica," all in large folio; the three latter are very capital engravings, and are now become rare.

Cornelius Coning, or Koning, was born at Haarlem, A.D. 1624. He is among those artists who are but little known, and who deserve to be known better. We have some portraits of the illustrious men of the sixteenth century, engraved by him in a firm and pleasing style; but can only specify the following, few; Laurent Coster, the printer of Haarlem, from J. V. Compes; Martin Luther, the reformer, both in large folio; Dierck Philips, theologian; Menno Simons; and Adriaans Tetroolus, of Harlem, from P. Grebber; and some of the princes of Prussia, after Audiceffin, which we are not able to detail, all in folio.

Bernard Baleau, or Bailly, or Van Balen, was a native of the Low Countries, who flourished at Rome during the latter half of the seventeenth century, but the events of his life are obscure, and we are not acquainted with his birth-place; he worked entirely with the graver, in a heavy style, and his portraits, which are the chief of his works, have no great share of merit, either with respect to drawing, or the execution of the engraving. The following are the most important.

Portraits of cardinal Urbin, who was chosen pope in the year 1672; Canute, king of Denmark, after C. Panig; Our Saviour between St. Helena and Mary Magdalen, from Lazaro Baldi; "St. Mary Magdalen de Pazzio," from the same painter, all of folio size; "St. Peter of Alcantara, to whom the Virgin and Infant Saviour are appearing," from the same master; and the five saints canonized by Clement X. viz. "St. Cyprian;" "St. Francis Borgia;" "St. Philip Benetius;" "St. Louis Bertrand;" and "St. Rosa, with the Infant Christ," all in large folio, after Ciro Ferri. This artist likewise engraved many of the plates for a work intitled "Effigies Cardinalium viventium."

Paul Potter, the very celebrated painter and etcher of animals and landscape, was born at Enkhuizen in the year 1625. He was the son and disciple of Peter Potter, a painter of inconsiderable talents, but is far from indebted for his extraordinary attainments to his father's instructions, than to his own assiduous study of nature. No artist has shewn more sensibility to the beauties of rural landscape scenery, or more early and thorough knowledge of the forms and colours of those animals which constitute its most brilliant ornament; the style of none is more simple, original, and unsophisticated; the genius of none shone with a brighter ray, for the short day of his glory, over the paternal and domestic scenery of his native country. He died at Amsterdam A. D. 1654, at the early age of twenty-nine years.

The works of Paul Potter are held in very high estimation. His etchings are greatly and justly admired for the taste, spirit, and simplicity of style which are displayed in

them; and collectors often pay large sums for fine impressions of them.

His prints are original works, *i. e.* done immediately from his own compositions and studies from nature, and are not numerous. But we are uncertain whether or not the following short list contains the whole of his engravings.

A set of five, in small folio, of various horses, with landscape back-grounds. A set of eight, in quarto, of cows and bulls, &c. A mountainous landscape, with a peasant driving cattle, a very fine and rare print, in folio. Another very beautiful landscape, in which a shepherd, surrounded by his flock, is playing on his pipe, also of folio dimensions; and a set of small plates of plants and flowers.

Nicholas Ryckmans, or Richmaus, was born at Antwerp in the year 1620. He was probably the disciple of P. Pontius, whose style he imitated, or rather tried to imitate. He worked with the graver only, in a neat but stiff manner, and the outlines of the naked parts of his figures (the extremities especially), are exceedingly incorrect. The following are among the best of his works, which the merit of Rubens, rather than his own, have recommended to public notice. "The Adoration of the Wise Men," from Rubens, in large folio; the first impressions of which are prior to the insertions of the address of either Gasper Huberti, or Corn. van Merlen. "The Entombing of Christ;" "A Head of Christ;" and "The Holy Family," very rare, all in folio; "Ulysses discovering Achilles at the Court of Lycomedes," in large folio; "Our Saviour and his Thirteen Apostles," half figures, on a set of fourteen leaves, in quarto, all after Rubens; and a work, intitled "Palazzi di Genova, raccolta e designati da P. P. Rubens." It is divided into two parts, representing the plans, elevations, and sections of the principal palaces and churches at Genoa: the first part contains seventy-two plates, and the second sixty-seven. It was first printed at Antwerp in 1622, and reprinted in 1652, and is of large folio dimensions.

Cornelius van Caukerken was born at Antwerp, A. D. 1625, where he established a print-shop of respectability, and engraved several plates from Rubens and other masters. He worked entirely with the graver, in a heavy, laboured style, without much taste. He usually crossed his second strokes squarely upon the first, which mode of engraving requires more exquisite handling of the graver than Caukerken possessed, to render the effect agreeable. His lights are generally too much covered; and his drawing is very defective. However, some of his best prints are by no means devoid of merit: among which number the following may be reckoned.

Portraits.—Peter Snayers, of Antwerp, from Van Heil; Tobias Verhaect, a landscape painter, from Otho-van-ius; Peter Meerte, a portrait painter of Brussels; Robert van den Boeck, a painter of camps, from Gonzales Coques; John de Carandolet; Francis de Faino, baron de Janajo; Charles van den Bosch, bishop of Bruges, in an oval, without the names of the painters, all of quarto size; and Charles II. of England, with a back-ground by Hollar, in large folio.

Historical, &c. after various Masters.—"A dead Christ lying on the Ground, with his Head on the Lap of the Virgin," after Caracci; "A dead Christ, supported by the Holy Virgin and St. John," after Vandvke; "The Descent of the Holy Spirit;" "Charity with three Children," both from the same painter; "Roman Charity," after Rubens, a plate much to be preferred to the other engravings of Caukerken, and of which it is uncommon to find good impressions; "St. Anne and the Virgin," after Rubens, in folio, a rare print; "The Martyrdom of St.

Lievijn," bishop of Ghent, after Rubens, in large folio (those impressions are the best with the address of Hollander); and "A Female suckling a Child," in folio, from Ab. Diepenbeek.

Philip Fruytiers was born at Antwerp in the year 1625. He was originally an oil painter, but afterwards preferred water-colour, and greatly excelled in miniature painting. His works chiefly consist of portraits and conversations, which he executed in a very masterly style. His heads are very expressive, and his draperies well drawn. Rubens was so much pleased with this painter, that he and his family sat to him; and the picture of them, which he painted, was considered as his master-piece.

Fruytiers likewise excelled in etching, which he performed in an intelligent style, worthy of a great printer; and generally produced powerful effects of chiaroscuro. His engravings are not numerous, nor are we able to specify more than the following.

Portraits of Godofredi Wendelini, a philosopher of the seventeenth century, in folio; Marcus Ambrosius Capello, bishop of Antwerp; Jacob Edelherr of Louvain, both in large folio; Hedwige Eleonora, queen of Sweden; and an emblematical subject on the birth of the Virgin, in folio, all from his own pictures.

For an account of the merits of John Eyt as a painter, see vol. xvi. part ii. He flourished at the period which is now under our review, and etched some few plates of animals with his accustomed feeling and vigour, of which the following is a list. A set of eight, in quarto, of various animals. And a set of seven, comprising the title, with a dedication to Don Carlo Gualco, marchese di Solerio, &c. &c. of dogs, with landscape back-grounds, in small folio. Few painters have produced etchings in a more feeling and animated style than this set is executed.

Henry bary was a native of Holland, born A. D. 1626. His style of engraving seems to have been formed from studying the prints of Cornelius Vliether; and the imitation appears most evident in his portraits; especially those which he has executed in his neatest manner. In drawing, taste, and harmony of chiaroscuro, he is frequently deficient; yet sometimes he has discovered much mechanical skill, and seems to have handled his graver with facility. One of his best and most finished prints is "Spring and Summer," personified by two children, a small upright plate, from Vandvke, and executed as a companion to the "Autumn and Winter," engraved by Munichuyten, after G. Lairelle. This plate is executed entirely with the graver, in a clear neat style, and shews his management of that instrument in the most striking light. Among the best of his remaining engravings are the following.

Portraits without the Names of the Painters.—Dirk and Walter Grabeth, painters on glass; Adrian Heerebond, a philosopher; Hieronymus van Bevernink; Didier Erasmus of Rotterdam, all of quarto size; Wilhelm Joseph, baron of Ghent, and admiral of Holland; Roelabout Hagerbeets, both in folio; Anitius Marius Severinus Boetius, in quarto; Jacobus Taurinus; the count John of Waldstein, both in folio; and the dachefs de la Valiere, in large folio.

Portraits signed with the Names of the Painters.—Hugo Grutius, after Michael Judon Mireveldt; Cornelius Ketels, the painter, from a picture by himself, both in quarto; Jacob Backer, the painter, after C. Terburgh, in an oval of folio size; John Schellhammer, minister of Hamburg; John Zas, a reformer of Gouda, from Chr. Pierfon; Jacob Batelier; and Arnold Guitermans, from Weisterbaen, all in folio; Michael de Ruyter, the Dutch admiral, after F. Bol; admiral Vlugh, after B. vander Helst, both in large folio;

Leo van Altzema, a Dutch historian, after J. de Baen, in large folio; and George de Mey, a celebrated theologian, after Coen Diemen, in folio.

Historical, &c.—"Neptune," a quarto plate, engraved from Bary's own composition. An allegorical title page to a work by Leo van Altzema, after Seemer, in folio. A woman suckling an infant, without the painter's name, and perhaps designed by himself. A pair of peasantry, in quarto, after A. Brouwer; the country house-keeper, after P. van Aerlen, in folio. A pair, intitled "Take Care of the Water!" and "Wine makes the People insolent," after F. Mieris, each inscribed also with four Dutch verses, in folio; and "A Youth dressed in a Hat and Feathers," after G. Terburgh, also in folio.

John Munnickhuysen, or Munichuyfen, was a native of Friesland, born A. D. 1636. He resided at Flanders, and executed a considerable number of meritorious works with the graver, among which are the following

Portraits of Hendrick Dircksen Spiegel, a burgo-mailler, a very fine engraving, from J. M. Limburg; Francis Burmann, professor of theology at Utrecht, from C. Maas; Gerard Brand, preacher at Rotterdam, from M. Muscher, all in folio; Peter Zurendonk, rector of the Latin school of Amsterdam, from David Plaats, in large folio; John van Wayen, preacher at Middleburg; Daniel Gravi, a clergyman of the same place, from Z. Blyhof, both in large folio; Peter van Staveren, a clergyman of Leyden, from Wilhelm van Mieris, in folio; admiral Van Tromp, of Holland, a fine portrait, from D. A. Plasse, in large folio; and the companion to Bary's "Spring and Summer;" representing "Autumn and Winter," personified by children, after Vandyke.

Hercules Zeghers, or Zegers, was born at Utrecht in the year 1625. He is spoken of by the author of "Lives of the Dutch Painters, &c." (Deschamps), as having been an artist of fertile invention, but an unfortunate exemplification of the scriptural text, that "the race is not to the swift, nor the battle to the strong, nor riches to men of understanding, nor favour to men of skill."

He both painted and engraved landscape. The above writer says, that his compositions are very rich, and much varied; and that he commonly represented very extensive scenes, with far distant horizons, but met with no patronage or encouragement. Nor was he a whit more fortunate, in this respect, in his etchings, which soon issued forth from the retail shops, as wrappers to other commodities.

The present writer has not seen any of the works of Zeghers, and is inclined to think that Deschamps may have overrated his merits. It is not easy to believe that at Utrecht, in the seventeenth century, good prints would have been depreciated to the value of waste paper; or if a solitary instance or so, of such depreciation had occurred, that very circumstance would have advanced meritorious engravings to some public notice, which must have led towards appreciation, and have finally benefited the artist, however obscure, in spite of the crafty practices of the print-dealers.

That Deschamps was not very observant as a connoisseur, nor very correct as a writer, may be inferred from his statement, that Zeghers discovered the secret of printing in colours upon *canvas*: where, for discovered the secret, we should read, had recourse to the expedient; and for *canvas*, according to the baron Henneken, we should read paper.

The concluding anecdotes related of this artist are probably more worthy of credit and of regret. Hercules made a last, and, according to Deschamps, a stupendous effort, sparing neither time nor pains, nor any kind of exertion of which he was capable, and produced an admirable land-

scape, of which he offered the engraved plate for sale to a print-dealer. The dealer advised him to convert his plate into stuff-boxes; and the artist heard with indignation that he would purchase it at no higher rate than the value of the copper. Zeghers took back his landscape, and, vowing that a half impression should sell for as much as the dealer had offered for the plate, destroyed his engraving in a paroxysm of disappointment. The artist thus verified his vow, and the dealer lost his bargain; but two proofs had been taken from the plate, and they were purchased at the price of fifteen ducats each.

Nothing certain, however, can be inferred from this anecdote, without seeing one of the two impressions from this plate, or hearing some more faithful report of its merits than Deschamps appears to have been qualified to give; since we know not who were the purchasers; and the ignorant part of the tribe of collectors, will often freely give those sums for rarity, which they withheld from meritorious exertion.

Unable longer to endure the scorn and the neglect with which he was treated by the dealers and the public, this unfortunate artist addicted himself to drinking; and, one day returning to his house in a state of intoxication, fell down stairs, and so materially injured himself that he died in a few hours.

It is almost superfluous to add, that the works of Zeghers are very scarce. In the public hall at Dresden are fifteen of his pictures; and another is mentioned by Houbracken, vol. ii. p. 136.

Gerard Valck, the servant, and afterwards the brother-in-law, of Bloteling, was born at Amsterdam in the year 1626. But both these artists migrated to England; and the reader will find an account of them, and their works, in our account of the *Origin and Progress of ENGLISH Engraving*.

Cornelius van Dalen the younger was born at Antwerp in the year 1626. He was the son of a print-seller of the same baptismal name, and, out of distinction, always added the word junior to his name. He is said to have learned engraving of Cornelius Visscher; but his style varied from time to time, resembling, as occasion appeared to him to require, those of Lucas Vorsterman, P. Pontius, S. Bolswert, and other masters. A set of antique statues, engraved by him, are in a bold, free style, as if founded upon that of Goltzius; others, again, seem imitations of that of F. de Poilly. In all these different manners he has succeeded; and they manifest the extraordinary versatility of his powers, and great command he had of the graver: for he worked with that instrument only.

He engraved a great variety of portraits, some of which are very valuable, and form the best, as well as the larger part of his works. He did not succeed so well in drawing the naked parts of the human figure: his outlines are heavy, and frequently incorrect; and the extremities, the feet especially, are seldom well marked. The following are selected from his best engravings:

Portraits.—Queen Catherine of Medicis, seated, a very fine engraving, in large folio; Francis Deleboe Sylvius, a physician, C. V. Dalen del.; John Ruppert van Groenen-dyck, the burgomaster of Leyden; Jacob Baudes Heertoot Wassenaer, lieutenant and admiral; the old, old, very old man, Thomas Parr, aged one hundred and fifty-two, all of large folio size; Eneas Dupré, the theologian, from D. Baudrigeen; Anna Maria Schierman, with six Latin verses, after Van Ceulen; Andrea Rivetus, professor of theology; Frederic Spatheim, from Van Negre, professor of theology, all in folio; James, duke of York and Albany, from San-

Lutichuys; Charles II. of England, companion to the preceding, from the same painter; John Maurice, prince of Nassau, after Gov. Hineck; Maarte Harpertz Tromp, the Dutch admiral, after Liveness; four very fine portraits, after Titian, from the cabinet of Reynst, viz. Peter Aretine, John Boccaccio, George Barberelli, and Sebastian del Piombo, all of large folio dimensions.

Hybrid, &c.—"The Adoration of the Shepherds;" "The Virgin and Infant Christ," both in 4to.; an allegorical engraving, representing a fair leading an ass, and a woman and child lying near a cock, in 4to.; "The four Fathers of the Church," after Rubens, in folio, executed in the style of P. Pontius; "The Graces embellishing a Statue of Nature," after the same painter, a large upright print on two plates. In the execution of this print, he seems to have had an eye to the neater works of S. Boffwert. "A Shepherd crowning a Shepherdess with Flowers," after Callelyn, in 4to.; "The Holy Virgin presenting the Breast to the Infant Christ," after Hineck; "Venus and Cupid;" and a head of a negress, both from the same painter, all in folio; "The four Elements," represented by children, in ovals of quarto size; a concert of four persons; "Giorgione," in large folio, from the cabinet of Reynst; and "The Monument of Admiral Van Tromp," after a marble group by Verhulst, a very rare print, in large folio.

Nicholas van Hoië, or Van Hoy, was born at Antwerp in the year 1626. He was but an indifferent engraver; but, at the death of Francis Leux, was entitled cabinet painter to the emperor of Germany. In conjunction with Steen, Offenback, and other artists equally indifferent with himself, he engraved the collection of pictures, which D. Teniers the younger made for Leopold, archduke of Austria. This collection was published at Antwerp in the year 1660, in folio, consisting of two hundred and forty-three prints, and is usually known by the name of the Gallery of Teniers. The following engravings are likewise by him: "The Virgin and Holy Infant, with St. Jerome," after Baroccio, in 4to.; "Christ and the Woman of Samaria," after Raphael; "The dead Body of Christ extended on the Earth, and the Virgin prostrate before it," from D. Fetti; and "Apollo and the Muses on Mount Parnassus," after Tintoretto, all of folio size.

Richard Collin was born at Luxembourg in the year 1626. He went to Rome to study under Sandrart, from whose drawings he engraved several plates. He afterwards returned to Antwerp; from whence removing to Brussels, he was honoured with the title of engraver to the king of Spain. But in his engravings he seldom exceeded mediocrity. There is a portrait of this artist, with a long inscription in bad French. The following are some of his best engravings:

Portraits of Artus Quellinus, a statuary of Amsterdam; John Philip van Thienen, a flower-painter, both from E. Quellinus, in 4to.; Joachim Sandrart; Cornelius Hazart, a controversialist, both in folio; Bartholomew Murillo, the celebrated painter of Spain; Christian Albert, bishop of Lubeck, both in large folio; Anna Adelhildis, uxor principis de la Tour et Taxis; Claude Francis de la Vieville, abbé of Louvaine, in large folio; Arnold John Philip de Raet van Voont, knight of the order of Christ; and the thirty portraits of the saints of mount Carmel, all in large folio.

Historical, &c.—"Ester before King Ahasuerus," in large folio, from Rubens; "Christ carrying the Cross," after Van Diepenbeck, in folio; "St. Arnold," after the same painter; and "The Sepulchral Monument of Peter Pafqual," both in 4to.

Francis van Neve, or de Neve, was born at Antwerp, A.D. 1627. He studied the works of Rubens and Vanduyke, and afterwards travelled to Italy. He became a landscape-painter of considerable merit, and succeeded remarkably well in introducing small figures into his pictures.

On his return to his native city, Van Neve etched a considerable number of landscapes, into which he introduced historical figures with much judgment. They are executed in a slight, but intelligent style; the effects are very agreeable, and they are all from his own compositions, proving at once the excellency of his taste, and the fertility of his genius. The following are selected from his work, as being the most meritorious.

A pair of mountainous landscapes with buildings, and figures in the costume of the Grecians; a pair of landscapes of the same character, with an angler and two other figures in one, the other has a large tree and a river in the fore-ground, and a man tending sheep at a distance; a pair of pastoral landscapes, with figures in the dress of Arcadian shepherds; a pair of landscapes, into one of which is introduced Diana and Endymion, and in the other Venus and Cupid; and another is Venus reposing on the banks of a river, and Cupid swimming in it; a pair of historical landscapes, in one of which is Narcissus admiring himself; and the other is a pastoral scene, with a shepherd playing the tabor, accompanied with his flock; all of folio dimensions.

Henry Verschuring was born at Gorcum in the year 1627. He learned the rudiments of art under Theodore Govertz, whose school he quitted to study under John Both. From Utrecht, where Both resided, he went to Rome, where he frequented the public academy, and travelled successively to Florence and to Venice. In 1655 he returned to his native country, where he painted battles, skirmishes, and subjects of that kind, with great success; he always imitated nature with much truth, and his compositions abound with wild variety and characteristic spirit.

Verschuring executed a considerable number of slight etchings of skirmishes, military surprisings and pursuits, from his own compositions, of which the present writer is unable to say more than that they are very scarce.

This artist was drowned in a tempest at sea, on the twenty-sixth of April, 1690.

John or Joshua Offenbeck was born at Rotterdam in the year 1627, and became a landscape and cattle-painter, whose merits will be treated under the article *OSSENBECK*.

He travelled successively, either for patronage or improvement, to Frankfurt, Mayence, Ratibon, and Vienna, and in the course of his professional career, executed a considerable number of etchings in a free and painter-like style. Huber thinks they are the production of his leisure, but it may fairly be presumed that at least those which he executed for the gallery of Teniers were done as much for profit as for pleasure.

Among these are "The Death of the Children of Nöbe," after Palma; "The Children of Israel gathering Manna in the Desert," after Tintoret; "Orpheus charming the Brutes," and "The Four Seasons," all after Bassan, and of folio size. Offenbeck is thought to succeed better in etching after the pictures of Bassan, than those of any other master, and the last-mentioned are among his very best prints.

For other publications he produced two sets, of twelve quarto plates each, from his own compositions, of which one set consists chiefly of animals: "A View of the Campo Vaccino," at Rome, and "The Cafarella, near the Gate of St. Sebastian," in the same city; "A Boar-hunt," after Bamberocco, and the chateau of M. de Wenzelbourg, drawn presumptively by himself, all of folio dimensions.

LOW COUNTRIES, ENGRAVERS OF THE.

A set of six large upright folio etchings, entitled "The Gallery of Wenzelbourg," and after Salvator Rosa, Peter de Laer, and St. Vlieger, are of great variety; and "The Representation of a grand Festival given at Vienna," after a picture by Alex. Lantucci, in large folio, is also among the finest and rarest engravings of this master.

Adrian vander Kabel, or Cabel, was born at Ryfwick, near the Hague, A.D. 1631. He was the disciple of John van Goyen, but appears to have formed his style partly from studying the works of Salvator Rosa. He painted and etched landscapes, which were sometimes of pastoral, and at others of marine character, all of which he studied from nature, and imitated her with great accuracy.

The Rev. Mr. Gilpin justly remarks of his etchings, that, "in those which he has studied, and carefully executed, there is great beauty. His manner (style) is loose and masterly. His prints want effect, but abound in freedom. His trees are often particularly well managed: and his small pieces in general are the best of his works."

Among these may be distinguished a set of six quarto landscapes, ornamented with figures and ruined edifices; another set of thirty of mountainous character, with rocks, castles, and cataracts; another set of four, also of romantic character, adorned with figures and ruined fabrics, in folio; a pair of landscapes of the same general character, also in folio; and, in larger folio, another pair of "St. Jerome in the Desert," and "St. Bruno," or, according to Strutt, "St. Anthony," also in a wild and savage landscape. It is remarkable, that in the latter plate the figure of the saint is *engraved*, without any cross-hatchings, in the style of Mellan, and if Strutt's conjecture be right, is inserted by some other artist. The two latter prints are probably the rarest, though not the best, of the prints of Vander Kabel, who died at Lyons in the year 1695.

Jeremiah Falck, or Falk, was born at Dantzic some time about the year 1650. In his youth he travelled to Paris, and studied under Chaveau, but settled afterwards in Holland, where he etched and engraved several plates for the cabinet of Reynlt, in consequence of which he is generally classed with the engravers of the Low Countries. He worked both with the etching-needle and the graver, and engraved history and portrait with considerable success. In the course of his life he visited the courts of Denmark and Sweden, but finally established himself at his native city of Dantzic, where he died at an advanced age.

The number of his plates that are subscribed with his name, with the addition of "Van Stockholmia," shew that he must have remained in Sweden for some years, and have given rise to the suspicion of Strutt, that he was a native of that country. His style of engraving is vigorous and free, and his drawing tolerably correct, but his characters are defective in harmony.

The Abbe Marolles was in possession of ninety-three engravings from the hand of Jeremiah Falck, from which the following may be selected, as affording the best specimens of his abilities; viz. the *Portraits* of Tycho Brahe, inscribed "Non habere sed esse;" William Blaeu, the disciple of Tycho Brahe, a celebrated geographer, both in folio, and from drawings by himself; Constantine Terbor, of Ham-burgh, after Ad. Boy; Andrea de Leizno Lefczynski, bishop of Kaminiac, inscribed J. Falk, Polonius sc.; queen Christina of Sweden; Peter Gembici, bishop of Cracovie, all after his own drawings; Hans Schack, a Danish general, after C. van Mander; Louis de Geor, after David Beck; Leonard, count of Torkensfohn; Axel, count of Oxenstiern; Axel Lilio, a senator of Sweden; Adolphus Johan, prince palatine; Charles Gustavus, prince of Sweden, all after D. Beck,

and in folio; and Adrian Spieghelius, for the folio edition of his work, which was published at Amsterdam, A.D. 1645.

Historical, &c.—A set of "The four Evangelists," half-length figures, in quarto; "A Concert of Music," consisting of four performers, after Gaerckins, engraved for the cabinet of Reynlt, in large folio; "The Virgin and infant Christ, accompanied by St. John," after J. Stella, in folio; "The Cyclops at the Forge," after Michael Angelo; "Esau disposing of his Birthright to Jacob," after Tintoretto; "A Man and Woman singing," from a picture attributed to John Lys, in folio; "The old Coquet at her Toilette," from the same painter; and "St. John preaching in the Desert," after Bloemart, a very capital engraving, both in large folio. The last five engravings were for the cabinet of Reynlt.

John Hackaert, the landscape-painter of Amsterdam, of whom we have treated in our vol. xvii. etched a few plates, about this period, with much ability, and in a style resembling that of Waterloo.

Of these the chief are a set of six quarto plates of simple rural scenes, apparently views from nature. They are etched with taste, and No. 4 is particularly beautiful.

Daniel Stoppendael of Holland was born in the year 1630. In his style of engraving he was a follower of Cornelius Visscher, but, like other *followers*, was always behind.

His principal engravings are, a portrait of Erasmus reading, on a pedestal, in large folio; a set of twelve of figures and animals, in quarto, dated 1651; a collection of sixty views, entitled "Les delices de Diemen Meer," engraved from his own drawings, and another set of thirty-four views in Holland, all of quarto dimensions.

B. Stoppendael, or Stoependaal, was the countryman and contemporary of Daniel. Whether they were related is uncertain. He migrated to England with William III. and his principal works, which are now become scarce, record the events of the revolution, which placed William and Mary on the throne of these kingdoms.

"An Attack of a Convoy of Provisions;" the robbery of a coach, commonly known by the title of "The Pistol Shot," and "The Lime-kiln," were engraved by Stoppendaal, after Visscher's prints from Bamboccio, and are at present more sought after than the originals. "The Departure of William III.;" "The Arrival of that Prince in England;" "His Coronation;" and "His Opening of the Parliament," are of folio size, and from designs by the engraver himself.

Frederic Henry van Hohe was born at Haerlem, A.D. 1630, but migrated to England, and resided chiefly in London, where he was employed by the bookellers, and chiefly by John Dunton. His abilities were not considerable, but at a period when few engravings appeared that were superior to his, it is not to be wondered at that those of Van Hohe should have been held in some degree of estimation.

His prints are dated from 1648 to 1692, in which last year he executed the portrait of king William on horseback, which was prefixed to "The Epitome of War." His best engraving, according to Strutt, is the portrait of Jacob Cornelis, a middling-sized upright plate arched at the top, from C. Visscher, whose style of engraving he has imitated with some little success. The productions of his graver were chiefly portraits, among which are those of sir Edmundbury Godfrey, in folio; and sir Matthew Hale, in quarto. He engraved this last portrait twice, but the smallest is the most esteemed. Several frontispieces and book ornaments, and many of the plates for Quarles's Emblems, are also among the prints of Van Hohe.

The Bouttats were a numerous family of painters and engravers.

engravers. Frederic was born at Antwerp A.D. 1630, and had twenty-four children, of whom twelve were educated to different branches of fine art. Frederic published the works of other engravers as well as his own, and may deserve more credit in the annals of commerce (if such there be) than can be allowed him in those of art. He worked with the graver only, in a neat but dry style; his works are numerous, and consist chiefly of portraits, but their merits are small. From among them the following may be selected with advantage.

The *Portraits* of J. Baptist van Heil, a portrait-painter of Brussels; Daniel van Heil, a landscape-painter; and Leo van Heil, an architect, from pictures by J. Baptist van Heil; David Ryckaert, from a picture by himself; Charles Emanuel, duke of Savoy; Charles Gaspar, elector of Treves; Christina, queen of Sweden; Oliver Cromwell; Frederic-William, elector of Brandenburg; John George, elector of Saxony, all in quarto.

Of his *Historical* engravings—"The Holy Virgin, with St John and the Infant Saviour," and "A Card Party," from a design by himself, are alone worthy of notice.

Gaspar Bouttats was a younger brother of Frederic, who worked chiefly for the Dutch book-sellers. His prints consist chiefly of etching, which he performed without taste, in a tame and rapid style.

Beside his book-plates, which we shall not enumerate, he engraved a few of larger dimensions, among which are, "The Massacre of the Huguenots;" "The Assassination of Henry IV. of France;" and "The Decollation of the Counts Nadasti and Cerini, and the Marquis Francissani," all of large folio size, which, as they are without painters' names, are perhaps designed by himself; and "A Provision Tent," after Wouwermans, also in folio.

Gerard Bouttats was of the same family, and was born A.D. 1634, at Antwerp. He travelled during his youth to Vienna, where he became engraver to the university. His works rise not above mediocrity, and consist principally of portraits from his own drawings: among them are Adamaus Munds; Antonio d'Aumont; Charles Joseph, archduke of Austria; and Don Peter, king of Portugal, all of quarto size.

His best *Historical* prints are, "The Name of Jesus;" and "The Resurrection of our Saviour," both in quarto.

Philibert Bouttats was likewise a native of Antwerp, and one of the sons of Frederic. His engravings are mostly portraits, but are destitute of merit. Among them is pope Innocent XI. in large folio; the dauphin, son of Louis XIV.; and its companion, Mary-Ann Victoria of Bavaria, both in folio ovals; Elizabeth Charlotte, duchess of Orleans; William-Henry, prince of Orange; Christian V. king of Denmark; Herman Werner, bishop of Paderborn, in a circle; Alexander Sidney, ambassador; John Sobieski, king of Poland, all in folio; and a Thesis, with the portrait of the bishop of Munster, in large folio. We pass over Peter Balhafar, and the remainder of this family, as too inconsiderable to be worthy of the reader's attention.

Adrian Lomelin was born at Amiens in the year 1636. He studied the art of engraving at Antwerp, and always resided there. He worked with the graver only, and handled it very indifferently, but, unfortunately, several of the capital pictures of Rubens fell into the hands of this engraver, and his works are here specified chiefly on account of the merits of the originals.

However, some of his portraits after Vandyke are not wholly destitute of merit, and from these the following may, with advantage, be selected.

Charles I. king of England; Ferdinand of Austria, governor of the Low Countries; Jacob le Roi, lord of Herbaix; John Charles de la Faille, a Jesuit of Antwerp; Alexander de la Faille, an Antwerp senator; Zegher van Houtsum, of Antwerp; Adrian Stevens, an ecclesiastic; John Malderus, bishop of Antwerp; John de Wael; and John Baptista de Billohoven, an Antwerp Jesuit. This last is reckoned the very best of the portraits of Lomelin: all are after Vandyke, and of folio dimensions.

Historical. &c.—"Abigail appeasing David;" "The Adoration of the Eastern Kings;" "The Circumcision;" "The Baptism of Christ;" "Mary washing the Feet of Christ;" "Christ appearing to Mary Magdalen;" "The Trinity;" "The Triumph of Charity;" "Time unveiling Truth and conquering Heresy;" "The Assumption;" "The Virgin and Infant Saviour," attended by St. Dominic, and various others, all of large folio size; "St. Cecilia," in folio; "The Judgment of Paris," in large folio, all after Rubens; "Christ taken in the Garden," from Vandyke; and "The Holy Virgin," with the youthful Saviour presenting a crown to four fathers of the church, in folio, after Diapenbeck.

Nicholas Pitau, or Pithau, was born at Antwerp in the year 1633. He was the son and pupil of James Pitau. He travelled to Paris A.D. 1660. Bassan erroneously informs us that he was born in 1664 at Antwerp; and Watelet says at Paris in 1633; Huber and Martini correct these mistakes, and from other authorities it appears certain that he was at Paris the time we have mentioned above, and died there some time about the year 1676. His style of engraving nearly resembles that of Francis de Poilly, though his strokes are more vigorous. His drawing is in general tolerably correct, but, at times, is rather heavy, especially in the extremities of his figures. He worked with the graver only, and appears to have handled that instrument with much facility; but from the sameness of manner with which he has treated his figures, draperies, and back-grounds, the effect of his prints is cold and silvery. Watelet, who generally writes with more taste and feeling than almost any other of the foreign critics on engraving, praises him somewhat too highly, when he asserts that "Pitau's engraving of the Holy Family, after Raphael, is a chef-d'œuvre, both for the beauty of the execution, the purity of the drawing, and the strength and justness of the effect. The character of Raphael has, perhaps, never been so faithfully translated as in this print, which, by amateurs, has been preferred to the famous engraving of the Saint, by Edelinck," which is after the same celebrated master.

This artist engraved both portraits and historical subjects, and the following are selected from his best.

Portraits.—St. Francis of Sales, bishop and prince of Geneva; Louis Henry, duke of Bourbon; Oliver Cromwell, after Vander Werf, all in folio; Alexander VII., after P. Mignard, in large folio; Vincent de Paule, founder of the congregation of the Mission of St. Lazarus, after Sim. François, in folio; James Fabier du Bulay, master of the court of Requests; and Henry Louis Hubert de Montmort, of the French Academy, both in ovals of folio size; Theodore Bignon, master of the court of Requests, all after Ph. de Champagne; Peter Seguier, chancellor of France, from N. de Platte Montagne, in large folio; Prioli, author of the French History; Alexander Paul Pitau, counsellor, both in folio; Gaspar de Fieubet, chancellor; Nicholas Colbert, in large folio, all after C. le Febure; Louis XIV. of France and Navarre; the dauphin, son of Louis XIV. both from le Febure; and an anonymous portrait of a man, half-length, after John Daret, all of large folio size.

Historical, &c.—"The Holy Family," after Raphael, in folio; "The Entombing of Christ," after L. Caracci, in large folio; "The Virgin with the Infant Saviour reading," in an oval, after Guercino; "A dead Christ, with Angels weeping over him," from the same painter; a half figure of "The Virgin with the Infant Christ," in folio; "Jesus Christ in the Clouds, with St. John and the Virgin interceding for St. Bruno," in large folio; "Christ and the Woman of Samaria;" "The penitent Magdalen;" "The Council of St. Sulpitius;" and "The Holy Family," all after Ph. de Champagne, and of folio size. Another "Holy Family," wherein an angel is presenting the infant Saviour with a basket of flowers, after Villagrain; and a large Thetis, after Seb. Bourdon.

Charles or Karel du Jardin was born at Amsterdam in the year 1635, and died at Venice in 1678. He was the disciple of Paul Potter, or, as some authors affirm, of Berghem; and after studying for some years in his native country, made a voyage to Italy, under the pretext of accompanying a friend to Livourne.

Here he was so well pleased, either with the climate and landscape scenery, or the patronage which Italy afforded him, that he continued there for the remainder of his life. As a painter, we have already treated of the merits of Du Jardin. Both as painter and engraver, he added sparkling force to the taste and touch of Berghem. He understood the anatomy of domestic animals, perhaps better than Potter or Berghem. He drew with the utmost freedom, though his drawing is strictly correct. He copied nature simply and exactly, though not servilely; and has given us not only the form, but the characteristic peculiarities also, of each animal. He never indeed, like Hondius, animates his creation with the violence of savage fury: his genius takes a milder turn. In his prints, all is quietness and repose. His dogs, after their exercise, lie stretched at their ease; and the languor of a meridian sun commonly prevails through the piece. His composition is beautiful; and his execution, though neat, is spirited.

Some of his prints are of quarto, and others of folio, dimensions; but they are generally met with bound together in a folio volume, which is highly and justly valued by all persons of taste, and consists of fifty leaves. His subjects are generally landscapes, or pastoral conversations, in which cattle are often the principal objects. Of that which is placed the fifth in the volume, the Rev. Mr. Gilpin has written: "The design, though humble, is beautiful. The two dogs replying at noon, after the labour of the morning, the implements of fowling, the fictitious hedge, and the hoop-holes through it, all correspond, and agreeably tell the little history of the day. The composition also is good. The nets and fowling-pieces are judiciously added, and make an agreeable shape with the dogs. The hedge adds another pyramidal form. The light is well distributed. The drawing and expression are pure nature, and the execution elegant and masterly."

REYSDART, (for an account of the character of whose merits as a painter, see that article,) executed, about this period, some very masterly etchings; they are right, but very picturesque, and may be considered as beautiful sketches from nature. The following are a selection of the best: a very scarce, woody landscape, of very delicate execution, in small 4to.; a sea-view, with vessels, and a mountain towards the left, crowned with trees and buildings, in 4to.; a cottage embosomed in trees, with a wooden bridge, and a peasant and dog, in folio, executed in a broader style; a forest scene, in folio; and a landscape of wild character, with a hovel on the descent of a hill, in folio.

John le Ducq was a native of the Hague, and born in the year 1636. He learned the rudiments of painting of Paul Potter, whose style he imitated with much success. In 1671 Le Ducq was made director of the academy of painting at the Hague, and enjoyed the reputation of a good artist; but after some years he quitted the arts, and entered the military service. Le Ducq executed several etchings from his own designs, with much intelligence and precision; among which is a set of eight quarto plates, of dogs, dated 1654.

Romyn or Romain de Hooghe was born at the Hague in the year 1638; and being a man of genius, and of great fertility of invention, soon distinguished himself both as a designer and engraver. His style of art was singular and extravagant; but the surprise which his designs excited, and the impression which their novelty made on the public mind, occasioned his compositions to be much sought after; and he composed and engraved many of the frontispieces to the books which were at that time printed in Holland.

The Rev. Mr. Gilpin says of him: "Romain de Hooghe is inimitable in execution. Perhaps no master etches in a freer and more spirited manner: there is a richness in it, likewise, which we seldom meet with. His figures, too, are often good; but his composition is generally faulty: it is crowded and confused. He knows little of the effect of light. There is a flutter in him, too, which hurts an eye accustomed to, and pleased with, simplicity."

His prints are generally either historical or allegoric, and among them, "The Deluge at Coeverden" (which, as Mr. Gilpin says, is finely described) has excited much notice.

This Deluge at Coeverden is a small folio print, and is properly an *historical landscape*. De Hooghe had here a country to describe, and a story to tell. The country is the environs of Coeverden, a Dutch town, with an immense bank thrown up against the sea; the story is the ruin of that bank, which was broken through in three places by the violence of a storm. The subject was great and difficult, and the artist has acquitted himself in a masterly manner. The town of Coeverden fills the distant view: the country is overspread with a deluge, the sky with a tempest, and the breaches in the bank appear in all their horror. The composition, in the distant and middle parts, is as pleasing as such an extensive subject can well be. An elevated horizon was necessary to give a distinct view of the whole. The light is thrown over the landscape in good masses; and the degree of flutter, which Mr. Gilpin seems to censure above, was here congenial to the subject. The expression of the figures, of the horses especially, is very strong: those which the driver is turning, to avoid the horrid chain before him, are impressed with the wildest character of terror; and indeed the whole scene of distress, and the horrible confusion in every part of it, are admirably described.

The execution, though good, is inferior to that of some others of the works of De Hooghe; and, with the foreground, a popular critic finds the following fault: The spirit, he says, which the artist has maintained through the rest of the piece, seems here to flag; whereas if he should have closed the whole with some noble confusion, which would have set off the distant parts, and struck the spectator with the strongest images of horror. Instead of this, we are presented with a few pigs and calves shivering in the water. The thought seems borrowed from Ovid. In the midst of a world in ruins,

—"Nat lupus inter oves."

Among the numerous productions of this artist, the following are the most distinguished: Servatus Galenus. Resurrexerunt.

terodamensis Batavus, in folio; admiral Michael Adriaensz de Ruyter, a very fine portrait, in large folio; "The Army of William III. at the Battle of the Boyne," and a medallion of himself and queen Mary, in large folio; "William Henry, prince of Orange, on Horseback, accompanied by the young Princes, entering the City of Amsterdam;" an allegorical subject, relating to prince William Henry; another allegory, in compliment to Leopold II.; "The Marriage of William, Prince of Orange, with the Princess Mary;" "The Entry of the Prince of Orange into London;" "The Coronation of William III. in Westminster Abbey;" "The Flight of James II. into France;" "Louis XIV. receiving James at St. Germain's;" "The Siege of Vienna by the Turks;" "The Return of John III. king of Poland, after defeating the Turks;" "The Siege of Rochester," and "Taking of the Fort of Sheerness," both subjects on one plate; "The Excesses committed by the French Soldiers at Bodegrave, and other Places in Holland;" "The Defeat of the French at Hochlilädt in 1704," with the medallions of prince Eugene and the duke of Marlborough, all of large folio size; "The taking of Constantinople by the Turks," in folio; "The Jews' Synagogue at Amsterdam;" "The taking of Nerva by Charles XII. in the Year 1700;" "The City of Gran, assaulted by the Imperialists," both in large folio; "The Battle of St. Denis," on two large plates; "The Prince of Orange declared Stadtholder of Holland;" "The Arrival of the Prince of Orange at London in 1688," in large folio; twelve plates, illustrative of the fashions of the seventeenth century, invented by De Hooghe, in 4to.; "The Deluge at Coeverden," in folio, (the plate on which we have commented at some length); "The Entry of Louis XIV. into Dunkirk," a large print, lengthways, on two plates, from Vander Meulen; "Charles II. king of Spain, descending from his Carriage to pay Homage to the Host," in folio, from De Hooghe's own composition; "The Massacre of the two De Witts," in folio; an emblematical print, exposing the vices of the monks and other ecclesiastics of the Romish church, a middling-sized plate, lengthways, with the name of Loggan affixed to it, though it is evidently the work of De Hooghe, who, fearful perhaps of affixing his own name, fathered this engraving upon a foreign artist; and "The Fair at Arnheim," in large folio.

Abraham Genoels, surnamed *Archimedes*, was born at Antwerp in the year 1638. He learned the rudiments of art of Jacques Backreel, and afterwards travelled to Paris for improvement, where he was employed by Le Brun and De Seve, and where a royal pension and apartments in the Gobelins were assigned him. From the French metropolis, Genoels travelled to Italy, the common theatre of improvement, and after studying there awhile returned to Paris, with the reputation of an excellent artist. In 1682 he visited his native city, where he died at an advanced age. Genoels executed a considerable number of etchings of landscapes in a free masterly style, ornamented with very good figures and animals; a considerable number of them are from his own designs, and the large ones are particularly excellent. His composition is in general good, though perhaps, in some instances, a little too much crowded with objects. His prints should be viewed as engraved *sketches*, not as translations of finished pictures. This is the limit of their pretension, and thus regarded they are beautiful productions. The monogram of this artist will be found in *Plate IV.* of those used by the artists of the Netherlands.

The following are a selection of the works of Genoels. A pair of mountainous landscapes, with figures and monuments in the antique taste, in 4to; three pair of landscapes of

the same character, and also in 4to; a set of four mountainous landscapes, with water and buildings; four garden views with figures and statues, in 4to; a pair of very fine Italian views, ornamented with figures and statues; an Italian garden, with fountains and figures; a large landscape with a waterfall; and a rocky scene with water, all of large folio dimensions, are generally reckoned to be his very best productions.

James Neefs was born at Antwerp, A. D. 1630, and was probably related to Peter Neefs, the celebrated painter of architecture. He worked principally with the graver, and handled it with great facility. He drew the human figure with some degree of correctness, but in a mannered style. The characters which he has given to the heads of his figures, especially when they required also an animated expression, is often exaggerated.

He engraved both portrait and history, and his best works, though faulty in the above respects, have much merit on the whole. The following are selected as being most worthy the attention of the collector.

Portraits.—Joseph Bergaigne, a Roman prelate, from Th. van Thulden; Gaspar Nenius, bishop of Antwerp, from G. Seghers; John Tollenario, a Flemish Jesuit, from P. Fruytiers; Francis Snyders, the painter, the plate of which was etched by Vandyke, and finished with the graver by Neefs; Anthony de Tassis, from Vandyke; the marchioness of Barlemont, and countess of Egmont; Joshua de Hertoghe, a minister of his Catholic majesty at Ratisbon; Martin Ryckaert, landscape painter at Antwerp, all from Vandyke; Jaan Dolenaris, Jesuit and author of the *Speculum Venitatis*, after Ph. Fruytiers, all of folio size.

Historical, &c.—"The Fall of the Damned;" "Melchizedek presenting Bread and Wine to Abraham;" "Christ on the Cross," all in large folio; "St. Augustin," in folio; "The Martyrdom of St. Thomas;" "The Judgment of Paris;" "The Triumph of Galatea," very rare, all in large folio; "Philippus Prudens, Antwerpia," representing the king of Spain crowned by two geni, in folio; "The Cardinal Infanta of Spain," in folio, all after Rubens; a woman with milk pails, and another with a basket on her head; "Jesus Christ and the six Penitents," after Seghers, in large folio; "Job mal-treated by his Wife," in folio; "The Martyrdom of St. Lievens;" "Jesus Christ appearing to Mary Magdalen," in large folio, after Seghers; "Christ before Pilate," after Jordans; "The Satyr, or the Guest who blew Hot and Cold," in large folio; "A Shepherd and Shepherdess at rural Diversion," both after the same painter, in folio; and "St. Roch interceding for those afflicted with the Plague," after Erasmus Quellinus, in folio.

Anthony Francis Baudins, or Baudouins, was born at Dixmude in the year 1640, and died at Paris in 1700. He was the disciple of Vander Meulen, and con-disciple of Van Hughtenbourg. He etched in a bold, free style, not unlike that afterwards adopted by Chateilain. Baudins executed a great number of plates, most of them from Vander Meulen; the best of which are as follows: a set of six landscapes, in small folio; a set of six, with buildings and figures, dedicated to Ph. de Champagne, in large folio; a set of eight, of buildings and figures; a hunt of hinds, dedicated to the marquis of Louvois; a stag hunt, a very rich composition; a large landscape, into which is introduced the march of the king to Vincennes, dedicated to Le Brun; a landscape, with the march of the queen to Versailles, dedicated to the duke de Noailles; a view of Besançon, on two plates; view of the city of Arras, in Picardy; view of the city of Gray in Franche Comte; the city of Bethune in Artois, on two plates; a view of St. Lawrence de la Roche,

Roche, in Franche Compté; the castle of Jeux, on the frontiers of Franche Compté; the castle of Versailles, as it was formerly; another view of the same castle as it is at present; the castle of Vincennes on the park side; the castle of Fontainebleau, on two plates; and two fine Italian garden views, after Genoels, all of them of very large folio dimensions.

Michael Mouzin, or Mosyn, was born at Amsterdam in the year 1636. In the execution of his plates he united the point and the graver, but not successfully, for his style is heavy and laboured, and his drawing incorrect. The following are extracted from his works as being most worthy of notice. Admiral van Wassenaer, of Holland, in 4to. oval; admiral Ruyter, after H. van Alde, in folio; Cornelius de Witt, after the same painter, in large folio; John van Galen; a Dutch admiral, from Livens, in large folio; a couchant Venus, after Jac. Ad. Backer; the four elements under the empire of Venus, from Holstien, in large folio; a group of children dancing to the music of a tambourin and triangle, played by a woman and satyr; another group of three children dancing; and a satyr presenting a bunch of grapes to a female and child, all after Holstien, in folio.

Jacob van Meurs was born at Amsterdam, A. D. 1640, but is rather an obscure artist. He chiefly engraved book plates and ornaments, and some few portraits in a neat stiff style, among which are portraits of Nicholas Copernicus, the astronomer; Sibrandus Franciscus Eydelshemius, from T. Faber, both in 4to.; professor George Calixtus, in folio; Henry van Dieft, doctor of theology, from Glauwe, in a quarto oval, and Charles II. of England, in folio, from Ant. Vandyke.

Levinus Cruylus, or Lewin Cruyl, was born at Ghent in the year 1640, but embraced the ecclesiastical life, and resided at Rome. He drew and etched a considerable number of views in Rome, enriched with figures and buildings in a very intelligent pleasing style. Many of his drawings were engraved by Julius Testa, and we have also some very fine etchings by himself, that are marked with a monogram which will be found in *Plate IV.* of those used by the engravers of the Low Countries. Of those the chief are a set of twenty-three views of Rome, ancient and modern, in large folio; and another very large set of Roman views, with buildings and figures.

Peter Philippe, an artist of small account, was a native of Holland, born some time about the year 1640. He engraved portraits, among which the following, though without possessing much merit, are probably the best.

A half-length of Louis Henry, prince of Nassau, in folio; prince Henry Charles de la Tremouille, after Vander Bane; the assembly of the States General of Holland, after J. Toornaeck; and a Dutch banquet, after the same painter, all of large folio size.

Peter van Schuppen was born at Antwerp in the year 1623. Of whom he learned the earlier rudiments of art is not known, but he completed his studies at Paris, whither he was invited at the same time with Edelinck, by the minister Colbert. His juvenile talents must therefore have been of high promise.

At Paris, he very judiciously placed himself under the instruction of Nanteuil; here he became justly celebrated both for the number and merit of his engravings, and here he died at an advanced age, A. D. 1702.

He engraved a considerable number of portraits, chiefly from his own drawings, and in a style which proves him to have been a man of considerable talent. The following are a selection of his best portraits, some of which are very fine.

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Claudius de Lingendes, in 4to.; Joannes Verrius, doctor of theology, after Loir; Samuel Bochart; Gilles Ménage, from de Pillis; and Nicholas le Camus, all in folio; Renard, cardinal of Elte, and bishop of Reggio, in large folio; Anne de Courtenay, consort of Maximilian, duke of Sully; Francis Pithou, juris consulte, and Peter Pithou, his brother, all in folio; Anthony Chasse, prior of the monastery of St. Vedast; Peter Mercier, a general, all in folio; Francis Villani, bishop of Tournay, from L. François; Anne Adolphe, baroness of Pautersen, from the same painter, both in large folio; Claude Bazin of Beson, from le Febure, in folio; Louisa Mary Armand de Simianes, countess of Lyons; Louis le Pelletier, a parliamentary minister, from Nicholas de Largilliere; Francis van Meulen, the painter; and the prince of Wales, both from the same painter; Julius, cardinal Mazarine, from Nic. Mignard; Louis XIV. in a laurel border of oval form, from le Brun; the chancellor Seguier, from le Brun; Maximilian Henry, elector of Cologne, from Bartholet Flamel; Bernard de Foix, duke of Valette, from P. Mignard; Philip Despont, doctor of theology, from his own painting, all of large folio dimensions.

Historical, &c.—"The Holy Virgin seated, with the Infant Christ," in an oval border of olive leaves, after Raphael, dated 1661, in folio; "The Holy Family, with St. John, who holds a Dove," from Seb. Bourdon. The earliest impressions are before the nudity of the infant was covered with drapery. "The Holy Family," after Gaspar de Crayer; another "Holy Family," the same, except that the figure of St. Joseph is erased; "St. Sebastian, with an Angel drawing an Arrow from his Body," after Vandyke, all in large folio: and "King David," after Ph. Champagne, in folio.

The reader has probably already perceived that we are now arrived at a period, when the natural operation of commerce had tamed down engraving to the trading level, and an engraver rarely appeared in the Low Countries worthy of particular notice, though *workmen* of that profession swarmed both in Holland and in Flanders.

The principle of the rapid acquisition of pecuniary profit, which is the main spring of trade, seems to be essentially at variance with all the nobler pursuits of art and science. An extraordinary artist—a phenomenon—may indeed now and then appear under such circumstances; as Mr. Bird, in our own times, has stepped majestically forth—the painter of pathetic sentiment—from the tea-board manufactories of Birmingham; but the general principles of trade are not to be the less regarded as destructive, or at least deeply injurious in their tendency, to all lofty intellectual effort, and all philosophical enquiry into those principles, on which improvement in art and science may be perpetuated. To be exercised with honour and advantage to a nation, fine art has ever required a nobler impulse and more fostering care, than the short-sightedness of commerce has been inclined or prompted to bestow. The golden eggs of art are never laid fall enough for the cupidity of dealers. And the Cyclopædia might blush to detail the records of some engravers, who found a degree of favour and protection with the print-sellers, which the word patronage was sometimes prostituted to express, merely because they *worked cheap*, and worked *submissively*.

Among these obsequious tools, the engraver who would be content to afford the merchant the largest share of profit, it became his interest to hold forth to the public, or to that part of the senseless herd on whom Fortune showers her favours in her moments of caprice, as the best artist. Disheartened by preferences so unprincipled, the engraver of

modest merit would retire in silence, and either change his profession, or, if he were unable to do this, would look round for refuge where he might.

Several of those of the Low Countries, who lived at this period, sought an asylum in England. Bouyed up by hope, perhaps attracted by false representations of our national taste or prosperity, they failed hither over a sea of Disappointment. They imagined an Hesperian garden, and found a sterile waste. They escaped from the rapacity of one set of dealers, to drudge under task-masters that were more tasteless, and probably not less inexorable; and that fine ethereal mental effluence, which is the spirit of art, was evaporated, partly by the ardours of trade, and partly by the agitations of political revolution.

We, therefore, shall pass slightly over the dregs of Dutch engraving, with some regret on account of the nature of chronologic annals, and reserve the remains of our particular attention for Houbraeken, Audenaerd, Punt, and a few other artists of deserved celebrity, with which must be closed our account of the school of the Low Countries.

Conrad Waumans was born at Antwerp in the year 1630, and became the disciple of Peter Bailliu. He unfortunately imitated his master, when much better models might have been found, and his drawing is not less incorrect, and his style of handling his graver scarcely a whit more principled. Yet he is the engraver of a considerable number of plates, which collectors have thought worthy of some attention. The chief of these are the

Portraits of John Both, (the landscape painter and engraver,) after Willars; Herman Saftleven; David Baille of Leyden, and Cornelius Jansen, both from pictures by that distinguished artist, and all of 4to. dimensions. In folio he engraved the marquis of Mirabelle; Emily, princess of Orange; Frederic Henry, prince of Orange, clad in armour; and Maria Clara, princess de Croye; all after Vandyke.

Historical, &c.—"The Descent from the Cross," in large folio; "The Assumption of the Virgin," in 4to.; "The Holy Virgin and Infant Saviour," in folio; "The Holy Family with the abbé Alexander Scaglia receiving the Benediction of St. John;" and "Venus and Mars," in large folio; all after Rubens.

The family of Danckert, or Dankerts of Antwerp, though they maintained their station as dealers in that commercial city for upwards of a century, were as artists, and speaking of them in the aggregate, scarcely of superior pretensions to those of Waumans.

Cornelius was born at Amsterdam in the year 1561, and established himself as a printseller at Antwerp some time about the middle period of his life. In his youth he produced a few meritorious prints, but (either by choice or necessity) his talents as an artist were gradually absorbed by the craft and sollicitudes of trade.

The *Portraits* of Gustavus Adolphus, king of Sweden; Jacob Wassenaer, earl of Obfida; Cornelius de Wit; John Casimir, count of Nassau; John Calvin; and Peter Molinæus, all of folio dimensions, are among the best of his engravings; to which the collector may add the following few *Historical* plates.

Equestrian figures of "Ninus," "Cyrus," "Alexander," and "Cæsar," with emblematical accompaniments, in large folio. A set of "The Seven Planets;" another of "The Seven Wonders of the World;" another of "The Twelve Sybils," in large quarto, all from his own designs; and "Meleager presenting the Boar's Head to Atalanta," from Picou.

Daukcert Dankerts was the son of Cornelius, and was

born at Antwerp some time about the commencement of the seventeenth century. He was educated to engraving, but he was educated also to commerce, and succeeded his father as a printseller.

He engraved portrait and landscape, mingling in his technical practice the work of the etching needle with that of the graver. In his style of treating landscapes, pastorals, and cattle, he imitated Berghem and Visscher, but presented us with little more than the *caput mortuum* of their abilities. He gradually fell into a dry and heavy habit of crossing his first courses of lines with square second courses, and the taste and intimate knowledge of forms by which those great masters are distinguished, were in Dankerts utterly extinct.

He engraved chiefly after Berghem, and his best productions are "The Hartengaft," or Stag-hunt; "Het Vinkebaantze," or, the Bird Catcher, both in large folio. A set of four large landscapes of pastoral subjects, of which one has the effect of moon light. Another set of four, with cattle and figures, of somewhat small dimensions. Another set of six, of similar subjects, and a set of four, in folio, of which the title-page bears the inscription "Danckert Danckerts fecit et excut." cut on a stone, all from the pictures of Berghem.

Of his *Historical* prints we need only mention "The Departure of Charles II. for England;" "Venus, Cupid, and Satyr," and a fountain with fishermen. There is also a print, which bears his name, of a curious crystal vase, which was found in the treasury at Vienna; and his most esteemed portraits are those of Charles II. of England, and Bernard, earl of Martenitz.

John Danckerts was of Amsterdam, and of the same family with the preceding artist; the year of his birth has not been recorded, but soon after the middle of the seventeenth century he emigrated to England, where he engraved several plates after Titian and other masters, and where he is said to have produced the designs for the English translation of Juvenal, which were engraved by Hollar.

Justin Danckerts was of the same family, and was also a printseller of Amsterdam. He engraved the portraits of William, prince of Orange, and Casimir, king of Poland; a Venus and sleeping Cupid, and a set of the seven gates of Antwerp; more than which it would be needless to specify of works so utterly worthless as productions of art.

Henry Danckerts was brother to John, and was likewise educated an engraver, but quitted that profession to take up the pallet and pencils. He excelled in painting landscape, and travelled to Italy for improvement, where he resided during some time; from thence he came into England, and was patronized by Charles II. who employed him to paint views of the royal palaces, and the sea-ports of England and Wales. These works are dated 1678 and 1679. At the discovery of the Popish plot, being a Roman Catholic, and probably a suspected character, he returned to Amsterdam, where he soon afterwards died.

The following are the most important of his engravings: *Portraits* of king Charles II.; Ewald Serevelius; and Christian Rompf, (both physicians to the prince of Orange,) in large folio; a set of the sea-ports and palaces of England, and a large view, engraved on three plates, of the Y at Amsterdam.

Simon Vlieger was born at Amsterdam in the year 1612. He studied painting under Vander Velde the younger, and excelled in representing landscapes and sea-views. This artist likewise etched several pastoral subjects, ornamented with figures and animals, in a style which combined that of

Rembrandt

Rembrandt with the spirit of Van Uden. The mark which he frequently affixed to his engravings will be found in our *Plate IV.* of those used by the artists of the Netherlands: and the following is a selection of his best works.

A landscape, with a barge unloading on the banks of a river; a pair of landscapes, with trees, water, and figures, in quarto, executed in a very delicate style; a fish-market, with figures; a Dutch inn; a landscape, with water and ruins; and another landscape, with a number of turkeys on the foreground, all of folio size.

Valentine le Febvre, or Le Febure, was born at Brussels in the year 1642. In his youth he went to Venice to study the works of Titian and Veronese, and acquired some reputation as a painter. But his engravings, in general, are feeble, and want harmony; and the naked parts of his figures are heavy and mannered. He, however, handled the point with great facility, and produced good effects of chiaroscuro.

In the year 1680, a set of fifty engravings, by this artist, appeared at Vienna, entitled "*Opera selectiora, quæ Titianus Vecellius Cadabrienfis, et Paulus Calliari Veronenfis invenerunt et pinxerunt; quæque Valentinus le Febre Bruxellensis delineavit et sculpsit.*" In 1682, another edition was published, and in 1749 a third, with the plates retouched by John Adam Schweighart, of Nuremberg.

John Francis Milet, surnamed *Francisco*, was born at Antwerp in the year 1644. He was of French extraction, and becoming the disciple of Lorenzo Frank, was instructed to imitate the learned and admirable style of Poussin.

He became a painter and engraver of epic and heroic landscape; travelled to Paris, and from thence to England, where he left some testimonials of his merit as an artist. On his return to Paris he was elected a professor in the French academy, and ended his days in that metropolis, in the year 1680, leaving behind him several children, of whom two became painters.

The engravings of Francisco are justly regarded with some interest by connoisseurs. D'Argenville mentions the subjects of only three, but the following are all after his compositions, and have every appearance of being the productions of the same hand.

An heroic landscape, with Egyptian edifices, "*The Nile, and Moses floating in the Ark of Bulrushes.*" Another, with the story of Cephalus and Procris; a mountainous scene, with buildings and figures in the taste of Poussin; another with pastoral figures; another with figures bathing; another, in which is introduced the story of the woman of Canaan; an Italian garden scene with a bridge and figures, and a pair of upright landscapes, with ruined buildings and figures in the costume of antiquity, all of large folio dimensions.

Cornelius Vermeulen was born at Antwerp in the year 1644. He travelled to Paris for professional improvement, and resided there for some years, but at length returned to his native country, and died there in 1702.

He handled the graver with judgment, his chiaroscuro is tolerably good, and his style of manual execution possesses considerable neatness and clearness; but he did not understand the human figure correctly enough to excel in historical subjects, and his *portraits* are therefore his best works.

From these the collector may with advantage select those of queen Elizabeth; Anne Boleyn; Catherine Howard; and Oliver Cromwell, all after Vander Werf; John Baptist Boyer d'Aquilles; Louis de Clermont, bishop of Leon; Henry Meyercron, envoy to the court of Denmark from France, all in folio; Maria Louisa d'Orleans, duchess of

Montpensier, in an oval; Louis de Luxembourg, marshal of France; Peter Vincent Bertin; Bardo Bardi Magalotti, a Florentine gentleman; Joseph Roettiers, a medal engraver, all from H. Rigaud; Philip V. of France; Maximilian Emanuel, elector of Bavaria; Nicholas de Latina, marshal of France; Agnes Frances Lelouchier, countess of Arco, all after J. Vivier, in large folio; Louis Urban le Fevre de Caumartin, master of the Requests, from F. de Troy, in folio; Francis Brunet, president of the grand council, and Mezetin Angelo Constantine, both after the same painter; Maria Louisa de Tassis and Nicholas vander Borcht, both after Vandyke.

These are his principal portraits, which are all of folio dimensions. His few *historical* engravings that are worthy of notice, are "*Erigone, with Bacchus under the Form of a Bunch of Grapes,*" in folio, after Guido. One of Rubens's Luxembourg gallery, from the Life of Queen Mary de Medicis, and a courtly allegory of "*Louis XIV. conquering Heresy,*" from a marble group, by Le Conte, both of folio size.

Adam van Zylvelt was born at Amsterdam, A.D. 1645; under what master he studied is not known, but he evidently imitated the style of John Visscher. His principal works consist of portraits, in the execution of which he rarely went beyond mediocrity, and of these the chief are Coornhaert the engraver, in 4to.; Stephen le Moine, a theologian of Leyden; Christopher Wittichus, professor of the Leyden academy, and Herman Wittius, a theologian; all from J. Heyman, and all of folio size.

Albert Meyeringh was a painter and engraver of landscape and ornament. He was born at Amsterdam in the year 1635, and died in that city in 1714.

Albert learned the rudiments of art of his father Frederic Meyeringh, but owed the degree of excellence to which he attained rather to his own genius, and his friendship with Polydore, who was his fellow student. In his youth he travelled through France, and from thence to Italy for improvement. Here he first became acquainted with Polydore, and here for ten years the two friends pursued their studies together.

Meyeringh now returned to Holland, and was much employed in painting the ceilings and other decorative parts of various public edifices. He also painted landscape, and etched several folio plates, all from his own compositions, in a free and painter-like style. Their subjects consist chiefly, like those of the etchings of his friend Polydore, of rocky mountains, cataracts, and other romantic landscape scenery, adorned with cattle, figures, and ruined edifices.

Of the superior merits and general biography of John Glauber, the reader will find an account under the article *POLYDORE*. The etchings of this master are performed in a slight style, and their chiaroscuro is but feeble. Yet are they valuable, on account of the classic or pastoral beauties of his composition.

He in general etched after his own pictures, but he produced one classic landscape with rocks and waterfalls after Poussin, and his allegorical set of the revolutions of the four great nations of antiquity, which is intitled "*Statum Assyriorum, Perlarum, Græcorum, et Romanorum,*" is after Gerard Lairefle, as is also "*Abishag before David.*" All the prints of Polydore are of folio dimensions.

John Bisschop, or Episcopiüs, was born at the Hague in the year 1646, and died at Amsterdam in 1686. He owed his excellence as an artist entirely to his own genius, having never studied under any master. He made designs in distemper with great taste, and which are beautifully finished; and his etchings are very much esteemed by connoisseurs,

they are harmonised with the graver, and though slight, are free, intelligent, and pleasing. He imparts richness to his tones, and roundness to his figures, far beyond what is usually done with the point, to little assisted as it is in the prints of Bisschop by the graver. His figures in general are drawn with ability, yet in a mannered rather than a correct style. The extremities, indeed, are not always well marked, nor his heads equally expressive or beautiful.

His most considerable work is intitled "*Paradigmata graphices variorum artiplicum tabulis Æneis*," Hague 1672, in folio. Two editions of this work were published in the same year, one by the artist, consisting of one hundred and two plates; the other contains one hundred and thirteen, and was published by Nic. Visscher. As they differ essentially, the curious are generally desirous of possessing both.

The mark used by this artist was a J and E, because he latinised his name, substituting Episcopus for Bisschop: this monogram will be found in *Plate IV.* of those used by the artists of the Netherlands.

The remainder of the engravings by Bisschop, are "Christ and the Woman of Samaria," in large folio, after Annibale Caracci; "Joseph distributing Corn to the Egyptians," in large folio, from Bartholomew Bruinberge; "The Martyrdom of St. Lawrence," its companion, from the same painter. A large book from the drawings of the great masters; and a book of statues.

John van Hugtenburg, or Huchtenbourg, was born at Haerlem, A.D. 1646, and died at Amsterdam in 1733. He studied painting under John Wyck, and afterwards went to Italy for improvement, and resided a considerable time at Rome. On his return he visited Paris, and often painted on the same canvas with Van der Meulen, though his style bears resemblance to that of Wouvermans. Hugtenburg excelled in painting battles, encampments, sieges, &c.; and was employed by prince Eugene to paint and engrave the battles and sieges he so fortunately conducted. This artist not only characterised the different nations he represented by the costume, but by the general physiognomy of his figures.

He likewise etched a considerable number of plates in a slight, spirited style, with great freedom, and in a way which manifests the hand of a master. The figures, horses, and other principal objects, are executed with peculiar feeling and ability.

The work which he executed from the pictures which he painted for prince Eugene is usually bound up in a large folio volume, with historical explanations by M. J. Dumont. They were published at the Hague in 1725, on the frontispiece is inscribed "*Dessaintes et gravées en taille douce, par le Sieur Jean Huchtenbourg*." This work is curious and considerable, but is not considered as containing his best engravings; he likewise scraped mezzotinto a good deal, but his performances in that art are not so good as his etchings; and it is very difficult to find good impressions.

When this artist did not sign his name at length, he substituted his initials, in the manner expressed in *Plate IV.* of those used by the engravers of the Netherlands. The following are considered as some of his best engravings.

"Travellers halting before a Forge," in folio; "William III. reviewing his Army near Arnheim," in large folio; a set of eight oval prints, in 4to., representing marches, encampments, battles, &c.; a set of four mountainous landscapes with figures; "Hunters resting," in a woody landscape, in large folio; all from his own pictures. "A combat of Cavalry," in large folio, after Van der Meulen; another "Combat of Cavalry," dedicated to duke Charles

Albert of Chevreuse, in large folio; "The City of Lisse, invested by the French Army," on two large folio plates; "The taking of Dole," in large folio, on two plates; "The March of Louis XIV. and his Retinue, over the Pont-neuf to the Palace," in large folio; all after Van der Meulen. "The Battle between the French and Germans in Italy," in large folio, after D. Hoogstraten; and "The grand Procession of Horses in Holland," dedicated to Frederic William, son of the king of Prussia, in large folio. These two last are etched, and then harmonised with the graver, and are very capital performances.

Mezzotintos from his own Designs.—"Two Cavaliers mauling;" "Two Horse Soldiers dismounting before a Victualling Tent," both in folio; "A Halt before an Inn;" "Departure for Hunting;" "A Combat of Horse Soldiers;" another "Combat of Cavalry;" and "The Imperial Cavalry fighting against the Turks," all in large folio.

Peter Schenck was one of those who regarded engraving as a trade, or means of obtaining money, merely; and on whom it is fruitless to dwell. He was born at Elberfeld, A.D. 1645; became a printseller of Amsterdam, and died at Leipzig in 1711.

While he continued to engrave, he was a mere working-man of industry. Sometimes he scraped mezzotinto portraits; and sometimes he etched views; but both were very indifferently performed. Those of his productions which are best entitled to notice, are the

Mezzotintos of Petrus Schenck, after J. P. Feuerling, in folio; another portrait of Peter Schenck, seated at table with his wife, in large folio; Martin Luther; Gottfried Keck, after D. Richter; Gerard Laureffe; Philip Jacob Spener, theologist; John Oleraris; Peter de Witt, a divine, after Muris; Simon Schynvoet, an architect of Amsterdam; William Henry, prince of Orange; Charles XI. and Charles XII. kings of Sweden; built of the Virgin; "A Criminal confessing to a Monk;" "A young Woman confessing to a Monk;" "Death playing the Violin, and presenting himself to a Man," inscribed "Mortis ingrata Musica," all of folio size.

John vander Bruggen was another who merged the artist in the tradesman. He was born at Brussels, A.D. 1649; and worked for some time in his native country, but afterwards went to Paris, where he established himself as a print-seller. In 1698 he published the works of La Fage, with the portrait of that artist engraved by himself in mezzotinto, after Largilliere.

There is a great number of mezzotintos by Vander Bruggen, which, though not entirely destitute of merit, are such as do him no great honour as an artist. The mark which he frequently used will be found in our *Plate IV.* of those used by the engravers of the Low Countries.

The following are the most important of his engravings. The portrait of himself after Largilliere; Antony Vandyke; and the portrait of Louis le Grand, all in folio. "The Gold weigher," after Rembrandt; "An old Woman weighing Gold;" "A Man seated, with a Goblet in his Hand;" "A Man leaning against a Table, and a Woman behind him scolding;" "A Man seated under a Tree lighting his Pipe;" "A Man sleeping, and another standing near him;" "Cupid and Psyche sleeping;" a large skull, inscribed "Memento mori;" "An old Man in a Public-house, with a Girl playing the Flute;" "A Party of Peasants in a Public-house, smoking and drinking;" both the latter are after Teniers; and all are of quarto dimensions.

Susanna vander Bruggen was doubtless related to this artist, and engraved some few plates of no great merit, after Vandyke and Rubens.

LOW COUNTRIES, ENGRAVERS OF THE.

John Luycken, or Luyken, was born at Amsterdam some time about the middle of the seventeenth century, and died in that city in the year 1712. He studied the arts under Martin Zaagmoelen. Baſſan ſays of his prints, "we remark in them a fertility of genius, joined with great ſpirit, judgment, and facility of execution, he is the Callot, the Della Bella, and the Le Clerc of Holland." But this is ſaying a great deal too much. He neither drew ſo correctly, nor etched in ſo clear and determined a ſtyle as either of thoſe diſtinguiſhed engravers. It is true there are few of his prints, into which he has not introduced a great number of figures, but the groups are ſeldom artfully managed; the lights, for want of harmony, and being too much ſcattered, confuſe the ſubject, and fatigue the eye. This is ſpeaking of them, however, only comparatively; conſidering them by themſelves they poſſeſs great merit.

He chiefly engraved after his own deſigns, and the moſt conſiderable of his works is the large bible, which was published by Montier in two folio volumes, and the following.

A ſet of "The Ten Commandments," in 8vo.; a ſet of ſeventeen, of "The Hiſtory of Lapland and Finland," in 4to.; a ſet of ſeventeen views, &c. which accompany the Eaſtern Travels of M. Thevenot, in 4to. The hiſtory of William III. king of England, in 8vo.; "The Republic of the Hebrews," in twenty-eight plates, in 8vo. and 4to. "The Theatre of Martyrs," from the time of Jeſus Chriſt, to modern times, in a ſet of one hundred and five plates, in 4to.; "The Prophet Jonas, preaching to the Ninevites," in large folio; "The Aſſaſſination of Henry IV. of France," in folio; "The Flight of the Reformers at the Revocation of the Ediſt of Nantes," in large folio; "The Maſſacre of St. Bartholomew, or the Death of admiral Coligny," a very capital print, engraved on two large folio plates.

Gaspar, or Caſpar Luycken, was the ſon of John Luycken, mentioned in the preceding article, and was born at Amsterdam in the year 1660. He learned engraving from his father, and deſigned and engraved a conſiderable number of plates; but his works are neither ſo numerous nor ſo meritorious as thoſe of his father, whoſe ſtyle he imitated. Among them the following will probably be found moſt worthy of ſelection. "St. Francis Xavier preaching before the Emperor of Japan;" "The Jeſuit Miſſionaries obtaining Audience of the Emperor of China;" "The Emperor Joſeph I. receiving the Holy Sacrament;" "The Miracle of the Five Loaves," all of large folio ſize; "The Twelve Months of the Year;" "The Four Seasons;" and "The Grand Roman Cabinet;" all in folio.

Paul van Somer was born in Holland, A.D. 1649. He reſided during ſome time at Paris, and afterwards came to London. He etched, engraved, and ſcraped in mezzotinto, but his works in either art do him no great credit; among them the following are moſt worthy of attention.

"Tobit burying the Dead," in large folio, from Sebaſtian Bourdon; "Moſes found in the Ark of Bulruſhes," after Pouſſin; "The Baptiſm of our Saviour," after the ſame painter, both in folio; "Nil placet, &c." or the fable of the old man and his aſs, after Grifſier, on a ſet of fix folio plates.

From his own Compoſitions.—"The Holy Family;" "The Adoration of the Shepherds," both in folio; "A Ruſtic Converſation of Four Peaſants," in large folio. The four parts of the day, on 4to. plates, viz. "The Morning," (Cephalus at the chace;) "Noon Day," (Arethuſa bathing in the river Alpheus;) "The Afternoon," (Diana and Acteon;) and "The Evening," (Pyramus and Thisbe.)

The two following are in *mezzotinto*. "The Counteſs

of Meath," after Mignard; and "An Officer and Girl in converſation," both in folio.

John van Somer was born in Holland in the year 1640, and was probably related to Matthias van Somer, who, according to profeſſor Chriſt, engraved a ſet of landſcapes. John engraved in mezzotinto, and with the graver, but did not much exceed mediocrity. The following are ſome of his beſt productions. Antony Gregatus, profeſſor of theology at Heidelberg; Daniel Saeſſe, theologift, both in 4to.; Charles Louis, elector of Bavaria; Michael Adriaſt, admiral of the United Provinces, a fine portrait, in large folio, from Du Jardin; "Three Peaſants drinking in an Alehouſe," from J. Both; "Dutch Smokers," after Oſtade; "A Dutch Concert," from Teniers; "A Man filling his Pipe, and a Girl drinking," from Gerard Terburgh, all in folio; "The Angels appearing to Abraham," in large folio, from Laſtman; and "A Party of Pleaſure," from his own deſign.

S. A. Van Lamſweerde was a native of Utrecht, born ſome time about the year 1650; but he appears to have been an artiſt of no great merit. He engraved portraits ſomewhat in the ſtyle of Syderhoef, among which the following are moſt worthy of notice.

Francis Gomarius, a theologian of Bruges, in folio; Henry Alting d'Emſden, a theologian of Heidelberg, in 4to.; Anna Maria Schurman, in folio; Cyprian Regnier, a juris conſulte, at Utrecht, after Gerard Duffeit; and Charles de Maets, profeſſor of theology at Utrecht, after Hendrick Bloemaert; both in large folio.

John Lamſvelt was born at Utrecht in the year 1660. He was probably a diſciple of Romain de Hooghe, whoſe ſtyle he has tried to imitate. His principal works are portraits, part of which he engraved for the hiſtory of Louis XIII., by Michael le Vaſſor, among which the following are the moſt important. A Head of Oliver Cromwell, in an oval of quarto ſize; John de Wit; Cornelius Pieterſzoon Hoof; George Caſſander; Hubert Duiſhuis, of Rotterdam; all rare and much fought after by connoiſſeurs; and a large folio engraving of "The Siege of Tournay, by the duke of Marlborough and prince Eugene."

John Verkolie was born at Amsterdam in the year 1650, and died at Delft in 1693. He became an artiſt owing to an accident he met with in his youth, which obliged him to keep his bed for three years, during which time he amused himſelf with copying pictures and drawings; he acquired the rudiments of perſpective from books, and he ſoon tried to paint in oil, without any other inſtructions. He afterwards became the diſciple of John Lievens, and ſtudied with aſſiduity the pictures of Van Zyle. Verkolie reſided at Delft, where he was obliged to employ great part of his time in painting portraits, but he likewiſe ſucceeded in hiſtorical and converſational ſubjects. He amused himſelf with ſcraping in mezzotinto, which was then but recently diſcovered; and the prints which he executed are much ſuperior to what might have been expected at ſo early a period. The following *Portraits* are ſome of his beſt productions in that art.

Himſelf, after De Leeuw, in 8vo.; Steſſan Wolters, from P. Kneller, in quarto; Joſias van de Kapelle, a clergyman of Leyden; Cornelius van Aeken, a clergyman of Delft; William Henry, prince of Orange; and Hortenſia de Mancini, duchefs of Mazarin, after Lely, all in folio.

Various Hiſtorical Subjects, &c.—"Jupiter and Calisto," from G. Netscher, (the companion to "A Shepherd and Shepherdſs," by G. Valek, from the ſame painter); "Venus

and

and Adonis," from his own composition, companion to "Cephalus and Procris," engraved by Broedelet, after Gerard Hoet; "Venus and Cupid;" "Pan and Flora;" "A young Man and Girl conversing," from Ochtenvelt, all of folio size.

Nicholas Verkolie was born at Delft in 1673, and was the son of the preceding artist. He became the pupil of his father, and succeeded in painting historical subjects and portraits. He was also celebrated for his Indian ink drawings, which he finished with great delicacy. Nicholas learned the art of mezzotinto scraping from his father, and practised it with still more success. The following are some of his best engravings.

Portraits.—Nicholas Verkolie, from a picture by himself; the painter drawing from a model; the amateur Moëllards with a folio, all in quarto; John Peter Zomer, a connoisseur, holding a print in his hand, from A. Booner. Some few impressions were taken from this plate, without the print, which is held by Van Zomer; but these are exceedingly rare; Martin van Bockelin, from his own picture; and Bernard Picart, after Nattier, all in folio.

Various, from his own Designs, and after other Masters.—"The Holy Family," after A. vander Werff; "Diana and Endymion;" and its companion, "Bacchus and Ariadne," both in folio; "A Shepherd caressing a Shepherdess," in large folio, all after G. Netscher; "An Entertainment in a Garden," in folio, after J. B. Weninx; "Two Men drinking and smoking," after A. Matham, in large folio; "A Youth asleep on a Girl's Lap," from his own design; "A young Girl and her Lover having their Fortunes told," "An old Man seated in a Garden, with a Girl, who holds a Miniature in her Hand," both in folio. Heads of a man and woman laughing; a lap-dog playing on a chair; and two dogs at play, all in quarto, very delicate engravings.

Solomon Savery was born at Amsterdam soon after the middle of the 17th century, and by some writers is said, with great probability, to have resided during part of his life in England. Under what master he studied, if under any, is not known; but he handled his graver with a degree of vigour, feeling, and characteristic touch which proclaims original powers. The mechanical exactness and regularity of his hatchings, he, with great address, rendered subservient to his art of expressing the several surfaces which so beautifully diversify the ample face of nature: his chiaroscuro is sufficiently powerful; and if the graver was not the sole instrument of his art, he very rarely employed the point.

He produced a few historical subjects; but his chief excellence lay in portrait engraving, and he seems to have been partial to such heads as were covered with hats, either because he engraved the high-crowned hat, which was then in fashion, with considerable ability, or because he believed that so broad a mass of darkness which these hats afforded, gave effect to his faces.

His principal *Portraits* are those of doctor Camphuysen, surrounded by an olive wreath, and three allegorical figures, after C. Calleyn; Simon Episcopius, and Andrea Calvius, after Cuyp; Isaac Saaly of Ziriczee; John Speed, the English chronicler, with his hat on, a very excellent plate; king Charles I. with a high-crowned hat, the face of which portrait is believed to have been taken from a picture by Vandyke, and the hat and the other accompaniments added by Savery himself; and Thomas, lord Fairfax, also with a hat on, all of folio size.

Historical Subjects, &c.—"Christ expelling the Money-lenders from the Temple," in large folio. A man's head with mustachios and short curly hair, both after Rembrandt.

A grand entertainment given on the water, in honour of Mary of Medicis, after S. Vlioger, (which belongs to a set of engravings that were published at Amsterdam in the year 1638, and entitled "Medicea Hofpes.") A grand procession, in large folio, after M. de Jonghe; and a set of seventeen etchings, of which the subjects are taken from Ovid's *Metamorphoses*, after F. Cleyn.

Thomas Wyck, The dore Maes, Julius François, (surnamed *Horizonti*), Louis Deyster, Charles de Moor, and Richard and John van Orley, were Dutch and Flemish painters, who lived at this period, some of whom performed a few etchings, and others of whom scraped a few mezzotintos.

The etchings of Wyck are small, but free and delicate. Fourteen of them, which were in the possession of Mariette, and were sold at his auction for three hundred and six livres and six sous, are probably all that Wyck ever produced. They consist of pastoral and military subjects, and are all from his own compositions.

In those of Maes, much of painter-like intelligence may be discerned. "The Holy Virgin and Infant Christ, attended by two Angels;" and a set of small plates, of cavalry skirmishing, &c. are all that we know of from the needle of this artist.

The etchings of Horizonti, like those beautiful water-colour pictures with far distant and sweetly-painted horizons, from which he obtained his cognomen, are landscapes in which Tivoli and the Campania of Italy are frequent features.

Deyster filled up some of his hours of seclusion with etching and mezzotinto scraping; and his productions in these arts partake of the character of his genius as a painter, of which we have already treated. Among them is a set of four landscapes, in rather a grand style, of quarto size, which are rare and much esteemed.

The excellence of De Moor lay in portraiture. He etched, in a spirited manner, the heads of his master, Gerard Douw, Van Goyen, and Mieris, and he also, according to Bassan, scraped a few plates in mezzotinto, of which we know not the subjects.

Richard van Orley was born at Brussels, A. D. 1652, and died in the same city in 1732. He learned the elements of art of his father, who was a landscape painter of no great eminence. He began by painting miniatures; but feeling a desire to gain a more elevated station in art, he studied in the schools of design with great assiduity, and became an historical painter of no mean talent.

He likewise executed a considerable number of etchings in a slight coarse style, and which, in some instances at least, are defective in point of drawing; among them, the following are the most meritorious.

"The Marriage of Joseph and the Virgin," after Lucas Giordano, in folio; "The Fall of the rebel Angels," a large folio print, from Rubens; "A drunken Bacchus, supported by Satyrs," from the same painter; and "Vertumnus and Pomona," all in folio. A set of twelve, in octavo, from Guarini's "Pastor Fido." A set of twenty-eight folio plates, lengthways, taken from the New Testament, from drawings by John van Orley.

John van Orley was the brother of Richard, and did not distinguish himself less as an artist; he frequently made drawings from pictures for the latter to engrave after; and likewise assisted in engraving the set from the New Testament, after his own designs.

John Gole was born at Amsterdam about the year 1660. He worked with the graver in strokes, and scraped several mezz-

mezzotintos. His works are numerous, but not very estimable. On the whole, those appear to be the best which are executed with the graver. A few of the best of his engravings, in each manner, are specified below.

Line Engraving.—Charles XI., king of Sweden; the dukes de la Valliere; the unfortunate Grand Vizier; Kara Mustapha; Mahomet IV., emperor of the Turks; Abraham Hellenbroek, a clergyman; the head of a man of letters, in an oval; Nicolas Colvius, a clergyman of Amsterdam, after B. Vaillant, all of folio size.

Mezzotinto Engravings.—Bernard Somer; John Oyers; and Jacob Gole (juris consulte), the latter after D. Plaes; George Augustus, prince royal and elector of Brunswick, after Hirfman; Charles III. king of Spain; admiral Van Tromp; Charles, landgrave of Hesse-Cassel; Balthasar Becker, author of the *Enchanted World*; "Peasants smoking round a Fire," after Oskade. "A Group of three Peasants in an Ale-house, one of whom plays the Violin," after Brouwer; "The Tooth-drawer," after Temers, all in folio; "The School-master," after Hemskerk; and "Heracitus deploring the Misery of human Nature," after C. Dufart, both in quarto.

John Groenvelt, or Groenvelt, was born at the Hague in the year 1650. He etched a considerable number of plates, after Berghem, Van Goyen, Lingelbach, and other masters, which are much esteemed; and a few portraits, in which the faces are almost entirely stippled. His general style of manual execution is neat, but somewhat stiff; and the following are specified as being some of the best of his engravings.

"Dorothea, countess of Sunderland," after Vandyke, in folio; "A Girl with a Cat," after Bloemaert, in quarto; "The Adoration of the Eastern Kings," after P. Veronese; "Christ before Pontius Pilate," after Andrea Schiavone; and, "A Man asleep on a Tub," all of folio size; a set of six landscapes, after Berghem; and another set of four, after the same master, of quarto size, the subjects of which are various pastoral incidents.

Arnold Houbraken was born at Dordrecht in the year 1660, and died at Amsterdam in 1719. He studied under various masters, and lastly under Samuel de Hoogstraeten; he painted portraits and historical subjects; and is the author of a work in the Dutch language, entitled "The Great Theatre of the Dutch and Flemish Painters, by Arnold Houbraken, with their portraits, engraved by himself." According to our countryman Strutt, Houbraken came into England, and made drawings from the pictures of Vandyke, which were afterwards engraved by Peter van Gunt, and he received one hundred guineas for every drawing. He executed several slight etchings, with great intelligence, from his own designs; which are much sought after by amateurs. His heads of the painters are engraved, with much taste, in ornamental borders, with several on one plate; and the following are likewise by him: A set of etchings of boys and vases; "Vertumnus and Pomona," an emblematical subject, representing three women looking at a child in a sort of basket, or cradle, encircled by a serpent; and "The Disciples at Emmaus," in the style of Rembrandt, all in quarto, and from his own compositions.

James, or Jacob Houbraken, was an engraver of admirable talent, to whom England is largely indebted for perpetuating, and diffusing through Europe, the portraits of several of her most illustrious poets, statesmen, and warriors. He was born at Dordrecht in the year 1698, and was the son of Arnold, of whom we have treated in the preceding article. He dated many of his productions from Amsterdam,

which seems to afford evidence of his long residence there, but he died in his native city in the year 1780.

Houbraken had no other master than his father, but his genius, and the study which he bestowed on the best portraits of Nanteuil and Edelinck, superceded instruction, or rendered it superfluous. Strutt thinks, and with much of the appearance of reason, that he formed his style of engraving more particularly, by an attentive study of that portrait of Le Brun, which is engraved by Edelinck, and prefixed to his battles of Alexander. However this may have been, his very high rank, as an engraver of portraits, was soon acknowledged through Europe, and has called forth the just encomiums of Watteau, of Gilpin, of Martini, and of Strutt. In the collection of portraits of illustrious men, which was published in London by J. and P. Knapton, which perhaps, on the whole, may be esteemed the principal work of Houbraken; the surrounding accompaniments are said to have been designed and engraved by Gravelot. These accompaniments are etched with considerable taste and energy, and form an harmonious and very agreeable contrast, to the rich and deep-toned softness and more elaborate execution of the portraits themselves, to which they are kept in due subordination. In some of his foreign productions, however, Houbraken has himself opposed, in a similar manner, though not perhaps with quite equal success, the picturesque wildness and roughness of etching, to the more polished sweetness and mellowness of his dry needle and graver, and even in the laced ruffs and other ornamental parts of the dresses of his English portraits, he has contrived to mingle a small portion of etching with enviable success. But his chief strength lay in the truth and taste of his drawing, and the vigour and delicacy with which, as occasion required, he handled his graver. Sometimes, in the same production, may be beheld the boldest courses of mellow lines,—as in the armour of his portrait of the marquis of Montrose, after Vandyke,—blended and harmonized, with admirable address, with the utmost sweetness and delicacy of execution in the face and hair.

The monarch, or parliament, who could prevent engravers from affixing their names to any other than their own productions, would probably perform a most essential service to engraving as an art. The demands of commerce will have the matter otherwise. The cupidity of gain, in all trading places, fulfils the purity of an honourable love of fame, and damps the ardour of disinterested exertion. In the age and country in which it was the fortune of Houbraken to be placed, he was almost of necessity subject to this baneful influence: and his name accordingly appears to some engravings that are certainly in parts, if not altogether, the productions of inferior men. He who would measure the true standard of the merits of this distinguished artist, or form a just estimate of his attainments, should look at early impressions, (not such as are now common in the London shops, and taken from the retouched plates,) of the portraits of sir Thomas More, Hamden, Schomberg, the earls of Arlington and Bedford, the duke of Richmond, and some others in the same valuable volume.

Strutt is more critically observant in commenting on the works of Houbraken, than in most other parts of his biographical dictionary. He details the interest with which he regarded these portraits, with feeling; and exemplifies the comparison which he made between Houbraken and those admired portrait engravers who stand foremost in the school of France, by an elegant analogy.

After admiring the softness and delicacy of execution, good drawing, and fine taste, which are displayed in the works of Houbraken, he says, "If his best performances have

have ever been surpassed, it is in the masterly determination of the features, which we find in the works of Nanteuil, Edelinck, and Drevet: this gives an animation to the countenance, more easily to be felt than described. From his solicitude to avoid the appearance of an outline, he seems frequently to have neglected the little sharpnesses of light and shadow, which not only appear in Nature, but, like the accidental semitones in music, raise a pleasing sensation in the mind, in proportion as the variation is judiciously managed. For want of attention to this essential beauty, many of his celebrated productions have a milky appearance, and do not strike the eye with the force we might expect when we consider the excellence of the engraving."

The biographer here certainly touches his instrument with a finger of exquisite feeling: yet, as the wild music which should accompany and aid the varying sentiment of mental emotion, is of a distinct character from that Lydian measure and those dulcet tones, that

—————"Sooth the soul to pleasure ;"

so Strutt must not be supposed to mean that one particular style of engraving is suited, in preference to all others, to portraits of every kind, and engraved after whatever painter. The present writer entertains little doubt but that the semi-demi distinctions which he perceives between the styles of different engravers, analogous to those which are noted in music, will one day be so generally felt and understood by professors, and finally by the public at large, as to become the subject of critical admeasurement and animadversion; and when that day of pleasure shall arrive, the softness and sweetness, and delicate indelibility which addresses the fancy rather than the sense, which confers that exquisite melting roundness to which female and infantile beauty is so much indebted; which may be traced in the style of Houbraken, and which, in our own times, has played among the zephyrs, the loves, and the graces of Cipriani and Bartolozzi, will be as much admired, when properly introduced, as the more energetic touches of manly character and expression, or "little sharpnesses" which our English critic has described with a feeling so technically just.

Comparisons might, doubtless, be severally instituted with advantage to our critical knowledge of portrait engraving, between the Dutch artist and those great ornaments of the French school whom Strutt has named, but it would perhaps lead us into too wide a field for the present occasion. To compare him with Drevet alone: his works, though less elaborate, are scarcely less highly finished, and are more mellow and free. Drevet seemed always approximating toward an ideal standard of perfection in which exactitude should blend with truth and the graces, and the peculiar taste, and even the redundant ornaments of Rigaud, the portrait painter of a showy and luxurious, rather than a tasteful age, are sedulously rendered: Houbraken, disguising every appearance of solicitude, is always masterly and free, and always like the painter after whom he works, whether it be Holbein, Vandyke, or Lely. Drevet transcended all his predecessors, and left posterity to wonder at his powers of execution, and despair of attaining them: Houbraken is more practically meritorious; when we see one of his portraits, we believe, as we admire it, that the same hand and mind might have accomplished many, whereas, when we behold the St. Bernard, or archbishop of Paris, of Drevet, we think that scarcely less than a life could have been bestowed on them, and that he who has engraved these plates has done enough for one man, if he has done no more. If Drevet appears to defy competition, he does so with a stretch of careful attention, and a share of

manual and visual power, which we cannot but admire, whereas Houbraken is always easy, and always successful, when he does not allow a substitute to handle his graver. He appears, in his works, to have lived to be eminently and extensively useful; the spectator cannot regard one of his portraits, without supposing that he must, or knowing that he might, have done many; because he perceives that the artist knew the point where an high degree of excellence might, with practical advantage, stop short of the elaborate precision, and recondite beauty of executive detail, which is displayed in the portraits of Drevet.

The following list contains the whole of the works of Houbraken with which we are acquainted.

Portraits in Folio.—A half-length of himself, after Quinkhard, dated 1749; Arnold Houbraken, the father of Jacob; William VIII. landgrave of Hesse Cassel; Jacob van Hoorn, who married, for the fourth time, at the age of ninety-seven, a young woman of twenty-three; and its companion, his last wife, Jacoba van Sellied; Albert Seba, of Erzeel, in Oostfrise, member of the Academy of Natural Curiosities at Amsterdam; John Burmann, doctor of medicine; Francis Burmann, of Utrecht, theologian; Gustavus William, baron of Imhof; Peter Muschenbroeck, professor of medicine at Leyden, all after Quinkhard; George, lord Anson, after J. Wanderlaar; Ferdinand van Collen, a burgomaster of Amsterdam; Gerard Arnout, a burgomaster; Herman Alexander Roell, theologian, both from the same painter; Peter Burman, professor at Utrecht, after Herman van der My, or Myn; Jerome Gaubius, a physician; John Conrad Rucker, a juris consulte, both from the same painter; George I. king of England; Thurlow, secretary to Oliver Cromwell; and Thomas, lord Fairfax, both after Cooper; Catherine Howard, queen of Henry VIII.; sir Thomas More, the chancellor, both from Holbein, the latter a very celebrated engraving; William James Sgravefande, a mathematician, after Vandyke; William Russell, duke of Bedford, from the same painter; George Villiers, duke of Buckingham, after C. Johnson; Sigbert Havercamp, professor at Leyden, after F. Mieris; Mary Stuart, consort of William III. prince of Orange, after G. Netscher; John de Witt, grand pensionary of Holland, from C. Netscher; John Rodolphus Faesch, of Basle, from J. R. Huber; lieutenant-general Talmash, after sir Godfrey Kneller; Anthony, duke of Shaftesbury, after sir Peter Lely; Mary Louisa, of Hesse Cassel, from B. Accama; Henrietta Wolters, from a picture by herself; Cornelius Froost, the painter of Amsterdam; Jacob Compo Weyerman, from C. Froost; Nicholas Verkolie, from a picture by himself; Herman Schyn, schoolmaster, from Henrietta Wolters, called Van Peeue, all in quarto; Christian Gottlieb Glafey, after P. Salice; John Mannekemolen, after Schouman; the czar, Peter the Great; William VIII. landgrave of Hesse Cassel; and William, prince of Orange, all of folio dimensions.

Historical, &c. after C. Froost.—"The Grandmother," from the cabinet of Pinto, at Amsterdam, in large folio; "Avarice deceived," from the cabinet of Vander Mark, of Leyden, in folio; "The Festival of St. Nicholas," from the cabinet of Muilman, at Amsterdam; "The Cymbal Player," a grand composition, from the cabinet of Verchuring; "The Fair at Amsterdam," from the cabinet of Neyman; "Tartuffe, the Impostor," from the cabinet of Braamecamps, all in large folio. And the two following for the Dresden gallery; "Daniel Barbaro," a Venetian nobleman, after P. Veronese, in folio; and "The Sacrifice of Manoah," in large folio, after Rembrandt.

John van Vianen, of Amsterdam, was also a portrait engraver,

engraver, but of talents very inferior to those of Houbraken. He was born in the year 1660. He drew portraits from the life in a manner which has the reputation of accuracy, but his style of engraving, though neat, is tasteless.

Among his portraits are those of John Turretin, of Geneva; Augustus Pfeiffer, of Lubec; and Simon de Vries, from drawings by Vianen himself; and Frederic William I. king of Prussia, in cameo, with ornamental accompaniments, after J. Goeree, all of folio dimensions.

Vianen also engraved and published several views of his native city of Amsterdam.

Wilhelm, or William Swidde, was born in the province of Holland, A.D. 1660. He probably studied under one of the Visschers. Soon after his pupillage he travelled to Sweden, where he obtained patronage, and where he probably passed the remainder of his life.

He both drew and engraved landscape in a very pleasing style, in which delicacy is united with spirit, and his name and works have the honour of descending to posterity with those of Puffendorf, for the first edition of whose life of Charles Gustavus, of Sweden, Swidde produced the engravings, and also for "*Suecia Antiqua et Hodierna*."

The rest of his prints are generally found in sets, of which there is one, of twelve views of towns and cities in the province of Friesland; another set of six beautiful engravings, entitled "*Verfcheide landschapjes seer aardig getekent door D. Dalens, geetst door W. Swidde, et uitgegeven door N. Visscher*;" and another set of six mountainous landscapes, with ruined edifices, cattle, and figures, in small folio, also after Dalens.

John de Leeuw, the portrait-engraver, is worthy of small notice. He was born at the Hague soon after 1660, and was probably descended from William de Leeuw, of whom we have already treated.

In conjunction with John Lamsveld, he engraved the portraits for "*The History of Louis XIII.*" by Michael le Vaffor. He also engraved the portrait of John, duke of Marlborough, which is inscribed with the motto "*Veni, Vidi, Vici*," in folio; a very neat portrait of Karolus Niellius, in quarto; Joseph Justus Scaliger; and Cowley, the poet.

Robert van Audenaerd, or Oudenord, was born at Ghent, A.D. 1663. The name is provincial, and means literally "*of Oudenord*," of which place the father of our artist is believed to have been a native.

Robert applied himself to the study of art at a very early period of life, under the direction of Van Cleef, and other Flemish masters. He afterwards travelled to Rome for improvement, and was received into the Academy of Carlo Maratti.

At this period he is spoken of with praise as a painter; but we shall here consider him only as an engraver. His early progress in the latter art, was interrupted by an act of professional indiscretion, which is thus related by Strutt.

"He frequently used to amuse himself at his leisure with the point; and being pleased, as it should seem, with a sketch of his master, representing the marriage of the Virgin, he etched a plate from it, of which Carlo Maratti knew nothing, until the impressions being circulated about, he accidentally saw one of them in a print-shop, and by enquiry, soon discovered its author. Audenaerd felt severely the effects of his resentment, which he carried to such an height, that he forbade him to approach his school, declaring he would never see his face again." Maratti, however, though warm in his resentment, was not implacable, and the present writer would willingly ascribe the reconciliation which after-

ward took place between the master and disciple, to the intercession of Giacomo Frey.

Frey (as we have related in our biography of that very distinguished artist), was the liberal friend and fellow student of Audenaerd, and with the energy and indiscretion, possessed the generosity, of genius; every principle of sympathy must, therefore, have operated with him in obtaining the forgiveness of his master, and the return of his friend.

It seems not improbable that the affluity of Audenaerd was quickened by this occurrence, for he soon made so great progress in engraving, that Maratti was extremely pleased, poured forth his inward feelings respecting his art, and they were mellowed into principle, in the presence of his two favourite pupils; and many of his best pictures were, at his own instance, put into the hands of Audenaerd to engrave. In particular, it was by his recommendation, which has since been perceived to have its foundation in the soundest theory, that the two fellow-students learned to incorporate so large a portion of etching as we behold in their historical prints, with the work of the graver.

On this point, Strutt judiciously says, "the plates which were done by this artist entirely with the graver, are not equal, in my opinion, to those where he also used the point; they are cold and destitute of effect, and often, from his great solicitude to avoid an outline, his draperies appear heavy, and want sharpness in the folds. The same heaviness appears also in his heads and other extremities, and all the naked parts of the figure in general, as I think, will readily be allowed on examination of that, which represents "*The Assumption of the Virgin*," from Carlo Maratti, a middling-sized upright plate, with this inscription, "*Quasi aurora confurgens*;" which, if compared with the slight etching of "*Hagar and Ishmael*," from the same master, I think the spirit of the latter will well repay the want of that neatness which is found in the former. Audenaerd certainly possessed great knowledge of the human figure, and his drawing is seldom incorrect."

During his stay in Italy, cardinal Barbarigo, with becoming regard for the fame of his ancestry, engaged our artist to engrave the portraits of the distinguished men of that family, with emblematical accompaniments.

The work consists of one hundred and sixty-five plates, and for some years remained imperfect on account of the death of the cardinal, but at length the five plates which were wanting to its completion, were engraved at the expense of one of his descendants, and the work appeared at Padua, in large folio, accompanied by certain Latin poetry, in the year 1762; since which period it has been sold at the Barbarigo palace, at the price of twelve sequins.

After residing seventeen years in Italy, Audenaerd returned to his native city, where he died in 1743, being fourscore years of age. We subjoin a list of his best engravings.

Portraits.—Cardinal Sacristanti; cardinal Turfus; and cardinal Ottoboni, all from J. B. Gaulli; cardinal Francis Barbarini, after Carlo Maratti; cardinal Henry de la Grange d'Arquien, after Despontes; cardinal Joseph d'Archinto; cardinal Andrea di Santa Croce, both from Joseph Passeri; and father Francis Caraccioli, worshipping the sacrament, after And. Procaccini, all of folio size.

Historical, &c. after Carlo Maratti.—"Hagar in the Desert;" "Abraham offering his Son Isaac;" "Abraham's Servant meeting Rebecca;" "David with Goliath's Head;" "The Celebration of the Victory of David;" "Bathsheba at the Bath;" "The Annunciation;" "The Adoration of the Magi," an etching; "The Flight into Egypt;" "A Repose during the Flight into Egypt," and

in folio; "Christ on the Mount of Olives," in large folio; "Christ on the Cross;" "The Body of Christ on the Knees of his Mother," accompanied by St. John and the holy women; "The Death of the Virgin;" "The Assumption of the Virgin," after a picture in the cathedral of Urbino, all in large folio; "The Death of St. Joseph," an etching in folio; "The Virgin distributing the Rosary to the Nuns," commonly called "Our Lady of the Rosary;" "The penitent Magdalen;" "The Martyrdom of St. Blaize;" "St. Anthony of Padua kissing the Foot of the Infant Saviour;" "St. Philip of Neri;" "James I. king of Italy, received among the Gods;" "The finding of Romulus and Remus," all in large folio; "Daphne purified by Apollo," after a picture in the cabinet of the king of France, on two large plates.

Historical, &c. after various Italian Masters.—"The Nativity of our Saviour," after P. da Cortona, in large folio; a set of five etchings from "The Life of St. Bibienne," the fourth and fifth are from statues by Bernini, the remainder from P. da Cortona; a group of "Atalanta and Hippomenes," after Bernini; "The Rape of the Sabines," from John de Bologna; "St. de Facunda," after Hiac. Brandi, all in folio; "The Birth of the Virgin," from Annib. Carracci; "The Flagellation," and "Supplication of St. Andrew," both in large folio; and "St. Andrew transported to Heaven," in folio, all from Dominichino; "The Holy Family, with St. Luke painting the Portrait of the Virgin Mary," after M. A. Franceschini of Bologna; "The Anger of Achilles," a large engraving on three plates, dedicated to pope Innocent XII., and after J. B. Gauli; and a very rare and large engraving of an allegorical thesis, in which the same pope appears seated on a throne, or in the chair of St. Peter, overcoming heresy, &c.: it alludes also to the conversion of Frederic Augustus, and contains medallions of that prince and queen Christina of Sweden.

Arnold van Westerhout was born at Antwerp in the year 1666. After learning the rudiments of engraving of his father, he journeyed to Italy, and remained for some time at Florence, studying his art under the patronage of the archduke Ferdinand, from whence he removed to Rome, in which metropolis he remained till the year 1730, which was that of his death. His plates are executed with the graver only, in a neat, clear style; but his chiaro-scuro is feeble, and the outlines of his figures are not always correct. He engraved a considerable number of plates from his own compositions, and some few after other masters, among which the following are most worthy of attention.

Portraits.—Michael Angelo Zamburinus, superior of the Jesuits, after Odati; Julius de Arrighettis, superior of the order of the Servites, after Dio. Godin, both in 4to.; cardinal James Antony Moriga, after L. David; and prince Rospoli, in an oval, from the same painter, both in folio.

Hyberical, &c. after various Masters.—"St. Peter No-lasque borne through the Clouds by two Angels," and "Victory," both from his own compositions; a female, with a unicorn, in a landscape back-ground, after Carracci, in 4to.; "The Descent from the Cross," after Daniel de Volterra, in large folio; "The Virgin and Child," after Carlo Maratti; "St. Paul preaching at Athens," after J. B. Lenardi; "The Muses protecting the Monuments of fine Art from the Ravages of Time," all in folio, from the same painter; "The Elevation of Virgine, and Depression of Vice," dedicated to Lazari Pallavicini, in large folio; "A Woman kneeling, crowning an Eagle, accompanied by Pegasus," perhaps the muse of Pindar, after S. David, in folio.

Peter van Gunst was born at Amsterdam in the year 1667. This artist possessed infinitely more patience than good taste. He worked with the graver only, in a style which seems evidently formed upon the works of the Drevels. His first and second courses of lines are equally neat, and equally powerful, which gives them a cold, silvery effect. The folds of his draperies, though not ill drawn, are marked too harshly, especially upon the outlines of the lighter parts of them. His flesh is generally extremely neat, and finished with small dots; but the lights are too much covered, which makes them appear heavy and laboured; and he drew but incorrectly. His portraits are by far the best, as well as the most numerous of his works; but they are, in a great measure, liable to the same objections as his historical subjects. The following are selected from his works, as being of the most importance:

Portraits.—Urbain Cherreau, from John Petitot. This is believed to be the only print engraved after that master, who was a celebrated enamel painter. Cornelius de Witt; Charles de St. Evremont, after Parmentier, all in 4to.; Balthasar Bekker of Amsterdam, author of the Enchanted World, after Webber; Jacob Saporteu, a famous rabbi of Amsterdam; Francis Valentine of Dordrecht, an ecclesiastic, after A. Houbraken; Frederic Dekker, doctor of medicine at Leyden, after C. de Moor, all of folio dimensions; Salomon van Til, theologian, from the same painter, in large folio; Hero Siberina, a clergyman of Amsterdam, from Boissard; John William Triso, prince of Nassau, after B. Vaillant; Boris, prince of Kurakin, minister of the Russian states, after Kneller; Didier Erasmus of Rotterdam, after Holbein; Mary, queen of England, after Vander Werff; Mary Stuart, queen of Scotland; Frederic, palatine, king of Bohemia; Elizabeth, his queen; James I. of Great Britain; Hugh Latimer, bishop of Worcester; Francis Junius, painter and author, all after Vander Werff; head of William III. of England, after J. Brandon, all of folio size; Charles II. of England, after F. Stampart, in large folio; John Churchill, duke of Marlborough, after Vander Werff; a set of ten portraits, of Charles I., his queen, and the English nobility of both sexes of his court, whole length figures from Vandyke; and a set of nine, of "the Loves of the Gods," after Titian, all in large folio. The same set was engraved in mezzotinto by J. Smith.

Bonaventura Overbeck, surnamed *Romulus*, was born at Amsterdam in the year 1667, and died in the same city in 1706. He was the disciple of G. Laiffe, and published three folio volumes, (entitled "Reliquie antique Urbis Romae," of the antiquities of Rome; to which city he travelled three times, to make the necessary studies from nature, after which his plates were etched; and hence he obtained the cognomen of Romulus. His engravings are much admired for their firmness of style, and judicious distribution of light and shade, and were published at Rome in the year 1709; but presumptively there was an earlier edition.

Isaac Moucheron was likewise a native of Amsterdam, and born in the year 1670. He was the son of Frederic Moucheron, an admirable landscape painter, of whom he learned the rudimental principles of art; but at the age of twenty-four, travelled to Rome for improvement, where he made a great many drawings of Tivoli, and other places in and about Rome. After his return to Amsterdam, he soon became known by his excellent landscapes, enriched with figures and animals, which are held in the highest estimation. This artist executed a considerable number of etchings, in a very delicate style; the most important of which are a set of twenty-six folio plates, entitled "Views or

Heemsted,

Heemsted, in the Province of Utrecht, drawn and engraved by J. Moucheron, and published by the Widow of Nicholas Visscher, with the Permission of the States General." They are accompanied with French and German letter-prefs. Four garden views, with ruins and figures in the antique style; another set of four, of the same character, in large folio, from his own drawings; four landscapes, with buildings and figures, entitled "Einigé Landscapen, geschildert door G. Poussin in Rome, in t'Koper gebracht door J. Moucheron in Amsterdam," in folio; and a landscape, mentioned by Bassan, of which we know neither the title nor description.

Matthew Pool was born at Amsterdam in the year 1670, but studied engraving at Paris, where he resided for some years. He afterwards returned to his native country, where he married the daughter of Barent Graat, and engraved a considerable number of plates after various masters, in a style resembling that of Bernard Picart. The most important of his engravings are as follows: Petrus Hogenbetius, physician and poet; Barent Graat, the father-in-law of our artist; "Jupiter suckled by the Goat Amalthea," after B. Graat, all in folio; "Cupid caught in a Net by Time," after Guerchino, in an oval; a bacchanalian subject, after Poussin; a set of twelve, after Rembrandt, all in 4to; a set of one hundred and three, entitled "The Cabinet of the Art of Sculpture, by Van Bossuet, engraven by M. Pool, from the Drawings of B. Graat," in folio; and the three large burlesque representations of the ceremonies practised by the Dutch painters at Rome, on the reception of a member into the society, called "Schilderbent," from drawings by Barent Graat, after the original pictures by Dominique van Wynen, all in large folio.

James Coelmans was born at Antwerp in the year 1670, and died at Aix, in Provence, in 1735. He was the disciple of Cornelius Vermeulen, and was invited to Aix by M. de Boyer d'Aguilles, to engrave his collection of pictures, in conjunction with Sebastien Barras. This set of engravings was finished A.D. 1709, but was not published till 1744. It is the most considerable, and the best of the works of Coelmans, though the plates are executed chiefly with the graver, in a dark heavy style, destitute of harmony.

The drawing of the naked parts of the human figure is defective, and the expression of the heads is likewise but poor. The set of engravings above mentioned, consist of one hundred and eighteen, from which the following are selected as being the most important.

Portraits.—Donna Olympia Maldachini; the niece of pope Innocent X. from a picture by Josephin; the mistress of Alexander Varotari, surnamed Veronese, from a picture by that painter, both in quarto; a head of Paul Veronese, painted by himself, in folio; Conradus Ruten, from Bronckhorst, in quarto; Francis de Malherbe, after Finsonius Belga; Vincent Boyer, comte d'Aguilles, &c. from a picture by le Grand; and John Batista Boyer, comte d'Aguilles, &c. after Hyacinthus Rigaud, all of folio dimensions.

Historical, &c.—"The Holy Family," with a landscape back-ground, from F. Massoli Parmensis, in large folio; "St. Dominique passing the Holy Writings through the Fire, without damaging them," after Fr. Vanni; "The first Interview of Rachael and Jacob," after Michael Angelo; and its companion "Laban recompensing Jacob with Rachael," from the same painter; "Jacob quitting Laban," a fine composition, after Castiglione; a very rich composition of musicians, dancers, drinkers, &c. surrounded with whatever can add to the luxury and support of mankind, inscribed "Omnia vanitas," from the same painter; "Diana

and Actæon," from Ottovanius, all of large folio size: "Lot and his Daughters flying from Sodom," after Rubens, in folio; the interior of a Gothic church, with figures, after Steenwyck, in quarto; "A Satyr drinking from a Vase, which is supported by a Cupid," accompanied by a nymph, who seems to say, that is enough! and is probably intended for Temperance, after Poussin; "The Martyrdom of St. Bartholomew," after Seb. Bourdon; "Mount Parnassus," a rich composition, from Eustace le Sueur, all in large folio; "The Flight into Egypt," after P. Puget; "The Murder of the Innocents," from Claude Spierre, both in folio; and a head of "The Holy Virgin," after Seb. Barras, in large quarto.

Albert Haelwegh was a native of the Netherlands, and born about the year 1670. In 1690, he resided at Copenhagen; but was afterwards invited to Denmark, where he engraved a considerable number of portraits, in a stiff, dark style, but which, for some reason with which we are not acquainted, are collected with some degree of avidity by the foreign connoisseurs. Of the works of Haelwegh, the following are most worthy of notice; Louis, landgrave of Hesse Cassel, from S. Duarte; Joachim de Gerdford, of Synbyholm; Otten Krag de Woldberg; Gundec Rosenkrantz de Winding; Frederick Ratz de Tygestrup; Peter de Reetz de Tygestrup; and Magnus Kaas de Stofring, all Danish senators, from Albert Wachters, in folio; Sophia Amelia, queen of Denmark and Norway, in large folio; Christian, count de Rantzou, earl of Brandenburg, a fine portrait, in large folio, both from the same painter; the frontispiece to the "Flora Danica" of Simonis Pauli, with a portrait of the author, after Carl van Mander, in quarto; and "The Four Seasons," from the same painter, also in quarto.

Francis Piffen was born at Ghent in the year 1676, and became the pupil of Robert van Audenaerd. There are very few prints by the hand of this artist, and the following are all we can specify. "The Holy Virgin suckling the Infant Christ," after Rubens, in octavo; "The Conversion of St. Bavon," a grand composition, arched at the top, after Rubens, in large folio; "The Judgment of Midas," after the same painter; and "The Martyrdom of St. Blaize," from Gaspar de Crayer, both in folio.

Abraham Rademacker was born at Amsterdam, A.D. 1675, and died at Haerlem in 1735. He became an excellent landscape painter and engraver, without any instructions, having never studied under any master.

Rademacker drew in Indian ink, and painted in distemper, many views in Holland, which he embellished with figures and animals; he also etched a collection of views in the United Provinces, in a very masterly style; it contains three hundred prints, and was published at Amsterdam in 1731, in two quarto volumes.

Francis Harrewin was born at Brussels in the year 1681. He was the disciple of Romyn le Hooghe, and engraved a considerable number of plates from his own compositions, and those of other masters. Among his works is a set of the castles and villas, for le Roy's account of the Brabant family, which was published in 1699; and also the following portraits of Henry de Lorraine, duke of Guise; Marguerite de Valois, both in octavo; Albert, archduke of Austria, a whole length figure at prayer with St. James; its companion Isabella, infanta of Spain, also kneeling, while St. Margaret is presenting her with a wreath of flowers, both very rare prints in large folio, and after Rubens. Two folio views of the house of sir P. P. Rubens, at Antwerp, after Van Croes, may also be reckoned among the best productions of Harrewin.

Francis de Wilde was a native of Holland, born some time about the year 1680; according to Huber, but probably at a somewhat earlier period, since the etchings of his daughter were published in 1703. He resided at Amsterdam, where he etched and published "The Angels appearing to Abraham;" "The Birth," or "Triumph of Venus;" views, of a sea-port, and the city of Chalons, a landscape with reapers, and some few other subjects, both historical and landscape, which are believed to be all from his own compositions. His etchings are performed in a pleasing and spirited style, and the above were published early in the eighteenth century.

D. Wilde also acquired some celebrity by his collection of antique gems, which were etched by his daughter Mary, on fifty quarto plates, and published at Amsterdam, in the year which is mentioned above.

John Admiral, or P'Admiral, was born at Leyden, A.D. 1680. Under whom he studied is not known, but his ingenuity was very considerable, and he employed much of his time in engraving natural history and anatomy. The anatomical plates which he engraved for the work of the celebrated Ruysch are held in great estimation, and his other most important work is engraved from his own cabinet of insects, to collect and arrange which occupied thirty years of his life, excepting that portion of his time which was necessarily spent in his professional pursuits as an engraver. This collection was engraved on twenty-four plates, and published by P'Admiral himself in 1746.

A. van der Laan was born at Utrecht in the year 1690. He travelled to France, and remained there some years, during which time he was chiefly employed by the Parisian bookellers.

The most considerable work we have by this artist, is a set of landscapes, many of which are of the heroic and classical subjects which were painted and drawn in Germany and Italy, by Polydore. They are etched in a very delicate style, but on closer examination they appear to want precision.

This artist also engraved a good number of plates after Van der Meulen, among which are the frontispiece for Ryer's Alcoran, in quarto; the portraits of Lawrence Coster of Haerlem, in folio; a burlesque hunt of dwarfs, in large folio; and two large folio plates of "The Whale Fishery."

Peter Bout was a native of Brussels, and was born in the year 1690. He painted conversational subjects, and always introduced the figures in the landscapes of Bodewyns. There are some slight etchings by the hand of this artist, from his own compositions; among which the following are the most important. A set of four landscapes, two of which are winter scenes with skaters, the third a post chaise stopping at the door of an inn, and the fourth is a marine subject, in folio.

A. F. Bargas was the countryman and contemporary of Bout. He executed some few etchings of landscapes in a free and spirited style, both from his own compositions and those of P. Bout; which he usually marked with the letters A. F. combined in a cypher, and placed before his name. Among these are a set of six views of towns, villages, &c. embellished with figures from his own designs; and a set of four after P. Bout, viz. "A Fish Market;" "The Bride conducted to Church;" "A Country Wedding;" and "A Village Fair," all of folio dimensions. This last set was published, both with and without the names of the artists.

John Wandelaar, or Wandelaar, was born at Amsterdam in the year 1692. He studied the principles of drawing and engraving under Folkema and William van Gauwen;

and was so much interested in the general prosperity of the fine arts of his native country, that he became one of the most distinguished and strenuous advocates in Amsterdam for the erection of a public drawing academy in that city.

Wandelaar paid great attention to the study of anatomy, and was acquainted with the three greatest anatomical professors of the age, namely Ruysch, Kant, and Albinus, for the great work of the latter of whom he engraved the large anatomical figures, so much and so justly admired. They were drawn from the subjects themselves by Wandelaar under the inspection of Albinus, who appears to have directed him, though, copying from dead and flayed subjects, to swell out the muscles to the natural plumpness of living and strong men. The plates are engraved in a clear style, well adapted to the occasion, and were first published in the year 1747. The work appeared under the title of "*Tabulae selectae et musculorum corporis humani*," and was soon translated into English, and the plates copied by Grignon, Ravenet, Scotin, and others. Wandelaar likewise painted portraits on pasteboard; and drew with great ability in red and black chalks, frequently copying the pictures of the old masters. The following engravings also are by him. A set of twelve quarto plates, of "The Birth, Life, and Death of Our Saviour;" the portrait of Herman Boerhaave, professor of medicine at the Leyden academy, in folio; and two octavo plates of "The Grand Emir and his Wife; or King and Queen of the wandering Arabs."

Jacob Folkema was born at Deekum, in Friesland, in the year 1692, and established himself at Amsterdam, where he died A.D. 1767. He studied engraving under his father, and produced a great number of plates, of which some are after Picart, and others from his own compositions. They consist chiefly in small portraits, and vignettes for books. This artist had a sister Anne, who painted miniatures with some success; and likewise made some few etchings.

The most esteemed of the engravings of Folkema are, an emblematical subject on the death of the prince of Orange, William IV.; "Time unveiling a Bull of Francis Rabelais," surrounded with allegorical figures, in quarto, an odd composition. A lion and dog sleeping; and its companion, a lion and cat sleeping, in folio. The portraits of Michael Cervantes de Saavedra, from G. Kort; John Ens, professor of theology at Utrecht, after Colla; Petrus de Mastrecht, professor of theology at Frankfurt, from the same painter; Humphry Prideaux, dean of Norwich, after E. Seeman jun. all in quarto; Snetlagius, an ecclesiastic of Amsterdam, from Anne Folkema, in folio; and "The Martyrdom of St. Peter and St. Paul," in large folio, after Nicolo del Abbate, for the Dresden collection.

Jacob de Wit was born at Amsterdam in the year 1695, and died in the same city in 1754. He was successively the disciple of Albert Spire, a portrait painter, and Jacob van Halen, an historical painter, but he greatly conduced to his own improvement, by studying the pictures of Vandike and Rubens. De Wit painted history, and excelled in painting in imitation of bronze and marble basso-relievo. In the year 1712, which must have been while he was yet a youth of seventeen, he made drawings from the ceilings in the Jesuits' church at Antwerp, by Rubens, some of which he engraved, or assisted Punt in engraving. He likewise etched a few other plates in a free intelligent style, among which are "The Holy Virgin and Infant Saviour," in small quarto; and a set of four of groups of cupids and geni, variously engaged, in large quarto; the latter set are probably his very best productions in this art.

John Punt was born at Amsterdam in the year 1711. He studied engraving under Van der Laan, and the art of painting

ing in imitation of basso relievo, under Jacob de Wit. He also painted history in a style which bears strong resemblance to that of Terveltin, and after the age of fifty-five executed several ceilings; but we have here to treat of him only as an engraver.

In his folio prints from the compartments of the ceilings of the Jesuits' college at Antwerp, Punt discovers admirable taste and skill. Perhaps in the works of no engraver whatever, may be seen better examples of the bold fore-shortening of Rubens, whose knowledge of the perspective of objects, when seen from beneath, and especially that of the human figure, is admirably displayed in these ceilings, and is not less admirably rendered in the engravings, through the medium however of drawings, which we have already mentioned, and which must in all probability have been excellent, by J. de Wit.

Punt is one of those artists whose general reputation in the world has been by no means in proportion to their merits. Strutt, as the present writer conceives, could not have seen his productions, or could only have seen those few plates which, though they bear his name, are evidently the work of some inferior artist, for he calls him, with a tone of acquiescence in the deficiency of his fame, "a Dutch engraver of no great note;" and Huber and Martini have fallen into another error respecting him, (as will be noticed below,) which has also tended to deprive him of some portion of his just meed of reputation.

Regarding his "Moses on the Summit of Pisgah;" his "Queen of Sheba in the Presence of Solomon;" his "Nativity of Christ," or any other of the best of this series of engravings from the ceiling of the Jesuits' college, we scarcely know where to look for an historical engraver who accomplished more successfully, what he evidently aimed at; or who has imparted to his works more of the appearance of finish with the reality of slightness. Other men may proceed in the production of more operose works by careful observation and patient industry; a well-practised hand, guided by the vivid and spontaneous feeling of a tasteful mind, is alone adequate to the production of such prints as these. The art of leaving broad masses of white paper, without the least appearance of baldness, crudeness, or chalkiness, Punt possessed in an exemplary degree; and notwithstanding his slightness, his tones, when required to be so, are sweet, hazy, and aerial, in the upper parts, and it should be remembered that, in these celebrated ceilings, the perspective points, of sight and distance, are not in the horizon but in the heavens, while, in the lower part, his engraving is rich, mellow, and vigorous. In "The Adoration of the Magi," and "St. Michael expelling the rebellious Angels," these qualities are more especially observable. In the latter the rolling clouds, and smouldering smoke, and bickering flame, as well as the nudities, wings, shield, and drapery of the figures, are treated in a very superior style. His metal vases, armour, and other such objects, have also, though done with small labour, a peculiarly polished and glittering character, and all the various objects that enter into these several compositions are harmonized with artful simplicity, and in each are so thoroughly incorporated, that all evidently appears to be the production of the same hand and mind; and that mind, at no time languid; but always animated, rapid, in full possession of itself, and carrying the spectator of taste along with it.

The chiaroscuro of Punt is broad, bold, and harmonious; his lights are bright; his shadows and reflexes cleared and enriched by vigorous touches of the graver, and his most delicate tints are firm. His style of manual execution, generally speaking, consists of masterly courses of lines firmly

etched, or freely engraven: so freely, that the dextrous incorporation of these two modes of art are in his works much to be praised. Sometimes he throws a second, and sometimes a third course of engraved lines across his etching with the utmost freedom, as may be seen in the draperies, clouds, ground, and other passages of his works; and upon other occasions, as in metallic and other shining or polished substances, he employs an interline, always adapting his hatching, so as to characterize, in proportion to their relative degrees of importance in the composition, the several textures of the surfaces to be expressed.

Huber and Martini state that of the set of engravings from the compartments of the ceiling of the collegiate church of the Jesuits, ten were etched by Jacob de Wit, namely, "The Fall of the rebel Angels;" "The Ascension of Elias;" "Elihu before Ahazuerus;" "The Nativity;" "The Triumph of St. Joseph;" "The Temptation;" "Resurrection," and "Ascension of Christ," and "The Assumption" and "Coronation of the Holy Virgin."

Now, these ten engravings exhibit two such distinct and almost opposite styles of etching, that they cannot all be the production of the same artist. It is further observable, that the whole set of thirty-six bear the name of D. Wit as the draughtsman who, in the first instance, made those copies from the ceilings of Rubens, from which the plates were engraven,—one only of those ten mentioned by Huber and Martini bears the addition of "aquaforti" to the words "J. de Wit delineavit," and that one is "The Temptation of Christ in the Desert," which is etched in a style very inferior to "The Fall of the rebel Angels," and those other subjects which are enumerated above; another, which is inscribed "De Wit aquaforti," is "Abraham offering up Isaac," which is not mentioned by those authors as being the production of his etching-needle. On the whole, we are therefore led to claim all the most meritorious of these engravings for John Punt, and to conclude that Huber and Martini must, in this instance at least, have written at random.

The works of this artist, with which we are acquainted, are the portraits of Joanna Koerten Block, as a medalion with attendant genius, and Jacques de Roure of Antwerp, from a picture by himself, both in quarto. A set of forty small folio plates, of which the subjects are taken from La Fontaine's fables, after the designs of d'Oudry, published in 1758 and 1759; a set of thirty-six folio plates from Rubens' ceilings of the collegiate church of the Jesuits at Antwerp, prefaced by an historical portrait of this great painter, with allegorical accompaniments designed by De Wit. "The Ascension of Our Saviour," engraved after Sebastian Rica, for the work which is entitled "The Dresden Gallery;" "The English Coach," after G. van der Myn, both in large folio; "The Guard-House of the Dutch Officers," after C. Troost; engraved for the cabinet of M. Braamcamp at Amsterdam, by Punt and Tanje, and, by the same engravers in conjunction, "The Declaration of Love," and "The Proposal of Marriage," both after Troost, and of folio dimensions.

John Louis Krafft was born at Brussels, A. D. 1710. In 1733, he published a book, intitled "Tresor de Fables choisies des plus excellens Mythologistes," containing one hundred and fifty of his engravings. And afterwards the portraits for the history of the house of Austria, which was published in three folio volumes at Brussels, in 1744. This artist likewise etched five subjects after Rubens, which are specified in the catalogue of the works of that master, all of which are very rare; and also, "Job surrounded by his Friends and his Wife;" "Christ giving the Keys to St. Peter;"

LOW COUNTRIES, ENGRAVERS OF THE.

Peter;" "Christ with Nicodemus," (half figures,) all from Rubens; "Jupiter and Danae," from a drawing by Rubens, after Titian, all in 4to.; "Venus and Cupid," from a drawing by Rubens, after Giorgione; "St. Martin dividing his Cloak with the Beggar," after Vandyke, in large folio; "The Village Goatherd," and "Country Conversation," both in folio; and a stormy sea view, in large folio, all from Teniers.

Krafft heightened some of the impressions from his engravings with white chalk, which, from the difficulty of preserving such works, are now become rare and valuable.

Cornelius Troost was born at Amsterdam in the year 1697, and died in the same city in 1750. He was the pupil of Arnold Boonen, and besides engraving both in lines and mezzotinto, he painted portraits, fancy subjects, and history, and was furnished the Watteau of Holland, from the sparkling delicacy of his touch, and purity, and beauty of his colouring. The etchings of this master are much sought after for their truth and brilliancy; he likewise scraped several subjects in mezzotinto, among which are, a bull of an old man with a long beard, and a girl drawing, both in 4to; the portrait of Pietro Locatelli da Bergamo, and that of Vlaming, the poet, with two Dutch verses beneath, both in large folio, and all from his own drawings and paintings.

Philip Endlick, or Endelick, was born at Amsterdam A. D. 1700. He was the disciple of Bernard Picart, and always resided in the place of his nativity. The following portraits are engraven by him, from his own drawings, and are executed in a firm style. John Taylor, the celebrated oculist, of London; Henry, count of Moens; John Philip d'Almérie, governor of the isle of St. Martin; John Gosewyn Eberhard Allien, John Noordbeck, Peter Hollebeck, and Leonard Beels, all clergymen of Amsterdam, of folio size.

Peter Tanjé was a native of Amsterdam. He was born in the year 1700, and died in the same city in 1760. Tanjé was a laborious artist, and engraved a great number of portraits, vignettes, &c. But his most considerable work is five plates, from the famous windows of St. John's church at Gouda, and he likewise worked for the Dresden gallery. The following are selected from his engravings, as being most worthy the attention of the connoisseur.

Portraits.—Peter Tanjé, from J. M. Quickhard; John Maria Quickhard, both in folio; Martin Luther, from Lucas Cranach, in 4to.; Benjamin de Brissac, an ecclesiastic of Amsterdam, from L. F. du Bourg; Charles Linnæus, professor of botany at Upsal; John Osterdyck Scheit, doctor of medicine at the Utrecht academy, after Quickhard; Albert Vogt, theologian; John Beukelman de Honn, an ecclesiastic, from P. M. Brasser; John van Marle, an ecclesiastic of Rotterdam, after Curland; Thomas Philip de Boffu, cardinal and archbishop of Mechlin, from Snyers, all in folio; Lawrence Heister, surgeon; and Henry Ulhorn, physician; two medallions on the same plate, from Quickhard in 4to.; William van Haren, regent of Friesland, from Akema, in an oval; William, prince of Orange, from F. de la Croix; George II. of England, from Faber; Charles VII. of Germany; Christina, queen of Sweden, from Seb. Bourdon; Gustavus Reinbeck, doctor of theology, from Pefne; and M. Fagel, after G. J. Xavery, all in folio.

For the Gallery of Dresden.—A man with a book, from Correggio, known by the name of "The Physician of Correggio," in large folio; a woman in a bonnet, after Rubens, in folio; "A dead Christ," from F. Salviati; "Children

dancing before the Altar of Love," from Albano, both in large folio; "Card Players," after Michael Angelo, "Tarquin and Lucretia," from Lucas Jordens, both in folio; "Joseph and the Wife of Potiphar," half figures, from Carlo Cignani; and a portrait of a man, after Rembrandt, half length, both of folio size.

Historical, &c.—"The Temptation of Job," after Troost, in 4to.; "The Court of Law, of the Peasants of Puterveen," for the cabinet of M. Ploos van Amstel; and in companion, "The wicked Tavern-keeper at Puterveen;" "False Virtue or sham Sorrow;" and its companion, "The Tutor deceived," all in folio; "The Philosophers, or the runaway Girl;" "The sick Chamber of the Dutch;" and "The Marriage of Chloris and Roletta," all in large folio, after Troost.

Peter van Bleeck the younger was born in the year 1703, somewhere in Flanders, but for the greater part of his life resided in England, and died in London A. D. 1764. He was a mezzotinto scraper, and the son of Richard van Bleeck, a portrait painter; he always added the word junior to his name or cypher, for which see Plate IV. of those used by the artists of the Netherlands.

Most of his works are portraits, and are executed in a style not inferior to that of John Smith. The following are some of the most important. Richard van Bleeck, from a picture by himself; Francesco du Quefnoy, from A. Vandyke; Paul Rembrandt van Ryn, from a picture by himself; Eleanor Gwin, from Sir Peter Lely; Mrs. Cibber in the character of Cordelia; Mrs. Clive, in the character of Phillida; the comedians, Griffin and Johnson, in the characters of Tribulation and Ananias, all from his own drawings; and "The Virgin with the Infant Saviour," after Vander Werff. The four last are in large folio, the rest somewhat smaller.

Arthus Schouman was born at Dordrecht in the year 1710, and studied the principles of art under Adrian van der Burg. He became a painter of some repute, and in 1748, he established himself at the Hague, where he continued to exercise his various talents in crayon and water colour, painting; etching; mezzotinto scraping; and engraving on crystal, till toward the close of the century.

Among his best prints are a small etching of St. Francis; a man's head with moustachios, in 4to; and a lady at her toilette, in 4to.; Saartze Jans, after Troost, with six Dutch verses; a mezzotinto engraving in folio, and a party of amateurs at the house of a painter, also after Troost, and of 4to. size.

Simon Fokke was born A. D. 1712 at Amsterdam, and studied engraving under John Caspar Philips. He was a man of patient industry and unremitting application, but of little taste, and no genius. The greater part of his works consists of small portraits and vignettes, which he executed for the Dutch booksellers with considerable neatness. In the large historical works which he attempted he was far less successful.

Among his best productions are the portraits for a work, intitled "Portraits historiques des Hommes illustres du Danemarck;" it was published in 1746, in 4to.; and also the prints for another work, intitled "Arrivement et Séjour de L. A. S. S. et R. Monseigneur le Prince Stadholder Héritaire des Pays Bas, et de Madame son épouse, à Amsterdam le 30 de Mai et jours suivans, en 1768." Of his single prints upon a larger scale, the following are to be preferred. A portrait of himself, in 4to.; a view of the Y before Amsterdam, in folio; "The Statue of the Prince of Nassau Weibourg," from Haag; "Jacob keeping the Sheep of Laban," from the Dresden gallery, after Elspagnoletto; "Women

"Women bathing," after Troost; a burlesque on the death of Dido, in the Dutch style, after the same painter; a landscape, with the effect of winter, after P. Breughel; a view of the port of Livourne, after Vernet; and its companion, a view in the neighbourhood of Narni in Lombardy, from the same painter, all in folio.

Jurian Cootwick, or Kootwyck, was originally a goldsmith, and born at Amsterdam in the year 1714. He excelled in drawing with Indian ink and crayons, and engraved after many of the old masters, with some ability. An old woman seated, with a paper in her hand, in imitation of a drawing in black and white chalks; another of the same subject, a man seated, with his hat on his knees; a shepherd playing the flute, accompanied by a shepherdess; a landscape; the same landscape with alterations; a pair of landscapes; a pair of rustic subjects, with cows; and a loaded ass, are all believed to be after his own drawings.

He also engraved a sea view, after Lud. Backhuysen, which is very rare; a very highly finished engraving of the same subject; a pastoral subject, with a shepherd and his flock, after Berghem; and a set of three of cows and an ass, after P. van Bloemen.

Jacob vander Schley was likewise a native of Amsterdam, and born in the year 1715. He was one of the best of the pupils of Bernard Picart, under whom he studied till the death of that artist, and afterward finished most of the plates which were left imperfect by him.

The greatest part of the engravings of Schley are vignettes, portraits, and other book ornaments, which he executed in the style of his master: the following are some of the best of them.

"An Emblem of Divine Justice," John Baptista Boyer, marquis d'Argens, from Th. van Pee; Antonio Bernard Prévot, almoner to the prince of Conti, both in 4to; Bernard Picart, surrounded with allegorical figures, designed by Schley himself in folio; Henry de la Tour, viscount Turenne; and "The Combat between Jarnac and Chataugneraye," both small plates, and from drawings by the engraver himself.

Peter Spruyt was born at Antwerp in the year 1720. He was a man of some talent, and etched several plates, among which are the following, all after Rubens.

"Susannah surprised by the Elders;" "The Rape of Orythia;" "The Continence of Scipio;" and a group of children with wreaths of flowers, all of folio size.

C. Exthau was a native of Holland, whom Brandes mistakenly supposes to have been an Englishman. He was born in the year 1730, and became one of the most successful of the numerous imitators of Rembrandt, after whose pictures and prints he chiefly engraved.

Among his best works are, the head of an old man with a beard and large round hat, executed by means of mezzotinto combined with etching; head of an old man with a beard and short hair, both small; "Joseph accused by the Wife of Potiphar," a large folio print, with a striking chiaroscuro; "The Storm and Ship," wherein are the apostles, also distinguished by its very grand effect. After Rembrandt: a girl with a basket of cherries, accompanied by two boys, is after Rubens.

Christina Chalou was born at Amsterdam in the year 1747. She was distinguished, from a very early period of life, by her talent and love for the fine arts, and was instructed in that of engraving by Van Amstel, and Sarah Troost. The final period of her life has not been recorded, and she may perhaps be still living.

Christina is believed to be of the same family with the

two distinguished painters of the same name, who are now practising their art with so much credit to themselves, and benefit to the public, in this metropolis. There are prints from her hand which were produced at the very early age of ten years; in particular one, containing three figures, a promising and honest earnest of her future attainments. She engraved both in lines and in imitation of crayons. In the latter mode of art, her print of a seclusion in conversation with two children, is stippled with sufficient neatness. Among her best works in lines are two pair of heads in small circles; "The Entrance to School;" "The Interior of a Village School," and some other plates, of which the subjects are various incidents of domestic conversation, and Dutch rusticity.

We are now arrived at the time which gave birth to an engraver of the Low Countries, who is still living, following his professional pursuits in England, and known to the present writer. Ever regardful of the public, he stops short with a distrust of his own feelings, which may not be thought unbefitting, at the name of Mr. Anthony Cardon.

Low Flank and Hemisphere. See the substantives.

Low Island, in *Geography*, a small island in the East Indian sea, near the S. coast of Cumbava. S. lat. 9 1'. E. long. 117° 34'.

Low Green Point, a cape on the E. coast of the island of Sumatra. S. lat. 7 12'. E. long. 106.

Low, in the *Manege—To carry Low.* See CARRYING.

Low Mass. See MASS.

Low Style. See STYLE.

Low Water. See WATER.

Low Wines. See *Low Wines*.

LOWCOOTY, in *Geography*, a town of Hindoostan, in Bahar; eight miles W. of Mongir.

LOWDEBA, a town of Hindoostan, in Allahabad; 24 miles S.S.W. of Allahabad.

LOWE, PETER, in *Biography*, a surgeon of the sixteenth century, was born in Scotland. In a work, entitled "A Discourse on the whole Art of Chirurgery," published at Glasgow in 1612, he acquaints his readers, that he had practised twenty-two years in France and Flanders; that he had been two years surgeon-major to the Spanish regiment at Paris; and had then followed his master, the king of France (Henry IV.) six years in his wars. In the title page of his book, he calls himself doctor in the faculty of surgery at Paris, and ordinary surgeon to the king of France and Navarre. It does not appear how long he had resided at Glasgow; but he mentions that, fourteen years before the publication of his book, he had complained of the ignorant persons who intruded into the practice of surgery, and that in consequence the king (of Scotland) granted him a privilege, under his privy seal, of examining all practitioners in surgery in the western parts of Scotland. He refers to a former work of his own, entitled "The Poor Man's Guide," and speaks of an intended publication concerning the diseases of women. His epitaph in the cathedral church of Glasgow (see Penning's Tour to the H. L. p. 124.) is, however, dated 1612, in December of which year the work just mentioned was published; so that it is probably prevented by death from publishing his next work. "The Discourse on Chirurgery" appears to have been in a 2d. ed.; for the fourth edition of it was printed in London in 1754. It is, indeed, copious, plain, and adorned with all the references to ancient and modern authors; and, in fact, like the majority of books of that time, is more founded on authority than observation. James mentions another work of his with the following title, "An easy, certain, and perfect Method to cure and prevent the Spanish sickness; by Peter Lowe, doctor

doctor in the Faculty of Chirurgie at Paris, Chirurgion to Henry IV." London 1596, 4to. Aikm's Biog. Mem. of Med.

LÖWEN. in *Geography*, a royal town of Silesia, in the county of Glatz, the inhabitants of which are chiefly employed in turning; 13 miles W. of Glatz. N. lat. $50^{\circ} 13'$. E. long. $16^{\circ} 3'$.

LÖWEN, Löwen, or Lewin, a town of Silesia, in the principality of Brieg, on the Neisse; nine miles S.E. of Brieg. N. lat. $50^{\circ} 40'$. E. long. $17^{\circ} 23'$.

LÖWENBERG, or LEMBERG, a town of Silesia, in the principality of Jauer, near the Bober; 25 miles W. of Jauer. N. lat. $51^{\circ} 5'$. E. long. $15^{\circ} 42'$.

LOWENDAHL, ULRIC-FRIDERIC, WOLDEMAR, Count *cf.* in *Biography*, a celebrated general, was born at Ham-burgh in the year 1700. His father, grand marshal and minister of the king of Poland, elector of Saxony, injured him to arms when he was only thirteen years old. He rose gradually in the army, and served in several campaigns, exposed to the dangers and fatigues of warfare, proving himself, on all occasions, worthy of the rank he held, by his valour and prudence. In 1721 the king of Poland gave him the command of his horse-guards and a regiment of infantry; his leisure time he employed in the profound study of gunnery and fortification, and in 1728 he was made field-marshal and inspector-general of the Saxon infantry. After the death of the king he distinguished himself in the defence of Cracow; in the following campaigns he commanded the Saxon auxiliaries on the Rhine under prince Eugene, and he had a chief command at the storming of Otchakof. In 1743 he entered the service of the king of France, and was for some years actively employed in the war in which that monarch was engaged. In 1747 he attained the summit of his glory as a besieging general, by making a sweep of several towns of Flanders, concluding with that of Bergen-op-Zoom, which had been deemed impregnable. Immediately after the capture of this last place Lowendahl was declared a marshal of France. He now retired from the active scenes of war, and distinguished himself as a worthy estimable character in private life, equally agreeable and instructive in conversation, and furnished with a variety of knowledge. He was conversant with many languages, and devoted a large portion of his time to reading. He died at the age of fifty-five. His name had been some time enrolled among the honorary members of the Academy of Sciences. Moreri.

LOWENDOLLAR, or LAONDOLLAR, a Dutch silver coin, valued at 42 silvers, or a little more. This coin is $\frac{1}{3}$ of the ducatoon, weighs 17 dwts. 14 grs., and is valued at 43.07d. in Sir I. Newton's Table of Assays, &c.

LÖWENSTEIN, in *Geography*, a town and capital of a county, which is a fief annexed to Wurtemberg; nine miles E.S.E. of Heilbronn. N. lat. $49^{\circ} 6'$. E. long. $9^{\circ} 28'$.

LOWER, RICHARD, in *Biography*, an eminent physician and anatomist, was born at Tremere, in Cornwall, about the year 1631. He was descended from a good family, and received a liberal education, being admitted as king's scholar at Westminster school, and thence elected to Christ-church college, in Oxford, in 1649. After the usual course of university studies, he took the degree of M.A. in 1655, and then turned his attention to medicine. He became acquainted with the celebrated Dr. Willis, who employed him as a coadjutor in his dissections, and found him so able an assistant, that he afterwards became his steady friend and patron, and introduced him into practice. In 1665, Lower took the degree of M.D.; and in the same year published a defence of Dr. Willis's work on fevers,

entitled "*Diatribæ Thomæ Willisii M.D. et Prof. Oxon. de Febribus Vindicatio adversus Edm. de Meara Ormondien-sen Hibern. M.D.*" 8vo., a work of considerable learning and force of argument, but not without some fallacies, as he afterwards himself admitted. But his most important work was, his "*Tractatus de Corde, item de motu et calore Sanguinis, et Chyli in eum transitu*," which was first printed in London in 1669. In this work the structure of the heart, the origin and course of its fibres, and the nature of its action, were pointed out with much accuracy and ingenuity. He likewise demonstrated the dependance of its motions upon the nervous influence, referred the red colour of the arterial blood to the action of the air upon it in the lungs, and calculated the force of the circulation, and the quantity and velocity of the blood passing through it. In a word, this treatise was one of the most important contributions of the time to anatomical and physiological improvement. The work excited particular notice, in consequence of the chapter on the transfusion of blood from the vessels of one living animal to those of another, which the author had first performed experimentally at Oxford, in February 1665, of which some account had been laid before the Royal Society, and printed in the Philos. Transactions 1666, through the request of the Hon. Robert Boyle. He subsequently practised the transfusion upon an insane person before the Royal Society. Lower claims the merit of originality in this matter; but the experiment had certainly been suggested long before by *Liberius* (which see), and it is a matter of dispute with whom the thought first originated. It is allowed, however, that the French first tried the experiment upon the human subject. But it were useless to enter into the question; since experience soon decided, that the operation was attended with pernicious consequences, and it was therefore exploded. Lower had removed to London soon after the commencement of these experiments, and in 1667 had been a fellow of the Royal Society, and of the College of Physicians. The reputation acquired by his publications brought him into extensive practice; and after the death of Dr. Willis, he was considered as one of the ablest physicians in London. But his attachment to the Whig party, at the time of the Popish plot, brought him into discredit at court, so that his practice declined considerably before his death, which occurred in January 1690-91. He was buried at St. Tudy, near his native place, in Cornwall, where he had purchased an estate. In addition to the writings above-mentioned, he communicated some papers containing accounts of anatomical experiments to the Royal Society; a small tract on catarrh, which was added, as a new chapter, to the edition of the treatise de Corde of 1680; and a Letter on the state of medicine in England. Gen. Biog. Eloy Diet. Hist. de la Med.

Lower, To, in *Sea Language*, is to ease down gradually, expelled of some weighty body, which is suspended by tackles or other ropes, which being slackened, suffer the body to descend as slowly or expeditiously as the occasion requires. Hence lower *handily*, and lower *cheerly*, are opposed to one another; the former being the order to lower gradually, and the latter to lower expeditiously.

LOWER Alloway's Creek, in *Geography*, a township of America, in Salem county, New Jersey.

LOWER Creek, a river of America, in the western territory, which runs into the Ohio. N. lat. $40^{\circ} 9'$. W. long. $80^{\circ} 43'$.

LOWER Dublin, a township of America, in Philadelphia county, Pennsylvania, containing 1495 inhabitants.

LOWER Landing, or Eagle Landing, lies on Niagara river, Upper

Upper Canada, opposite to Queenstown on the Niagara-fort side.

LOWER Marlborough, a post-town of America, in Maryland, 30 miles from Annapolis, and 12 from Calvert court-house.

LOWER Milford, a township of America, in Burk's county, Pennsylvania.

LOWER Penn's Neck, a township of America, in Salem county, New Jersey.

LOWER Weau Towns, lie in the territory NW. of the Ohio, 20 miles below Rippacanoe creek, at its mouth in Wabash river.

LOWER, in *Rural Economy*, a term provincially applied to a lever in some places.

LOWERING, in the *Distillery*, a term used to express the debasing of the strength of any spirituous liquor by mixing water with it. The standard and marketable price of these liquors are fixed, in regard to a certain strength in them called *proof*; this is that strength, which makes them, when shook in a phial, or poured from on high into a glass, retain a froth or crown of bubbles for some time. In this state spirits consist of about half pure or totally inflammable spirit, and half water; and if any foreign or home spirit is to be exposed to sale, and is found to have that proof wanting, scarce any one will buy it, till it has been distilled again and brought to that strength; and if it is above that strength, the proprietor usually adds water to it to bring it down to that standard. This addition of water, to debase the strength, is what is called lowering it. People well acquainted with the goods will indeed buy spirits at any strength, only lowering a sample to the proof strength, and by that judging of the strength of the whole; but the generality of buyers will not enter into this, but have it all lowered for them.

There is another kind of lowering in practice among the retailers of spirituous liquors: the vulgar: this is the reducing it under the standard of proof. They buy it proof, and afterwards increase their profit upon it, by lowering it with water one-eighth part. The quantity of spirit is what they generally allow themselves for the addition of water; and whoever has the art of doing this, without destroying the bubble proof, as this is easily done by means of some addition that gives a greater tenacity to the parts of the spirit, will deceive all that judge by this proof alone; that is, very nearly all who are concerned in the spirit trade. Such an additional quantity of water as one-eighth makes the spirit taste softer and cooler, and will make many prefer it to the stronger spirit, which is hotter and more fiery; but unless the spirit, thus lowered, were tolerably clean, or the proof be some other way preserved, the addition of the water lets loose some of the coarse oil, which makes the liquor milky, and leaves a very nauseous taste in the mouth. Shaw's Essay on Distillery.

The way to judge of spirits not being thus lowered or debased in strength, is to examine them by the eye and tongue; and in buying a quantity of proof goods, such should always be chosen as are clean, thin, and light, and have a good crown of froth, which goes off in large bubbles, such as taste soft and uniform, and are not high flavoured, of an alkaline gust, nor acrid and fiery, but soon quit the tongue.

LOWERING the Flag. See **FLAG**.

LOWES WATER, in *Geography*, a lake of England, in the county of Cumberland, about six miles in circumference; 10 miles S. of Cockermouth.

LOWEST REGION. See **REGION**.

LOWESTOFF, in *Geography*, a market-town and parish in the hundred of Mutford and Lothingland, on the coast of

Suffolk, England. For a considerable period it was denominated Lothwistoff, as some think, from Lothbroch, a noble Dane, who landed in this neighbourhood about the year 864, and *wistfa*, a half hide of land. This derivation of its name is extremely doubtful. The town, however, is certainly of much earlier origin. Mr. Gillingwater, in his "History of Lowestoff," says it can be traced back to a period anterior to the fourth century. This town has suffered much from the plague at different periods, particularly in the years 1348 and 1547. It has likewise sustained frequent plundering and depredations, on account of the attachment of its inhabitants to the cause of royalty.

The situation of this town is lofty, and exhibits a fine and commanding appearance. It extends about a mile in length, and consists chiefly of one principal street, running in a gradual descent from north to south, which is intersected by several smaller streets or lanes from the west. The whole is, in general, well paved, and many of the houses, having been lately rebuilt in the modern style, give the town an appearance of great neatness. From its situation and exposure to the northern ocean, over which it commands an extensive prospect, it enjoys a most salubrious air, keen, but bracing. On the declivity of the cliff a number of hanging gardens are formed, which are interspersed with alcoves and summer-houses. At the foot of these gardens is a long arrangement of fishing-houses, extending the whole length of the town. Between these and the beach stand the boats employed in the herring-fishery, which is the chief support of the town, 70,000 barrels being exported from hence every season. Here are also two light-houses, conveniences for boat-building, and accommodations for bathing. A considerable number of families resort here for the benefit of the salt-water. Besides these sources of wealth to the inhabitants, there is a tolerable mackerel fishery, which commences in May and continues till the latter end of June, and supplies the adjacent markets, as well as the metropolis. A small china manufactory, and a ropery, also belong to the town.

The church, situated about half a mile west from the town, is a very fine building, in the pointed style of architecture, and consists of a nave with two side aisles. The principal entrance is by a stately porch, on the south side of which are three niches, the centre one intended for the reception of a statue of St. Margaret, the saint to whom the church is dedicated. The chancel is particularly neat and elegant. The font, which is very ancient, is ascended by three stone steps, the upper one bearing an inscription, but so much corroded as to be almost unintelligible. It is surrounded by three rows of saints, each row containing twelve figures, and is otherwise finely adorned by carved work. Mr. Whiston, the friend of sir Isaac Newton, and some time professor of mathematics in the university of Cambridge, from which he was expelled for his Arian principles, was long vicar of this church. This town had likewise formerly three chapels of ease, but only one of them now continues to be used. There are dissenting meeting-houses here for Methodists and Presbyterians. A theatre was erected in 1790.

Lowestoff is protected by strong batteries on the sea-side. From its extensive fishery, it is a good nursery for seamen, and has given birth to several eminent naval officers. A great sea-fight took place off this town on the 3d of June, 1665, between the British fleet under the duke of York, and the Dutch fleet, which was commanded by admirals Opdam and Van Tromp, in which the latter were defeated with the loss of eighteen ships taken and fourteen sunk. In this action, admiral sir Thomas Allen, a native of this

town, particularly distinguished himself. In the vicinity of Loweloff formerly stood the village of Newton, which has been entirely swallowed up by the sea.

Loweloff, according to the parliamentary returns of 1800, contained 572 houses, and 2332 inhabitants. The market is held on Wednesday, and the fairs on the 12th of May and 19th of October. A very full history of this town has been published under the following title, "An historical Account of the ancient Town of Loweloff, with curious Remarks on the adjoining Parishes, and a general Account of the Island, by Edm. Gillingwater, 4to. 1790."

LOWHILL, a township of America, in Northampton county, Pennsylvania, containing 545 inhabitants.

LOWITZ, GEORGE MORITZ, in *Biography*, professor at Gottingen, and member of the Imperial Academy of Sciences at Petersburg, was born, in 1722, at Fürth, near Nuremberg. He was put apprentice to the trade of a goldsmith, and by his expertness in the business, he was enabled afterwards to construct and improve mathematical instruments, with the use of which he was well acquainted. He now turned his attention to science, and made a very uncommon progress in mathematics and natural philosophy. In 1748, he distinguished himself by constructing two charts of the solar eclipse, which was to take place in the following July. He afterwards observed the eclipse with great accuracy, by a new method of his own invention. Next year he published a chart representing the solar eclipse announced for the 8th of January, 1750, as it would appear to the inhabitants of Petersburg, Rome, Berlin, Nuremberg, Lisbon, &c. During these years he had been employed in the education of young persons, and in 1751 he was appointed professor of mathematics and natural philosophy in the Egidian seminary at Nuremberg, and was entrusted with the care of the observatory. On his entrance into this new office he pronounced an oration on the advantages which might be derived from the study of the higher branches of mathematics, which was printed in 1752. He published in the same year an account of various experiments on the properties of the air, which he employed as a guide in his lectures. About this time he removed to Gottingen, and was made professor of practical mathematics, with a salary of four hundred dollars. Having little to do as professor, he filled up his vacant hours in writing papers on various useful subjects; the greater part of these were read before the Royal Society of Gottingen, and they added, in a considerable degree, to his reputation. He was at the same time employed by the Cosmological Society in constructing globes; but, after a time, conceiving his services had not been sufficiently remunerated, he quitted the society with disgust. After this he was appointed, by the Hanoverian government, director of the observatory, an office which he resigned in 1764, together with the professorship; and he now resided at Gottingen as a private individual. He soon found that his means were insufficient for his support: his affairs became embarrassed, and his situation would probably have been forlorn, had not the Academy of Sciences at Petersburg invited him into Russia for the purpose of observing the transit of Venus, which was to take place in the year 1769. In a short time after this he was appointed a member of the Academy of Sciences in the astronomical department, and he was ordered to repair to Surjev, a small town on the river Ural, a few miles from the Caspian sea, the place destined for observing this curious phenomenon. This mission he accomplished in the completest manner, and published an account of it in the year 1770. He then proceeded, in the month of September, by the Caspian sea, to Astrachan, and having determined the geographical position

of that city, he repaired to some other places for the like purposes. He was next engaged in surveys for a new canal, which he continued, at different periods, till the month of August, 1774, when the whole undertaking was unfortunately stopped by a sudden and unexpected irruption of some rebel troops. Lowitz, and his friend and assistant, betook themselves to places which they hoped would afford them shelter and security. The latter, after burying his books, instruments, and other property, sought for safety in the fortrefs of Dnietrieffsk, from whence he proceeded to Astrachan. Lowitz, with his family, set out for the German colony of Dobriska, but unfortunately fell into the hands of the rebel chief, who put him to death in the most barbarous manner. His wife and son were suffered to escape after they had been plundered of the best part of their property: but Lowitz's books, papers, and instruments, having been deposited in an unoccupied house, were, by good fortune, preserved. Gen. Biog.

LOWK, in *Agriculture*, a provincial term, signifying to weed corn, or other crops sown broad-cast.

LOWKOW, in *Geography*, a town of Poland, in the palatinate of Volhynia; 10 miles E. of Zytmiers.

LOWLANDS, a denomination applied to the southern districts of Scotland, in contradistinction to the *Highlands*; which see. The inhabitants of these different districts differ from each other in language, manners, and dress; but the difference has been gradually decreasing. The language, manners, habits, and dress of the gentlemen in the Low Countries resemble those of their English neighbours, with whom they have frequent intercourse. The peasantry and middle class are sober, industrious, and good economists; hospitable and discreet, intelligent, brave, steady, humane, and benevolent. Their fidelity to one another is a striking feature in their character. In their mode of living and dress there are some peculiarities, but these are gradually wearing out. Within these few years the use of pottage, and bread of oatmeal, is almost disused among the commonalty, and tea, wheaten bread, and animal food, are as common on the north as on the south of the Tweed. See SCOTLAND.

LOWMAN, MOSES, in *Biography*, was born in London in the year 1679. He was originally intended for the profession of the law, was educated accordingly, and entered a student in the Middle Temple. When he attained to years of manhood, he abandoned the law, and determined to qualify himself for the office of minister among the Protestant dissenters. With this view he proceeded to Holland, and pursued his studies at Utrecht and Leyden, and on his return in 1710 he was chosen assistant preacher to a dissenting congregation at Clapham, of which he was afterwards elected pastor. In this connection he continued during the remainder of his life, discharging the duties of his station with constancy and regularity, esteemed and beloved by his flock, and highly respected by those who knew him. As an author, his first publication was in 1740, and intitled "A Dissertation on the Civil Government of the Hebrews, in which the true Design and Nature of their Government are explained, and the Justice, Wisdom, and Goodness of the Mosaic Constitutions vindicated, &c." In 1745, he published "A Paraphrase and Notes upon the Revelation of St. John," which is held in high estimation by the most judicious critics. The next work of Mr. Lowman was upon Jewish antiquities, intitled "A Rational of the Ritual of Hebrew Worship, &c." Besides these, he printed a small tract concerning "The Demonstration of a God, from the Argument a priori," and a sermon on Popery. He died in 1752, in the 73d year of his age. As he was a firm believer

believer in the Christian revelation, so he had imbibed the spirit which it recommends; and those virtues and duties which he inculcated upon others he carefully practised himself. *Biog. Brit.*

LOWESITZ, in *Geography*, a town of Bohemia, in the circle of Leitmeritz; four miles W.S.W. of Leitmeritz. N. lat. 50° 30'. E. long. 14° 9'.

LOWOWECH, or **NEUSTAT**, a town of the duchy of Warlaw; 32 miles W. of Posen.

LOWREY, a town of Hindoostan, in the circle of Gohnd; 36 miles E.S.E. of Raat.

LOWTAIAH, a town of Algiers; 27 miles S. of Tubnah.

LOWTH, **WILLIAM**, in *Biography*, a learned English divine and commentator of the scriptures, son of an apothecary, was born in the parish of St. Martin's, Ludgate, in the city of London, in the year 1661: he was instructed in the classics at Merchant Taylors' school, and made such progress in them that he was deemed fully qualified for the university before he was quite fourteen years of age, and was accordingly elected from thence into St. John's college, Oxford, in 1675. He took his degree of M.A. in 1683, and proceeded bachelor of divinity in 1688. His first publication was "A Vindication of the divine Authority and Inspiration of the Old and New Testament," in answer to Le Clerc's famous five letters on this subject. This work attracted public notice, and he was appointed chaplain to Dr. Mew, bishop of Winchester, and shortly promoted to a prebend in the cathedral church of that see, and to a rectory in Hampshire. Mr. Lowth next published a small piece, which has been very frequently reprinted, entitled "Directions for the profitable reading of the Holy Scriptures," &c. In 1714 he published two sermons, and also "A Commentary on the Prophet Isaiah," in quarto, which was followed, in 1718, by "A Commentary on the Prophet Jeremiah." In 1723 he gave the world his "Commentary on the Prophet Ezekiel," and soon after one on Daniel, and the minor prophets. These illustrations of the prophecies were afterwards collected in a folio volume, as a continuation of bishop Patrick's Commentary on the other parts of the Old Testament, in which form they have been frequently reprinted. Mr. Lowth, though an able scripture expounder, was a good general scholar, and furnished Dr. Potter, afterwards archbishop of Canterbury, with notes on Clemens Alexandrinus, which were published, with the author's name to each, in the doctor's edition of that father. He communicated to Dr. Hudson remarks on Josephus, of which that editor availed himself, and acknowledged his obligations in the preface to his edition of the Jewish historian. To the labours of Mr. Lowth many other learned men and valuable writers have been indebted, besides those above referred to. He died in 1732, being in the seventy-third year of his age. He was distinguished for unaffected piety, a most exemplary zeal in the discharge of the pastoral functions, and for an unremitting desire of being useful to his parishioners. *Biog. Brit.*

LOWTH, **ROBERT**, son of the preceding, was born at Winchester in the year 1710. Here he was educated in grammar learning at the school founded by William of Wykeham, in which he acquired an accurate knowledge of the Greek and Roman classics, and made considerable progress in oriental literature. Even at school he discovered a poetical genius, and among other pieces which he wrote at that period, was a beautiful poem on "The Genealogy of Christ," as it is represented on the east window of Winchester college chapel; and another, which appeared in the twenty-third volume of the Gentleman's Magazine, entitled

"Catherine's Hill," the place where the Winchester scholars are allowed to play on holidays. In 1728, he was sent to New college, Oxford, of which institution he was elected a fellow in 1734: took his degree as M.A. in 1737, and was, in 1741, elected professor of poetry in the university of Oxford. In the discharge of the duties of this office he delivered his "Prælectiones" on Hebrew poetry, which will be noticed more at large hereafter. His first preferment in the church was the rectory of Ovingdon, in Hampshire, to which he was presented by bishop Hoadly. In 1748, Mr. Lowth accompanied Mr. Legge, afterwards chancellor of the exchequer, to Berlin, who went to that court in a public character, and with whom, from his earliest years, he lived on terms of the most uninterrupted friendship. In the following year he undertook the charge of the sons of the duke of Devonshire, as travelling tutor on the continent. The duke was so thoroughly satisfied with the conduct of Mr. Lowth in this office, that he afterwards proved his steady friend and patron. In 1750 he was appointed archdeacon of Winchester, and three years after he was presented to the rectory of East Woodhay, in the county of Southampton. In 1753 he published his work already mentioned, entitled "De sacra Poesi Hebraeorum Prælectiones Academicæ;" of which he gave the public an enlarged edition in 1763, in two volumes 8vo. The second volume consists of additions made to the work by the celebrated Michaelis. This work, though entitled only "Lectures on Hebrew Poetry," will be found "An excellent compendium of all the best rules of taste, and of all the principles of composition, illustrated by the boldest and most exalted specimens of genius, which antiquity has transmitted to us, and which have seldom fallen under the inspection of rational criticism. But these lectures teach us not only taste, but virtue; not only to admire and reverence the scriptures, but to profit by their precepts. The author has penetrated into the very sanctuaries of Hebrew literature; he has investigated, with a degree of precision which few critics have attained, the very nature and character of their composition: by accurately examining, and cautiously comparing every part of the sacred writings; by a force of genius, which could enter into the very design of the authors; and by a comprehensiveness of mind, which could embrace, at a single view, a vast series of corresponding passages, he has discovered the manner, the spirit, the idiom of the original, and has laid down such axioms as cannot fail to facilitate our knowledge and understanding of the scriptures." Such is the opinion of this work given by the translator of it, the late Dr. George Gregory. Subjoined to the "Prælectiones" is "A short Confutation of Bishop Hare's System of Hebrew Metre." In the year 1754, the university of Oxford honoured the author with the degree of doctor of divinity, and in the following year he was nominated first chaplain to the marquis of Hartington, lord lieutenant of Ireland. Thither he accompanied that nobleman, and was, in a short time, offered the bishopric of Limerick, which however he exchanged for some preferment in the county of Durham, in his own country. In 1758, Dr. Lowth preached a sermon at Durham, on Free Enquiry in Matters of Religion, which has been frequently reprinted. In the same year he published his "Life of Wykeham, Bishop of Winchester," and founder of the colleges in which he had received his education. His next piece has been exceedingly popular in our schools, though now generally superseded by a work of the same kind by Mr. Lindley Murray, viz. "An Introduction to English Grammar." Passing over a controversy between Dr. Lowth and Dr. Warburton, which did not reflect much credit on

the angry tempers of the disputants; we may observe that Dr. Lowth was elected a fellow of the Royal Society at Gottingen in the year 1765, and in the following year he was promoted to the see of St David's, and almost immediately translated to the bishopric of Oxford. In this high office he remained till the year 1777, when he succeeded Dr. Terriek in the see of London. In 1778 he published the last of his literary labours, entitled "Isaiah: A new Translation, with a preliminary Dissertation, and Notes, critical, philological, and explanatory." His design, in this work, was not only to give an exact and faithful representation of the words and sense of the prophet, by adhering closely to the letter of the text, and treading, as nearly as may be, in his footsteps; but, moreover, to imitate the air and manner of the author, to express the form and fashion of the composition, and to give the English reader some notion of the peculiar turn and cast of the original. This version, excellent in itself, was not entirely faultless, and the mistakes were pointed out by Michael Dodson, esq. (See DODSON.) In 1779 the bishop was called on to preach a sermon before the king at the Chapel-royal, on Ash-Wednesday, in which he attacked the opponents to the ministerial system of government, among whom was the celebrated Dr. Richard Price, who defended himself with energy and spirit. In 1781 bishop Lowth was engaged in a law suit with Lewis Disney Ffytche, esq., concerning the legality of general bonds of resignation, which, if Dr. Towers's statement of the case be at all accurate, was highly discreditable to his lordship: suffice it to say, that in this case the decisions of the courts of law, almost unanimously pronounced, were unexpectedly reversed by the house of lords, by a small majority of *one*, and of the numbers who voted on this occasion fourteen were bishops, and as such parties in their own cause. (See Dr. Towers's Observations on the Cause between the Bishop of London, and L. D. Ffytche, esq.) In 1783 the bishop was fixed on to succeed archbishop Cornwallis, but on account of his advanced age he thought proper to decline the high honour of the archbishopric of Canterbury. In the latter years of his life he endured a great degree of suffering from that dreadful disorder, the stone, which he bore with fortitude and resignation to the divine will. He experienced also some of the most painful strokes of calamities which a father can experience, in the loss of affectionate children. In 1768 his eldest daughter died at the age of thirteen, of whom he was passionately fond, and whose death he deplored in the following exquisitely beautiful epitaph, which is inscribed on her tomb:

Cara, vale, ingenio præstans, pietate, pudore,
Et plusquam natæ nomine cara, vale.
Cara Maria, vale. At veniet felicius ævum
Quando iterum tecum, sim modo dignus, ero.
Cara, redi, keta tum dicam voce paternas,
Eja, age in amplexus, cara Maria, redi.

In 1783, his second daughter, as she was presiding at the tea-table, suddenly expired. His eldest son also, of whom he was led to form the highest expectations, was hurried to the grave in the bloom of youth. His lordship died at Fulham in 1787, having nearly completed the 77th year of his age. Of bishop Lowth's extensive learning, fine taste, and peculiar qualifications for the station which he filled, he has left abundant proofs. While his amiable manners rendered him an ornament to the high rank in which he moved, and endeared him to all with whom he conversed, his zeal for the established religion of the country made him anxious to promote to places of trust and dignity such cler-

gymen as he knew were best qualified to fill them. He united, in an eminent degree, the qualities of the gentleman with those of the scholar: he conversed with elegance, as he wrote with accuracy. His heart was tender and sympathetic. He possessed a mind which felt its own strength, and decided on whatever came before it with promptitude. In those trials where affliction was to be suffered or subdued he behaved as a man and a Christian. His piety had no tincture of moroseness; his charity no leaven of ostentation. The bishop was author of some sermons, preached on particular occasions, and of many poetical pieces, some of which have been frequently reprinted; the titles of which will be found in the General Biography.

LOWVILLE, in *Geography*, a post-town of America, in Oneida county, New York; 550 miles from Washington.

LOWYA, a town of Hindoostan, in Bahar; 15 miles S.S.E. of Bettiah. N. lat. 26° 35'. E. long. 84° 43'.

LOXA, or LOJA, called by Abulfeda *Lujchab*, an irregularly built town of Spain, in the province of Grenada, situated partly on the declivity and partly at the foot of a hill near the Xenil, about five leagues W. of Grenada, and taken from the Moors in 1486. It contains three parishes, four convents, four hospitals, a bridge, and the ruins of a castle; together with a salt-work and a copper forge. It is the chief town of a corregidor; the country about it is pleasing, fertile, and full of olive trees, gardens, orchards, fine fruit trees, and flowers. In the vicinity are immense numbers of hares and rabbits. Near the town, towards Grenada, are a small plain and a valley, both sown with corn, flax, and hemp, and producing also a great quantity of vegetables. N. lat. 37° 18'. W. long. 4° 18'. It contains about 8000 inhabitants.

LOXA, or *Laja*, a town of South America, the capital of a jurisdiction of the same name, in the province of Quito, founded in the year 1546, by captain Alonso de Mercadillo, and resembling in extent, form, and buildings, the city of Cuenca; but the temperature of the air is considerably hotter. Besides two churches, Loja has several convents, a nunnery, a college of Jesuits, and an hospital. In its district are 14 villages, and within the territory of its jurisdiction is produced the famous specific for intermitting fevers, well known by the name of Cascarilla de Loja, or Quinquina. (See CASCARILLA and CINCHONA.) The jurisdiction of Loja derives also great advantage from breeding the *Cochineal*; which see. The inhabitants of Loja, known over the whole province by the name of Lojanos, do not exceed 10,000 souls; though formerly, when the city was in its greatest prosperity, they were much more numerous. Their character is much better than that of the inhabitants of Cuenca; and besides their affinity in customs and disposition to those of the other villages, they cannot be reproached with the character of being slothful. In this jurisdiction such numerous droves of horned cattle and mules are bred, that it supplies the others of this province, and that of Piura in Valles. The carpets also manufactured here are of such remarkable fineness, that they find a ready sale wherever they are sent. The corregidor of Loja is governor of Yaguarfongo, and principal alcalde of the mines of Zaruma; but the post of governor of Yaguarfongo is at present a mere title without any jurisdiction; part of the villages which formed it being lost by the revolt of the Indians, and the others added to the government of Jaen; so that the corregidor of Loja enjoys only those honours intended to preserve the remembrance of that government. The town of Zaruma, in the jurisdiction of which are mines of gold, has presented the corregidor of Loja with the title

of its alcalde major. It was one of the first towns founded in this province, and at the same time one of the most opulent; but it is at present in a mean condition, owing chiefly to the decay of its mines, on which account most of the Spanish families have retired, some to Cuenca, and others to Loja; so that at present its inhabitants are said not to exceed 6000. The declension of these mines, which is owing to the negligence of those that are concerned in working them, more than to a scarcity of the metal, has been disadvantageous to the whole department of Loja; and consequently diminished the number of its inhabitants. S. lat. 4°. W. long. 79° 14'.

LOXA, a town of Sweden, in the province of Savolax; 108 miles N. of Nyflot.

LOXARTHUS, (from *λοξος*, *oblique*, and *αἰσεν*, *a joint*.) in *Surgery*, deformity of a joint.

LOXIA, in *Natural History*, a genus of birds of the order *passeres*, of which, according to Latham, there are eighty-five species; but in the last edition of Gmelin, there are an hundred species enumerated and described. This latter arrangement we shall follow in the present article. The essential character is as follows: the bill is strong, thick, convex, rounded at the base; the lower mandible is bent in at the edge; the nostrils are small, and round at the base of the bill; the tongue is truncate. The familiar name of this genus is *grosbeak*.

In the *loxia*, *emberiza*, and *fringilla* genera, both mandibles are moveable, by which means they are able to shell and break in pieces the seeds they feed upon. Of this numerous tribe there are but five species that are British, which will be noticed by asterisks prefixed to the specific names.

Species.

* **CURVIROSTRA**: Common cross-bill. Mandibles crossing each other; body varying in colour; wings and forked tail brown. Linn. *Le bec-croisé*, Briss. *Shield-apple*, or *cross-bill*, Willoughby. This is the most remarkable bird of the whole genus. Both mandibles are hooked, and turned different ways, so that they do not meet in a point. The bill, however, is not uniformly in the same direction: in some individuals the under mandible is twisted to the right, in others to the left side; a circumstance that has been noticed, to prove that the variation in the bill is rather owing to certain uses to which it is applied by the bird, than to any fixed appointment in nature. This species is found sometimes in Britain, though it is not by any means a constant visitor in these islands. It inhabits more generally the northern countries of Europe, especially some parts of Germany, Switzerland, Russia, Sweden, &c. where it is permanent the whole year. Birds of this species migrate, from unknown causes, into other countries, not regularly, but in the course of several years. They inhabit the pine forests, and feed upon the cones; for the scaling of which their bills are admirably formed. This bird is observed to hold the cone in one claw, like the parrot; and to have all the actions of that bird, when kept in a cage. It is said to make its nest in the very highest parts of the fir trees, fastening it to the branch with the resinous matter which exudes from the trees. Mr. Latham says, "I have never heard of its breeding in England, but know one instance of its being shot at large in the middle of summer. I have been told that they have done great damage in orchards, by tearing the apples to pieces for the sake of the seeds, the only part they delight in. Many are taken with a bird-call and bird-lime, and others by a horse-hair noose fixed to a long fishing-rod: for so intent are they on picking out the seeds of the cone, that

they will suffer themselves to be taken by the noose being put over the head.

There are two varieties: the one reddish, head scarlet; the other larger, bill thicker and shorter. The male is red, varied with brown and green, and is said to change its colours thrice a year; the female is olive-green, mixed with brown.

LEUCOPTERA; White-winged grosbeak. Mandibles crossing each other; feathers whitish, edged with red; rump pale red; vent whitish; tail and wings black, the latter with two white bands. It inhabits North America; is about six inches long. The bill is of a horn colour; legs are brown. Latham received specimens both from Hudson's Bay and New York.

PSITTACEA; Parrot-billed grosbeak. Olive colour; quill and even tail-feathers edged with yellowish; lower mandible much shorter. The plumage in the female is not unlike that of the male, except the head, which is the same as the other parts of the body, with a mixture of yellowish-grey about the sides of the head. It inhabits the Sandwich islands.

* **COCCOTHAUSTES**; Hawfinch. This is *le gros-bec* of Brisson, and is rather larger than the foregoing species. It is of a chestnut-ash colour; wings with a white line, having the middle quill-feathers rhombic at the tips; tail-feathers black at the base of the thinner web. The female is less bright in colour; the part between the bill and the eye is grey, instead of black. This may serve as a general description, but the colours vary very much. This species, though ranked among the British birds, visits these kingdoms occasionally, and for the most part in winter, and has never been known to breed here. It is more plentiful in France, where it may be seen in abundance about the beginning of April; and soon after makes its nest between the fork of the branches of trees, about ten or twelve feet from the ground. It is composed of small dry fibres, intermixed with liverwort, and lined with finer materials. The eggs are of a roundish shape, of a blueish-green, spotted with olive-brown, with a few irregular black markings interperfed. It is also common in Italy, Germany, Sweden, and the western parts of Russia, where the wild fruits grow: in the rest of the empire they are exceedingly scarce, except beyond lake Baikal, where they arrive from the south in great plenty, to feed on the berries of a tree peculiar to that country. From the strength of the bill, it cracks the stones of the fruit, of the haws, cherries, &c. with the greatest ease.

* **ENNUCLEATOR**; Pine grosbeak. *Gros-bec de Canada*, Brisson. *Le dur-bec*, Buffon. *Greatest bullfinch*, Edwards. Wings with a double white line; tail-feathers all black; head, neck, breast, and rump, in the young bird red, in the old bird yellow; female olive, or greenish-brown, with here and there a reddish or yellowish tinge, but chiefly at the top of the head. It frequents the most northern parts of this kingdom, being only met with in Scotland, and especially the Highlands, where it breeds, and inhabits the pine-forests, feeding on the seeds like the cross-bill. It is found in all the pine-forests of Siberia, Lapland, and the northern parts of Russia; common about St. Petersburg in the autumn, and is caught in great plenty at that time for the use of the table, returning north in the spring. These birds are likewise common in the northern parts of America, and appear at Hudson's Bay about the month of May, to which place they are said to come from the south, and are observed to feed on the buds of the willow.

MACROURA; Long-tailed grosbeak. Black; band on the wings and back reddish-yellow; tail long, wedged. Inhabits

hits Africa, near the Senegal. It is about seven inches long; the bill and legs are black.

AUREA; Gold-backed grosbeak. Black; back golden; wing-coverts pale brown, spotted with black; legs bluish. It inhabits Benguelo.

RUBICILLA; Caucasian grosbeak, so called from the Caucasian mountains which it inhabits. It is about eight inches long. Scarlet, spotted with white; belly and vent rosy; greater wing-coverts brown; tail black; feathers of the body cinereous at the base, giving the plumage a waved appearance.

* **PYRRHULA**; Bullfinch. *Le Bouvreuil*, Brisson. The bill of this bird is of a dark horn colour, the upper mandible hooked, and projects over the lower, which is roundish, like a parrot's; top of the head, feathers round the eye, and a spot under the beak, of a dark blue glossy black; the hind part of the neck and the back are grey; the throat and breast are of a beautiful flesh-coloured red; belly and vent white, as is the rump; quill-feathers and tail black; wing-coverts blue-black, the less ones tipped with white; legs very short and black. The female is black on the head, flight-feathers, and tail; breast and under parts of a reddish-brown; the rump whitish. There are three other varieties: 1. Entirely black. 2. White, back with a few black spots. 3. White; head, neck, breast, and belly rosy.

These birds are very troublesome visitors to the orchards and gardens, in the spring of the year; feeding on the buds of cherries, plums, and other fruit-trees. They retire to woods and close cover, to build their nests in May. They have no song in the state of nature, but are readily taught fine notes of music, and even to speak. Females are made as perfect as males in musical tunes. They form a slight nest of twigs laid crossways, and lay four eggs.

CARDINALIS; Cardinal grosbeak; Virginian nightingale. *Le gros-bec de Virginie*, Brisson. Crested, red; frontlet black; bill and legs blood-red; bill and legs pale rosy; crest, when erect, pointed. The female differs from the male, being mostly of a reddish-brown. This species is met with in several parts of North America, and has obtained the name of nightingale, on account of its fine song. In the spring, and most part of the summer, it sits on the tops of the highest trees, singing early in the morning, so loud as to pierce the ears; frequently kept in cages, in which it sings through the year: sometimes it is quite mute for a time, and again restless, hopping from perch to perch, and singing alternately. It inhabits North America; feeds on grain and Indian corn, which it hoards up.

CARLSONI. Red; chin black; rump, tail, wings, and legs brown. Inhabits the islands of the Indian sea; it resembles the *cardinalis*, but is not crested.

BOETONENSIS; Indian grosbeak. Crested, red; frontlet red; bill and legs yellow; the toes are long; claws sharp, pointed; wing-coverts black. It inhabits India, and is about eight inches long.

MADAGASCARIENSIS; Madagascar grosbeak. Red, ocular band black, back spotted with blackish; the bill also is black; wings and tail brown edged with olive. It is about five inches and a half long, and inhabits Madagascar. The young birds at first are olive, and do not arrive at the red colour but by degrees.

MEXICANA; Mexican grosbeak. Red; wings and tail black. It inhabits New Spain, and is about six inches and a half long.

BRASILIANA; Brazilian grosbeak. Brown; beneath reddish, with spots annulate with black; head and middle of the belly red; crescent on the nape and tip of the tail white;

the bill is of a flesh colour; wings and tail black; wing-coverts and secondary quill-feathers reddish at the tips. It is found in Brazil.

DOMINICANA; *Le gros-bec du Bresil*, Brisson; *American bullfinch*, Willoughby. Black; head and chin scarlet; breast, belly, and edge of the quill-feathers white; the neck is blackish above; back, rump, and wing-coverts grey a little spotted with black; vent and sides of the neck whitish; wings and tail black; legs cinereous. It inhabits Brazil. There is a variety; cinereous, beneath snowy; fore part of the head and throat red; tail-feathers black edged with cinereous, the outmost white on the outer edge. It is about the size of a lark.

CUCULLATA; Crested Dominican grosbeak. Cinereous; crested; head and chin scarlet; breast and belly white; tail long, the lateral feathers blackish. This, which by Latham is reckoned a variety of the *Dominicana*, and which is about the same size, inhabits Brazil.

SIBERICA; Siberian grosbeak. Size of a linnet, but fuller of feathers. Bill somewhat longer than that of a bullfinch; round the base of it the feathers are of a deep purple; head and back in some birds of a deep vermilion; in others of a rose-colour marked with brown, as in the linnet; the under parts paler, and not spotted. The female and young birds are of the colour of a linnet, with a tinge of red on the belly and rump.

This is a most beautiful species, and inhabits the bushy shrubs about the rivers and torrents of the southern mountains of Siberia, and particularly about lake Baikal; fond of the seeds of the blueish and other mugworts; it is a restless bird, and in winter unites into small flocks, and keeps in warmer situations among the shrubs.

VIRGINICA; Yellow-bellied grosbeak. Head, neck, middle tail-feathers, and body beneath red; belly yellow; nape, lower part of the back, wings, and lateral tail-feathers olive. The bill is yellow, and the bird is found in Virginia.

CRISTATA; Crested grosbeak. Whitish, front is crested; the rump and legs are red; middle tail-feathers very long. It inhabits Ethiopia, and is one of the largest of its tribe. Crest and breast in the male red, female white.

ERYTHROCEPHALA; Paradise grosbeak. *Le cardinal d'Angola*, Brisson; *Sparrow of Paradise*, Edwards. Pale ash; head purplish; breast spotted with white; bill and legs flesh colour; chin red; body beneath; a double oblique band on the wings white. It inhabits Angola.

MAJA; White-headed grosbeak. Brown; head white. It inhabits Malacca and China, and is about four inches long. The head and neck are whitish, and so also are the second and fourth quill-feathers.

FLAVICANS; Yellow grosbeak. Back greenish; head tawny; the wings and tail are of a greenish-yellow. It is the size of a canary bird, and is an inhabitant of Asia.

BONARIENSIS; Marigold grosbeak. Head and neck blue; body above blackish, beneath yellow; belly and vent sulphur; wings and tail blackish, edged with blue. It inhabits Buenos Ayres, where it is rarely seen till September; it frequents cultivated places and gardens; seen in pairs, and apparently very much attached to each other; feeds on grass and on seeds. The bill is blackish; the legs are reddish; claws sharp, curved, grooved, the hind-one very large.

ORYZIVORA; Java grosbeak. *Le gros-bec cendre de la Chine*, Brisson; *Paddy, or Rice bird*, Edwards. Cinereous; temples white; bill red. It inhabits China, Java, and Africa, is five inches long, and very destructive to rice plantations. The female has the bill and eye-lids very pale red,

red, and wants the white on the cheeks; but the edge of the wing is white as well as the under tail-coverts. It is thought to be a Chinese bird, by its being often met with on the paper hangings of that country. Latham thinks this the more likely, as he has seen it among some Chinese paintings, in which it bore the name of "Hung-tzoy."

FLABELLIFERA; Fan-tailed grosbeak. This species is the size of a sparrow; length about five inches. Bill stout and dusky; the upper parts of the body are reddish-brown, paler on the rump; the under the same, but somewhat paler, and more inclined to red; quills, tail, and legs dusky. One of these birds had a grey breast and belly. They inhabit Virginia, where they are called fan-tails, and continually carry the tail spread in an horizontal direction.

PANICIVORA; White-winged grosbeak. Black; spurious wings black; bill flesh-colour. It inhabits Africa, and is seven inches and a half long.

MALACCA; Malacca grosbeak. Bay; head and belly black; bill blue; the breast and flanks are white; and the legs are brown. It inhabits Java and China, and is rather more than four inches long. There is a variety that is ferruginous, head and lower part of the neck black.

MOLUCCA; Molucca grosbeak. Brownish; head, throat, and tail-feathers black; the bill is black; hind-head brown; rump waved white and black; wings and legs brown. It inhabits the Molucca isles.

PUNCTULARIA; Cowry grosbeak. Bay; belly black, spotted with white; the bill and legs black; hind-head and back reddish-brown; breast and flanks black, with hearted white spots, middle of the belly and vent white. It inhabits Java.

UNDULATA; Eastern grosbeak. Brown-red, beneath waved with brown; the tail is a pale red-ash. It inhabits Asia; is six inches long. The bill is short and strong.

HORDEACEA; Yellow-rumped grosbeak. Tawny; temples white; tail and breast black. Inhabits India.

SANGUINIROSTRIS; Red-billed grosbeak. Grey, beneath white; bill and legs red; the front and face are black; breast and belly pale ochre; the feathers are sometimes blackish in the middle; wings and tail brown. It inhabits some parts of Africa and Asia.

ASTRILD; Waxed-bill grosbeak. Brown waved with blackish; bill, orbit, and breast scarlet. It inhabits the Canaries, America, and Africa; is about four inches long; hides itself under grass and herbs, and feeds on seeds. There are two other varieties, viz. 1. Rump and vent scarlet. 2. Beneath rosy-white; crown, neck, and back blue; a scarlet band across the eyes.

LEUCURA; White-tailed grosbeak. Bill and legs red; head and wing-coverts cinereous; back yellow; breast and belly yellowish; tail white, the outmost feathers black. It inhabits Brazil, and is three inches long.

CYANEA; Angola blue grosbeak. Blue; wings and tail black; the bill is of a lead-colour, irides hazel, legs black. It inhabits Angola.

VIRENS. Greenish; shoulders blue; wings and tail black, edged with green. It inhabits Surinam.

ANGOLENSIS; Angola grosbeak. Black-blue; belly ferruginous; wings with a white spot; the bill is black; wings edged with white; legs purplish-flesh-colour. Found in and near Angola.

FERRUGINEA; Brown-headed grosbeak. Head and chin brown; body above black, beneath ferruginous; even tail and quill-feathers black, edged with yellow; the bill is of a horn colour, and the legs are pale; its length is about six inches.

MELANURA; Grey-necked grosbeak. Head and tail black; neck above brown; throat and vent grey; belly reddish; vent white; quill-feathers black, the primaries near the tip, and the secondaries on the inner edge, are white. It inhabits China, and is the size of the hawkfinch. The head of the female is grey.

AURANTIA; Orange grosbeak. Orange; crown black; quill and tail-feathers black, edged with orange. The female has the whole head, and fore-part of the neck, black; the under part of the body white; the rest of the body orange but less bright; and the quills edged with grey. It inhabits the isle of Bourbon, but some specimens have been sent from the Cape.

TORRIDA; White-billed grosbeak. Black; breast and belly bay; middle tail-feathers very long. It inhabits South America.

LINEOLA; Lineated grosbeak. Black; the frontal line and temples are white. The body above is black-blue, and beneath it is white; bill black, with a white spot above the upper mandible; tail is forked; quill-feathers black, the primary white at the anterior base. It is found in many parts of Asia and Africa.

HAMBURGIA; Hamburg grosbeak. Head and neck chestnut above; chin, band in the middle of the white throat, and rounded tail, brown; back, breast, and rump yellowish-brown, spotted with black; belly, vent, and two bands on the wing-coverts, white. It is about six inches long; inhabits Hamburg and its neighbourhood; feeds on insects, and climbs trees like a creeper.

MEXICANA; Yellow-headed grosbeak. Spotted with brown; front, chin, rump, and eye-brows pale yellow. It inhabits New Spain, and is nearly six inches long.

***CHLORIS**; Greenfinch. This is a well-known bird; the colour is a yellowish-green, palest on the rump and breast, and inclining to white on the belly; the quills are edged with yellow, and the four outer tail-feathers are yellow from the middle to the base; the bill is pale brown and stout; and the legs are flesh-colour. The female inclines more to brown.

The greenfinch is common in Great Britain, and makes its nest in some low bush, hedge, &c. composed of dry grass, lined with hair and wool; the female lays five or six eggs, marked at the larger end with red-brown: she is so anxious and careful of her charge during incubation, that she is often taken on the nest. The male takes his turn in sitting on the eggs. The greenfinch soon becomes tame; even old birds are familiar almost as soon as they are caught. It is apt to grow blind, like the chaffinch, if much exposed to the sun; it flies in troops in winter, and lives five or six years.

It is common in many parts of Europe, but in Russia it is rarely seen, and never in Siberia, hence it is imagined that it shifts its quarters according to the season. It is common in the northern parts of England and in many parts of Scotland.

SINENSIS; Chinese grosbeak. Head and neck greenish-grey; back pale brown; primary quill-feathers, the first half yellow, lower part black; secondaries within black, without grey, vent yellow. It inhabits China.

BUTYRACEA; Yellow-fronted grosbeak. Greenish; head and back spotted with black, beneath yellow; bill, tail, quill-feathers, and legs black. The front, eye-brows, and temples are yellow; spots on the female brown and the tail tipped with white. It is found in India and at the Cape.

DOMINENSIS; St. Domingo grosbeak. Green-brown, beneath pale rufous, spotted with brown; vent and area of

the eyes white; wings black; tail and legs brown. It inhabits St. Domingo.

AFRICANA; African grosbeak. Varied with greenish-brown and grey, beneath white; breast varied with brown; primary quill and lateral tail-feathers edged with reddish-white, the out-molt with a white spot. Inhabits the Cape of Good Hope.

HYPOXANTHA; Sumatra grosbeak. Yellowish; front and eye-brows pale yellow, quill and tail-feathers black, edged with yellowish. Inhabits Sumatra.

CANADENSIS; Canada grosbeak. *Le gros-bec de Cayenne*, Brisson. Size of a house-sparrow; bill ash-colour, and the edges of it somewhat projecting in the middle; the upper parts of the plumage olive-green; the under paler, and inclining to yellow; the feathers round the base of the bill, and the chin, black; the legs are grey. It inhabits Cayenne and Canada, as its different names signify.

SULPHURATA; Brimstone grosbeak. Olive-brown; throat and belly pale yellow; eye-brows yellow; it is about six inches in length, and inhabits in flocks near the Cape of Good Hope, frequents the banks of rivers, and builds a pendulous nest, with a long neck beneath, in trees and shrubs.

FLAVINENTRIS; Yellow-bellied grosbeak. Olive spotted with brown, beneath yellow; quill and tail-feathers brown, edged with olive; above the eyes a yellow stripe; the rump is olive coloured; tail forked; legs grey. Inhabits the Cape of Good Hope. There is a variety; hind-head, cheeks, and chin cinereous.

COLLARIA; Nun grosbeak. Yellowish; breast and collar yellow; temples black. There is a variety with a broader collar. Inhabits India and Angola.

GRISEA; Grey grosbeak. Blue-grey, neck and front white; bill and claws brown, legs reddish.

BENGALENSIS; *Le moineau de Bengale*, Brisson. *Yellow-headed Indian sparrow*, Edwards. *Bengal grosbeak*, Linn. Grey; crown yellow, temples whitish; belly whitish; spotted with brown. "This bird," says sir William Jones, "is exceedingly common in Hindoostan; he is astonishingly sensible, faithful, and docile; never voluntarily deserting the place where his young are hatched, but not averse, like most other birds, to the society of mankind; and easily taught to perch on the hand of his master. In a state of nature he generally builds his nest on the highest tree he can find; especially on the Pa'myra, or on the Indian fig-tree, and he prefers that which happens to overhang a well or a rivulet: he makes it of grass, which he weaves like cloth, and shapes like a bottle, suspending it firmly on the branches; but so as to rock with the wind, and placing it with its entrance downward, to secure it from the birds of prey. Its nest usually consists of two or three chambers; and it is popularly believed that he lights them with fire-flies, which he is said to catch alive at night, and confine with moist clay or with cow-dung. That such flies are often found in his nest, where pieces of cow-dung are also stuck, is indubitable; but as their light could be of little use to him, it seems probable that he only feeds on them. He may be taught with ease to fetch a piece of paper, or any small thing that his master points out to him. It is an attested fact, that if a ring be dropped into a deep well, and a signal be given to him, he will fly down with amazing celerity, catch the ring before it touches the water, and bring it up to his master with apparent exultation; and it is confidently asserted, that if a house, or any other place, be shewn to him once or twice, he will carry a note thither immediately on a proper signal being made. The young Hindoo women at Benares, and in other places, wear very thin plates of gold called *ticar*,

slightly fixed, by way of ornament, between their eye-brows; and when they pass through the streets, it is not uncommon for the youthful libertines who amuse themselves with training these birds, to give them a signal which they understand, and send them to pluck the pieces of gold from the foreheads of their mistresses, which they bring in triumph to their lovers.

MALABARICA; Malabar grosbeak. Cinereous; quill and tail-feathers black; chin and vent white; the bill is black. It inhabits India.

AFRA; Black-bellied grosbeak. Beneath black; head, flanks, and tail-coverts yellow; wings and tail brownish. It is found in Africa.

CAFFRA. Black, quill-feathers brown; shoulders red; plumage silky; bill brown-ash; quill-feathers at the edges and coverts white; tail longer than the body; legs grey. It is of the size of a bull-finch, and inhabits the Cape of Good Hope.

TOTTA. Quill and tail-feathers all black, the very tips white; the body is of a brownish colour, but beneath is a pale orange; front greenish-brown; it has six primary quill-feathers; eight secondary; ten tail-feathers beneath footy; flanks yellowish; legs black.

INDICA; Ash-headed grosbeak. Blackish, beneath whitish; head and neck cinereous; tail tip with white. Inhabits India; is very small; and has blue legs and bill.

ASIATICA; Asiatic grosbeak. Reddish-ash, beneath cinereous; belly pale red; head, greater wing-coverts, quill-feathers, and tip of the tail black. It inhabits China, and is the size of a bull-finch. There is a variety; blueish-ash; head, wings, and tail black; quill and two middle tail-feathers and tip of the tail black.

CANORA; Brown-cheeked grosbeak. Dirty greenish, beneath cinereous; cheeks brown, surrounded with a yellow fringe. It inhabits Mexico, and sings charmingly.

LINEATA; Radiated grosbeak. Black, beneath white; sides of the body, and base of the primary quill-feathers, transversely streaked with white and black.

PERLATA; Pearled grosbeak. Black, beneath brown; near the tail varied with white and black. It inhabits Africa.

FASCIATA; Fasciated grosbeak. Brownish, with black crescents; quill-feathers, tail, and cheeks brown, under the chin a broad red band; the bill is blueish-grey, and the legs are of a flesh-colour. It inhabits Africa.

CANTANS; Warbling grosbeak. Brown, transversely lined with blackish, beneath white; tail brown, wedged. It inhabits Africa, and is about four inches long. A variety of this species has a yellowish belly; chin and sides waved white and blackish, and is named the Gambia grosbeak.

MELANOCEPHALA; Black-headed grosbeak. Pale yellow; head black; bill cinereous; throat and irides black; legs blue-ash. It is about six inches long, and inhabits Gambia.

ERYTHROMEAS. Red; head and chin black; the bill is black, white at the base; tail rounded. Female above greenish-orange, mixed with red, beneath orange; quill-feathers olive, the outer edge rufous.

CORONATA; Black-crested grosbeak. Scarlet, beneath blue; crest on the head and spot in the middle of the throat black. It inhabits America.

CANA; Cinereous grosbeak. Hoary; quill and tail-feathers brown, legs red; bill cinereous; greater quill-feathers white at the base, blackish at the tips; tail blackish, edged with pale ash; legs flesh colour.

PHILIPPINA; Philippine grosbeak. Brown, beneath yellowish.

yellowish-white; crown and breast pale yellow; chin brown. The female has the upper parts brown, margined with rufous; rump of this last colour; legs yellowish. These inhabit the Philippine islands, and are noted for making a most curious nest, in form of a long cylinder, swelling out into a globose form in the middle. This is composed of the fine fibres of leaves, and fastened by the upper part to the extreme branch of a tree. The entrance is from beneath; and after ascending the cylinder as far as the globular cavity, the true nest is placed on one side of it, where, says Latham, this little architect lays her eggs, and hatches her brood in perfect security. There are three divisions in the nest of this bird; the first is occupied by the male, the second by the female, and the third contains the young; in the first apartment, where the male keeps watch, while the female is hatching, a little tough clay is placed on one side, and on the top of this clay a glow-worm, which is said to afford its inhabitants light in the night-time.

There is a variety of this species. Tail and quill-feathers greenish-brown, edged with yellow. Inhabits Abyssinia. This makes a nest somewhat like the former, of a spiral shape, not unlike that of a nautilus. It suspends it, like the other, on the extreme twig of some tree, chiefly one that hangs over some still water; and always turns the opening towards that quarter from whence least rain may be expected.

ABYSSINICA; Abyssinian grosbeak. Yellowish; crown, temples, throat, and breast black; shoulders blackish; quill and tail-feathers brown, edged with yellow. It inhabits Abyssinia; size of the lark; makes a pyramidal pendent nest, the opening of which is on one side, facing the east; it is divided in the middle by a partition, and the nest is within this cavity on one side; by this means it is secure from the intrusion of snakes, squirrels, monkeys, and other mischievous animals, and defended from the westerly rains, which last for several months almost unceasingly.

PENSILIS; Pensile grosbeak. Green; head and throat yellow; ocular band green; belly grey; vent rufous-red; bill, legs, tail and quill-feathers black, the last edged with green. This species inhabits Madagascar; is the size of a house-sparrow; constructs its pensile nest of straw and reeds, shaped like a bag, with an opening beneath, on one side of which is the true nest. The bird does not choose a new situation every year, but fastens a new nest to the end of the last; sometimes as far as five, one hanging from another; builds in large societies, and brings three young ones at each hatch.

A bird similar to this is mentioned in Kämpfer's History of Japan, which makes the nest near Siam, on a tree, with narrow leaves and spreading branches, the size of an apple-tree; the nest in the shape of a purse, with a long neck, made of dry grafs and other materials, and suspended at the end of the branches; the opening always to the north-west. The historian says he counted fifty on one tree only; and describes the bird itself as being like a canary-bird in colour, but as chirping like a sparrow.

SOCIATA; Sociable grosbeak. Rufous brown, beneath yellowish; frontlet black; tail short. This species inhabits the interior parts of the Cape of Good Hope: they live together in vast tribes under one common roof, containing several nests, which are built on a large species of mimosa; this, from its size, its ample head, and strong wide spreading branches, is well calculated to admit and support their dwellings. The taleness and smoothness of its trunk are also a perfect defence against the invasions of the serpent and the monkey tribes; in one tree described by a very intelligent traveller, Mr. Paterfon, there were

several hundred nests under one general roof. It is described as a roof, because it resembles that of a thatched house, and projects over the entrance of the nest below in a singular manner. "The industry of these birds," says this author, "seems almost equal to that of the bee. Throughout the day they seem to be busily employed in carrying a fine species of grafs, which is the principal material they use for the purpose of erecting this extraordinary work, as well as for additions and repairs. Though my short stay in the country was not sufficient to satisfy me by ocular proof that they added to their nest as they annually increased in number; still, from the many trees which I have seen borne down by the weight, and others which I have observed with their boughs completely covered over, it would appear that this is really the case. When the tree, which is the support of this aerial city, is obliged to give way to the increase of weight, it is obvious that they are no longer protected, and are under the necessity of building in other trees. One of these deserted nests I had the curiosity to break down, to inform myself of the internal structure of it; and found it equally ingenious with that of the external. There are many entrances, each of which forms a regular street, with nests on both sides, at about two inches distance from each other. The grafs with which they build is called the Boshman's grafs, and I believe the seed of it to be their principal food; though, on examining their nests, I found the wings and legs of different insects. From every appearance the nest which I dissected had been inhabited for many years, and some parts of it were much more complete than others. This, therefore, I conceive to amount nearly to a proof that the animals added to it at different times, as they found necessary from the increase of the family, or rather of the nation or community."

STRIATA; Striated grosbeak. Brown, streaked with ferruginous, beneath white; throat black. About the size of a wren. It inhabits Bourbon.

ZEYLONICA; Ceylon grosbeak. Ferruginous brown, beneath purple, waved with black; front and rump blueish. Inhabits Ceylon.

LUOVICIANA; Louisiana grosbeak. Black; breast, belly, band on the wings, and base of the quill-feathers white. Inhabits North America, and is about six inches long. There is another variety with a rosy breast.

MACULATA; Spotted grosbeak. Feathers of the upper part of the body black, spotted with white towards the tip, of the lower part whitish, streaked with black; quill and tail-feathers whitish on the outside. It inhabits America.

OBSCURA; Dusky grosbeak. Middle of the throat, and double band on the wing-coverts white; quill-feathers green, flanks white, spotted with brown; feathers of the head, neck, and back edged with brown. Inhabits in the neighbourhood of New York.

HUDSONICA; Hudson's Bay grosbeak. Brown; belly white, sides spotted with brown; wing-coverts with two red bands. It inhabits Hudson's Bay, from whence it derives its name. It has strong bill and legs; feathers of the back and rump, secondary quills and tail-feathers edged with pale rufous; tail a little forked.

CAPENSIS; Cape grosbeak. Blackish-brown; rump and wing-coverts pale yellow. There is a variety with feathers above brownish, in the middle spotted with black, beneath whitish, spotted with black. The bill and legs black; feathers of the head short, and in breeding time silky; wings chisaut, edged with grey; greater quill-feathers edged with yellow, back sometimes pale yellow. Inhabits

Coromandel and the Cape; is found chiefly in thickets near rivers; eggs cinereous, spotted with black.

NIGRA; Black grosbeak. *Le bouvreuil noir du Mexique*, Brisson and Buffon. *Little black bullfinch*, Catfby, Albin. &c. This species is of the size of a bullfinch; the bill is black, stout, and deeply notched in the middle of the upper mandible; plumage black, except a little white on the fore part of the wing, and base of the two first quills; legs black. Inhabits Mexico.

CRASSIROSTRIS; Thick-billed grosbeak. Black; base of the quill-feathers, and middle tail-feathers in the middle white; legs whitish; the bill is thick and yellowish.

REGULUS; Crimson-crested grosbeak. Bill very thick and strong. There was a fine specimen of this bird in the Leverian museum.

AMERICANA; Black-breasted grosbeak. Black; beneath white; pectoral band black; wings with a double white band; tail rounded; legs brown. It inhabits America.

CERULEA; Blue grosbeak. *Le bouvreuil bleu de la Caroline*, Brisson. This species is the size of the bullfinch; bill half an inch, stout, and brown: the base of it furrounded with black feathers, which reach on each side as far as the eye; the whole plumage besides is of a deep blue, except the quills and tail, which are brown with a mixture of green, and across the wing-coverts a band of red; the legs are dusky. The female is brown with a little mixture of blue.

"I suspect," says Latham, "this to be Bancroft's bird, which he says is sky-blue, with the outer edges of the quills and tail crimson; and the more so, as I have lately met with one from Cayenne, which had the chin, as well as round the bill, black, and both the shoulders, some of the wing-coverts, and the edges of the secondaries, marked with reddish."

URIX; Grenadier grosbeak. Grey; bill, front, and belly black; neck and rump tawny; sometimes the wings are white, and the tail is brown. It is the size of a sparrow; inhabits Africa, and is found chiefly in marshy grounds and among the reeds. The nest is formed with small twigs, so closely interwoven with cotton, as not to be penetrated in any weather. It is divided into two compartments, of which the upper is for the male, and the lower for the female and the young.

FLAMINGO. White; head, neck and breast, and belly rosy. Inhabits Upsal; resembles the bullfinch; bill and legs reddish; feathers of the frontlet blackish at the tips; third and fourth quill-feathers and spot on the rump black; transverse line on the wings and upper surface of the tail footy.

VIOLACEA; Purple grosbeak. *Le bouvreuil violet de Bahama*, Brisson. *Black sparrow*, Raii Syn. This is the size of the sparrow; bill is black; plumage violet black, except the irides, a streak over the eye, the chin, and the vent, which are red; legs dusky grey. Where the male is black, the female is brown, and the red is not so bright; it inhabits the Bahama islands, Jamaica, and the warmer parts of America.

GROSSA; White-throated grosbeak. Bluish hoary; throat and tail-feathers blackish; chin white; bill red. Inhabits America.

MINIMA; Dwarf grosbeak. Brown; beneath testaceous; primary quill-feathers at the base and secondaries on the hind-part white. This species is very small; it inhabits Surinam.

FUSCA; Brown grosbeak. *Le petit bouvreuil noir d'Afrique*, Brisson. Size of a canary bird; bill short and thick,

and of a lead colour; the head and upper parts of the body brown; the under of a pale ash-colour; vent pure white; the quills dusky black; the base of eight of the middle quills white; tail the colour of the quills, with palish ends; legs pale. It is an inhabitant of Africa, and is met with at Bengal.

GUTTATA. Brown; breast black; bill and rump red; sides of the body black spotted with white. It inhabits New Holland.

SEPTENTRIONALIS; Northern grosbeak. Black; wings with a white spot. Inhabits Scandinavia; resembles the bullfinch.

MINUTA; Minute grosbeak. Grey; rump and belly beneath ferruginous; some quill-feathers on each side white at the base; tail entire. It inhabits Surinam and Cayenne; is very small, active, and bold; frequents inhabited places, and feeds on seeds and fruit. Bill and legs brown; cries like a sparrow; makes a roundish nest, composed of a reddish herb, and placed on the trees which it frequents.

BICOLOR; Orange-bellied grosbeak. Brown; beneath red; another variety; brownish, beneath white; chin somewhat ferruginous. Inhabits India; the bill is whitish and legs are brown.

PRASSINA; Red-rumped grosbeak. Olive-green, beneath yellowish hoary, rump pale red; legs yellow. This is the description of the male; the female of a variety is olive brown, beneath yellowish hoary; rump pale red; legs yellowish.

TRIDACTYLA; Three-toed grosbeak. *Le Guifso Balito*, Buffon. Bill toothed on the edges; the head, throat, and fore-part of the neck of a beautiful red, which is prolonged in a narrow band quite to the vent; the upper part of the neck, back, and tail black; the wing-coverts brown, edged with white; quills brown, with greenish edges; legs dull red; the wings reach half way on the tail; the toes three only, two before and one behind.

This inhabits Abyssinia; frequents woods, and is a solitary species; feeds on kernels and seeds, which it breaks with the greatest ease with its bill. Latham, Lewin, Gmelin's Linnaeus, &c. &c.

LOXOCARYA, in *Botany*, from *λοξος*, oblique, and *καρυα*, a nut. Brown Prodr. Nov. Holl. v. i. 249. This genus is separated from *Reclinia*, solely on account of its having an undivided style, and a fruit of one cell, which is as it were a third part, or one lobe, of that of *Reclinia*. We presume to think this distinction scarcely sufficient. One species only is mentioned.

L. cinerea; found by Mr. Brown in the south part of New Holland.

LOXODROMIC TABLE. See TABLE.

LOXODROMICS, the art or method of oblique sailing, by the loxodromy, or rhumb.

LOXODROMY, **LOXODROMIA**, formed of *λοξος*, oblique, and *δρομος*, course, the line which a ship describes in sailing on the same collateral rhumb.

The loxodromy, called also the *loxodromic line*, cuts all the meridians in the same angle, called the *loxodromic angle*. This line is a species of the logarithmic spiral, described on the surface of the sphere, having the meridians for its radii.

LOYAL, in the *Manege*. A horse is said to be loyal, that freely bends all his force in obeying and performing any manege he is put to; and does not defend himself, or resist, notwithstanding his being ill treated.

A loyal mouth is an excellent mouth, of the nature of such as we call mouths with a full rest upon the hand.

LOYALSOCK CREEK, in *Geography*, a river of America,

rica, in Northumberland county, Pennsylvania, which runs into the W. side of the branch of Susquehannah river, from the N.E.: 26 miles from Sunbury. It is navigable 20 or 30 miles up for batteries of 10 tons. N. lat. 41° 15'. W. long. 77° 1'.

LOYHA, a small island on the E. side of the gulf of Bothnia. N. lat. 65° 6'. E. long. 25°.

LOYOLA, IGNATIUS DE, in *Biography*, celebrated as the founder of the order of Jesuits, was descended from a noble Spanish family, and born in 1491, at the castle of Loyola, in the province of Guipuscoa, whence he derived his surname. At an early age he was appointed page at the court of Ferdinand and Isabella, and was shewn distinguished marks of favour. But the indolence and tameness of a courtier's life did not accord with young Loyola's active disposition; he panted for fame, and to attain to a conspicuous situation, he determined to enter into the army. He was taken under the patronage of the duke de Najara, a grandee of Spain, a soldier of high reputation, and under his auspices, he passed through different degrees of military rank, and discovered on all occasions great courage, and a strong attachment to the service. His morals, which had been corrupted at court, were not reformed in the army, where, following the example of those about him, he addicted himself to the licentiousness too prevalent in the military life; he was, however, possessed of a high sense of honour, was frank, disinterested, and generous, and much beloved by those who served under him. In 1521, he had the command of the citadel of Pampluna, then besieged by the French, and after displaying the utmost valour in repelling the enemy, he was in a moment disabled by a severe wound in the left leg, and by a cannon shot which broke his right. The garrison having thus lost the example of their leader, surrendered at discretion. The French paid every attention to Loyola, and as soon as he was in a state fit to be moved, they sent him in a litter to his native place. It was a considerable time before a cure was effected, and during that period he happened to have no other source of amusement than what he found in reading the lives of the saints, the effect of which on his mind, was to inspire him with a desire of emulating the glory of the most celebrated among them. From this time he resolved to renounce the vanities of the world, to visit the Holy Land, and to devote himself to an austere religious life. Hence he undertook a pilgrimage to our lady of Montserrat, to hang up his arms near her altar. His zeal at this time was without all bounds; he attempted to take away the life of a person who suggested a doubt whether the Virgin Mary had remained pure and immaculate after her delivery. Having arrived at Montserrat, he adopted a new method of consecrating himself to the service of the Virgin; he stripped off his clothes, which he gave to a poor man, put on a coarse garment of sackcloth, girded himself with a cord, from which was suspended a gourd for carrying water, put a matted shoe on one foot, which had not yet recovered the injury produced by his wounds, leaving the other naked and his head exposed to the violence of the weather, and substituting in the place of his lance a plain crab-tree staff. Thus equipped, he presented himself before the altar of the Holy Virgin, hung his military weapons on a pillar near the altar, and watched all night, sometimes kneeling and sometimes standing, devoting himself as a champion. Early in the following morning Loyola departed on foot for Manresa, three leagues from Montserrat, intending to go through a course of penance, by way of preparation for his expedition to the Holy Land. He underwent, for the space of twelve months, the most rigorous mortifications of every

kind, after which he commenced his labours of spiritual exhortation, both in private families and in public places, and in a very short time he published his book entitled "Spiritual Exercises." Loyola, intent upon visiting the Holy Land, embarked for Italy, and proceeded to Rome to obtain the pope's blessing, which he obtained from Adrian VI. with leave to pursue his pilgrimage to Jerusalem. After visiting the scenes of our Saviour's principal transactions in that city, and the surrounding country, and going through the exercises usually performed by pilgrims, Loyola formed the design of remaining in Palestine, for the purpose of devoting himself to the conversion of the inhabitants of the East. This design he communicated to the father guardian of the Franciscans, by whom he was referred to the father-provincial, who, aware of the danger of the enterprise, refused his consent, and sent Loyola back to Europe. At Barcelona he commenced a course of school learning, which he completed in two years, and then went to the university of Alcalá de Henares, where he suffered himself to be diverted to other objects besides literature, and of course made but a mean progress in his studies. He had taken as his model the works of Thomas à Kempis, which he was perpetually reading. He spent a considerable portion of his time in the service of the sick, in begging excursions, and in instructing and exhorting the people. Loyola had now associated himself with four companions who imitated his plans of life, and looked up to him as a master and leader. Their different dress, and extraordinary manner of living, induced multitudes to become their followers: this awakened the jealousy of the inquisitors, who instituted enquiries relative to Loyola's doctrine and behaviour, and having found that he was a believer in the sound faith, he was dismissed. After this he was some time imprisoned on the suspicion of having persuaded a lady of rank and her daughter to undertake a long pilgrimage barefoot. Being liberated, he went to Salamanca, and was a second time imprisoned through the interference of the Dominican monks, who were jealous of his popular exertions in a religious course. He was now determined to abandon his native country, where he was subject to so many hindrances in what he conceived the way of his duty: he accordingly went to Paris in 1528, where he recommenced the study of the Latin language at Montague college; went through a course of philosophy in the college of St. Barbara, and studied divinity under the Dominicans. His zeal in instructing others exposed him to trouble in Paris, as it had done in the Spanish universities, and he narrowly escaped whipping in St. Barbara's college-hall. No suffering had the effect of cooling his zeal; he formed an association among the scholars of that college, the members of which took a vow to conform to a strict religious discipline, and to engage in a new undertaking for promoting the interests of the Catholic faith. They agreed to preach in public places, and in every place where they could obtain permission, recommending the beauty and rewards of virtue, and pointing out the deformity and punishments of vice, and this in a simple evangelical manner, without the vain ornaments of eloquence; that they should instruct children in the Christian doctrine, and the principles of right conduct, and that they should receive no money for exercising their functions, but be governed in all their proceedings by a view to the glory of God. The society thus formed was to be denominated "The Company of Jesus." Loyola was now anxious to obtain the approbation of the pope, in order that a new institution might be formed under his sanction. His holiness, Paul III. referred the petition of Loyola to the committee of cardinals, who violently opposed the esta-

blishment of such an order, representing it not only as unnecessary but extremely dangerous. He again threw himself at the feet of the pope, and proposed that besides the three vows of poverty, chastity, and monastic obedience, which are common to all the orders of regulars, the members of his society should take a fourth vow, of obedience to the pope, binding themselves to go whithersoever he should command for the service of religion, and without requiring any thing from the holy see for their support. This was a proposal which the pope could not reject; he confirmed the institution of the Jesuits by a bull, granted the most ample privileges to the members of the society, and appointed Loyola to be the first general of the order. (See our article *JESUITS*.) In 1550, he was desirous of resigning his office of general, but the society would not consent to the measure, and he retained it till his death in 1556, when he was in the sixty-fifth year of his age. Before that event, he had seen his order spread over the greatest part of the old and new worlds, and he had established, in the short space of sixteen years, twelve large provinces, containing at least an hundred colleges. He was beatified by pope Paul V., and in 1622 he was canonized by Gregory XV. Bayle. Moreri. Robertson, and art. Jesuits.

LOYOLA, in *Geography*, a village of Spain, in the province of Guipuscoa, formerly belonging to the family of Ignatius, founder of the order of Jesuits. See *JESUITS*.—Also, a town of South America, in the audience of Quito; 50 miles S. of Loxa.

LOZE, a river of Congo, in Africa, which runs into the Atlantic, navigable for boats, but having no harbour at its mouth. S. lat. 7° 55'.

LOZENGE, or **LOZANGE**, in *Geometry*, a kind of parallelogram, or quadrilateral figure, consisting of four equal and parallel lines or sides, whose angles are not right, but whereof two opposite ones are acute, and the other two obtuse; the distance between the two obtuse ones being always equal to the length of one side.

Scaliger derives the word lozenge from *laurengia*; this figure resembling, in some respects, that of a laurel leaf. In geometry, it is ordinarily called *rhombus*; and, when the sides are unequal, *rhomboids*.

LOZENGE, in *Heraldry*, is a rhombus, or figure of equal sides, but unequal angles; resembling a quarry of glass in our old windows; placed erect, point-ways. It is in this figure that all unmarried gentlewomen and widows bear their coats of arms; because, as some say, it was the figure of the Amazonian shield; or, as others, because it is the ancient figure of the spindle.

The lozenge differs from the *fusil*, in that the latter is narrower in the middle, and not so sharp at the ends.

LOZENGES, among *Jewellers*, are common to brilliant and rose diamonds. In the former they are formed by the meeting of the skill and star-facets on the bezel; in the latter, by the meeting of the facets in the horizontal ribs of the crown.

LOZENGE is also a sort of medicine, made into small pieces, to be held or chewed in the mouth till they are melted there; the same with what are otherwise called *trochisci*.

LOZERE, in *Geography*, one of the nine departments of the southern region of France, composed of Cevennes and part of the Cevennes, N. lat. 44° 30', S.E. of Cantal, and S. of the Upper Loire, 18 French leagues long, and 15 broad, contains 5390 kilometres, or 269 square leagues, and 1,502,7 inhabitants. It is divided into three districts, 24 cantons, and 193 communes. The districts are Marvejols, including 60,750 inhabitants; Mende, 52,813;

and Florac, 42,364. Its capital is Mende. Its contributions amount to 892,776 fr. and its expences to 179,687 fr. The northern districts consist partly of granite mountains; towards the middle of the department the hills are calcareous; and in the southern part the Cevennes are composed of schistus. A considerable proportion of this territory is not susceptible of culture. The chief products are barley, flax, hemp, fruits, and pastures for sheep. Here are mines of iron, copper, lead, and antimony, with mineral springs.

LOZICZE, a town of Poland, in the palatinate of Bielsk; 56 miles S.W. of Bielsk.

LOZZI, a town of the island of Corsica; 11 miles N.W. of Corte.

LOZZO, a town of Italy, in the Paduan; 8 miles S.S.W. of Padua.

LU, a town of France, in the department of Marengo; 8 miles W. of Alexandria.

LU, in *Chinese Music*, implies a key. Dividing the octave into 12 semitones, they give the name of *lu* to each, numerically. See *CHINESE MUSIC*.

LUA, in *Geography*, a river of the island of Cuba, which runs into the sea; 25 miles N.E. of Cape Cruz.—Also, a town of Arabia, in the province of Oman, on the coast; 10 miles N. of Sohar.

LUA, in *Mythology*, a Roman divinity mentioned by Livy, lib. viii. and invoked in war. The name is supposed to be derived from *luere*, to expiate.

LUABO, in *Geography*, a river on the W. coast of Africa, a branch of the great river Zambezi, which separates from it at the distance of 30 leagues from the sea.—Also, an island situated between the Luabo and Zambezi. See *MOCARANGA*.

LUANA POINT, a cape on the S. coast of Jamaica. N. lat. 18° 2'. W. long. 77° 50'.

LUANCO, a town of Spain, in Asturia, near the W. coast; 20 miles N. of Oviedo.

LUANZA, a town of Africa, in the country of Mocaranga. S. lat. 17° 15'. E. long. 32° 30'.

LUARCA, a sea-port town of Spain, on the N. coast, in the province of Asturias; 30 miles N.W. of Oviedo.

LUBAD, a town of Asiatic Turkey, in Natolia, on a lake of the same name, 21 miles long, and four broad; 7 miles S. of Bursa.

LUBAN, a town of Lithuania, in the palatinate of Novogrodek; 20 miles S.E. of Sluck.

LUBAN, or *Lulan*, one of the Philippine islands, about 12 miles in circumference.

LUBARTOW, a town of Poland, in Volhynia; 36 miles W. of Berdyczew.

LUBASZYN, a town of Lithuania, in the palatinate of Minsk; 52 miles E. of Minsk.

LUBAT, a town of Asiatic Turkey, in Natolia; 28 miles W. of Bursa.

LUBATCHOW, a town of Austrian Poland, in Galicia; 16 miles N. of Lemberg.

LUBBECHE, or **LUTHICKE**, a town of Westphalia, in the county of Minden, consisting of about 258 dwelling-houses, which obtained the privileges of towns in 1270, and was surrounded with ramparts, ditches, and walls. This town enjoys several immunities, and particularly a territorial jurisdiction over a considerable district. Its chief trade consists in yarn and linen, breeding of cattle, and brewing of beer. It has sustained, at several times, great damage by fire; 14 miles W. of Minden.

LUBBEN, or **LUBIO**, a town of Lower Lusatia, situated on the Spree, in a circle to which it gives name; 36 miles

36 miles S. of Berlin. N. lat. $51^{\circ} 37'$. E. long. $13^{\circ} 45'$.

LUBBERT, SIBRAND, in *Biography*, a theological professor and divine, was born at Langoworde, in Friesland, about the year 1556. He studied in the colleges of Bremen and Wittenberg. He afterwards went to Geneva, and diligently attended the lectures of Beza, Casaubon, and Francis Portus. From Geneva he went to Newstadt, and attended the lectures of the learned Zachary Ursinus, who, after a time, recommended him as his own successor as professor of logic, an honour which he declined, and accepted soon after an invitation to become pastor of a congregation at Embden. The duties of this office he discharged with singular fidelity and zeal. In 1584, he removed to Friesland, and was appointed preacher to the governor and deputies of the states of that province; also professor of divinity in the new university of Franeker. He went to Heidelberg, where he was admitted to the degree of doctor of divinity, and then returned to his professorship, which he occupied with reputation nearly forty years. During this period he was often employed in very important affairs. He died at Franeker in 1625, at the age of sixty-nine. He was author of many learned pieces against Bellarmine: he published a work against Socinus, and he wrote against Arminius, Vorstius, Grotius, and the other defenders of the cause of the Remonstrants. His last work was a commentary on the Catechism of Heidelberg. Bayle. Moreri.

LUBCZ, in *Geography*, a town of Russian Lithuania; 25 miles N. of Novogrodek.

LUBECK, a city of Germany, one of the three cities of the Hanseatic league, acknowledged as such, together with Hamburg and Bremen, in the definitive treaty of indemnities, 25th of February 1803, with the guarantee of their jurisdiction and perpetual neutrality. It is also one of the college of imperial and free cities. It is situated within the limits of Holstein, on the navigable river Trave, communicating by several streams with the Baltic and German ocean. The town stands on the two declivities of a long hill, moderately high, the eastern part extending towards the navigable river Wackenitz, and the western towards the Trave. Besides walls and towers, it is so surrounded by strong ramparts, and wide moats. The streets are for the most part steep, and the houses built of stone, and old fashioned, the doors being so large as to admit carriages into the hall, which serves frequently for a coach-house. The established religion, ever since the year 1530, has been Lutheranism. It has four parochial churches, as well as the cathedral of an ancient see. The archbishopric of Lubeck lies in that part of the duchy of Holstein, which was anciently called "Wagria." Its see was first erected by the emperor Otho I. at Oldenburg, in 951, for the conversion of the Wends, or Venedi, who inhabited this country, and transferred to Lubeck in the year 1164. The reformation of the diocese was begun under bishop Henry of Bochoitz, and being promoted by his successors, was accomplished in 1561. The bishop of Lubeck, though a prince of the empire, yet in the college of princes sat neither on the spiritual nor temporal bench, but on a particular bench placed cross-ways, and laid there for him and the bishop of Osnabruck, when a Lutheran. He had also a vote among the princes of the circle of Lower Saxony. The cathedral stands in the imperial city of Lubeck: but is invested with no authority. The chapter consists of thirty persons, who, with the exception of four Roman Catholics, are all Lutherans. When the indemnities were settled at Ratisbon in 1802, it was decreed that the bishopric with its chapter should be secularised in favour of the duke of Oldenburg;

reserving only the property within the city, which was to be added to the domain of the city. Lubeck was once the chief city of the *Hanseatic league*, which see; but this honour now belongs to Hamburgh. On the spot where it now stands was formerly a town named "Bucu;" but when this was demolished, about the year 1144, Adolphus II. count of Holstein and Schaumburg laid the foundation of this city, which, in process of time, became so famous. In 1156 the town, which had suffered much from fire, was given by count Adolphus to duke Henry, which, being rebuilt, he erected into a free port, and conferred upon it a municipal right of great importance. This was confirmed in 1188, by the emperor Frederick I., and afterwards by succeeding emperors. In 1276, the whole city, five houses excepted, was destroyed by fire. Lubeck has various manufactures, and its trade is very considerable, partly owing to the commodiousness of its situation. The quay of Lubeck is on the river Trave, which falls into the sea at the distance of 14 miles, and admits vessels from 150 to 200 tons burden, and sometimes, but rarely, 300. Mr. Coxe observed about 120 merchant ships destined to Russia, Sweden, and Denmark. The trade, however, is chiefly a trade of commission, drawing from Russia, Sweden, and Denmark their raw commodities, and supplying them with wines, silks, cloth, and steel ware. The exports, partly by Lubeck, and partly by Hamburgh, are grain, flax, hemp, hops, wax, honey, cattle, butter, cheese, fruits, feathers, dried geese, tallow, linseed, wool, and timber. Lubeck, according to Hoeck, contains 30,000 inhabitants. It was taken by the French in 1806. N. lat. $53^{\circ} 52'$. E. long. $10^{\circ} 45'$.

LUBCK, or *Luboi*, an island in the East Indian sea, near Madura. Its distance W. of Tonikaky is about 112 leagues; and W. from the islands of Salemba 31 leagues. S. lat. $5^{\circ} 43'$. E. long. $112^{\circ} 44'$.

LUBEN, a small town of Silesia, with large suburbs, in the principality of Lignitz: here is a Lutheran college; 12 miles N. of Lignitz. N. lat. $51^{\circ} 22'$. E. long. $16^{\circ} 15'$.

LUBENAU, or LUBNOW, a town of Lower Lusatia, in the circle of Calau, on a small river which runs into the Spree, the chief place of a barony with a chateau; 15 miles S.S.E. of Lubben. N. lat. $51^{\circ} 53'$. E. long. $13^{\circ} 52'$.

LUBERSAC, a town of France, in the department of the Correze, and chief place of a canton, in the district of Brives; 8 miles W. of Uzerche. The place contains 3087, and the canton 10,351 inhabitants, on a territory of $247\frac{1}{2}$ k. metres, in 12 communes.

LUBIEN, a town of the duchy of Warsaw; 26 miles S.S.W. of Posen.

LUBIENIETZKI, STANILAUS, in *Biography*, a celebrated Unitarian minister in the 17th century, was born at Racow in the year 1623. He was educated with great care, and his father introduced him in due time, to persons of respectability and consequence in the state. About the year 1648 he was admitted into the ministry by the synod of Czarcow, and appointed pastor of a church of that name. This situation he was obliged to quit in 1655, upon the irruption of the Swedes into that neighbourhood, and in the following year he retired with his family to Cracow. Here he employed much of his time with the other ministers, in frequent fasting, prayer, and preaching; and for the benefit of the Hungarian Unitarians, who came thither with prince Ragotzki, he frequently preached in the Latin language. While he continued at Cracow he was much noticed by the king of Sweden, who did him the honour

not admitting him to his table. After that city fell again into the hands of the Poles, in 1657, he followed the Swedish garrison, with two other Unitarians, to supplicate that they and friends of the same religious persuasion, who had placed themselves under his protection, might be comprehended in the amnesty to be granted at the conclusion of the peace with Poland. This was not granted, and finding that there was no hope of remaining in safety in his native country, he went to Copenhagen, in 1660, to seek an asylum from the king of Denmark for his persecuted brethren who had been banished from Poland. He received kind treatment from his majesty, who could do nothing more than promise to connive at their settlement at Altona. Thus circumstanced, he thought it advisable to return to Pomerania, and arrived at Stettin in 1661. Persecution followed him to this place, and he was obliged to remove to Hamburg, where he directed his family to join him in the year 1662: from this city he was driven by the same fiend in 1667, and took refuge again at Copenhagen. He now hoped there was a prospect of a peaceful settlement, because the magistrates of Fredericksburg consented that the Unitarians should reside in their town, and enjoy, without molestation, the private exercise of their religion. He therefore removed to that city, and invited his banished brethren to join him, sparing no pains nor cost, that he might settle and provide for them there. Scarcely, however, had they taken quiet possession of their new abodes, when they were banished from the city, and even the dominions of the prince to whom the city belonged. Lubienietzki was ill at the time when he received the order, but promised to obey it as speedily as possible. Before, however, he could be removed, poison was administered to him in his food, to which two of his daughters, as well as himself, fell sacrifices, while his wife, who had eaten very sparingly, narrowly escaped the same fate. He died in 1675, about the age of fifty-two. He wrote many books, the greater number of which was not printed. The principal published work was entitled "Theatrum Cometicum," in two vols. folio, which contains a minute historical account of every single comet which had been seen or recorded from the deluge to the year 1665. At the time of his death he was engaged in writing "A History of the Reformation in Poland," which was printed in Holland in 1685, in 8vo, with an account of the author's life.

LUBIN, AUGUSTINE, an able geographer in the seventeenth century, was born at Paris in the year 1624. He entered, at an early age, among the religious of the reformed order of St. Augustine, and was distinguished by his proficiency in literary pursuits, particularly in ancient and modern geography, and in sacred and profane history. He passed through all the offices of his order, and his scientific skill was rewarded with the post of geographer to the king. He died at Paris in 1695. His principal works are "Martyrologium Romanum, cum Tabulis Geographicis et notis Historicis;" "Tabulæ Sacræ Geographicæ, five Notitia Antiqua, mediæ Temporis, et nova, Nominum utriusque Testamenti ad Geographiam pertinentium;" being a kind of dictionary to all the places mentioned in the bible; "Geographical Tables;" "The History of Lapland," translated from Scheffer; "The Geographical Mercury," &c.

LUBIN, EILHARD, was born at Westerstede, in the county of Oldenburg, of which place his father was minister. He studied at several German universities, and acquired an exact knowledge of the Greek language, with the branches of science usually taught in those seminaries. He was appointed professor of poetry in the university of Rostock

in 1595, and ten years afterwards, was promoted to the professorship of divinity. He wrote notes on Anacreon, Juvenal, Persius, &c. His principal work was entitled "Phosphorus de Causa prima et Natura Mali," printed at Rostock in 1596. He died in 1621. Bayle.

LUBINIA, in *Botany*, was named by Commerçon, the French botanist, in honour of his friend the chevalier de St. Lubin, who distinguished himself formerly at the siege of Madras, and was, it seems, in the confidence of Hyder Ally. What pretensions the chevalier had to commemoration, as a votary of science, does not appear, nor was Commerçon very select in the distribution of such honours. Justieu, who must have seen specimens, passed over the plant and the name in silence. Lamarck referred it to *Lyfimachia*. Venten. Jard. de Celf. 96.—Class and order, *Pentandria Monogynia*. Nat. Ord. *Lyfimachie*, Juss.

Gen. Ch. *Cal.* Perianth inferior, in five deep, ovate, rather unequal segments, with membranous edges, permanent. *Cor.* of one petal, nearly salver-shaped, slightly irregular; tube funnel-shaped, the length of the calyx; limb in five deep obtuse segments, the two lowermost rather the smallest. *Stam.* Filaments five, awl-shaped, inserted into the lower part of the corolla, equal, the length of the tube; anthers erect, oval, two-lobed. *Pist.* Germen superior, almost globular, smooth; style cylindrical, the length of the filaments, permanent; stigma simple, obtuse. *Peric.* Capsule roundish-oval, crowned by the style, with five notches at the top, of one cell, not bursting. *Seeds* numerous, roundish, compressed, rough. *Receptacle* central, ovate, somewhat compressed, unconnected with the capsule except at the base, from which it separates as the seeds ripen.

Eis. Ch. Corolla salver-shaped, irregular. Capsule ovate, not bursting, crowned with the style, of one cell. Seeds numerous, attached to a central receptacle.

1. *L. spatulata*. Vent. Jard. de Celf. t. 96. (*Lyfimachia mauritiana*; Lamarck Dict. v. 3. 372. Illustr. n. 1980.)—The only known species. Native of the isle de Bourbon. M. Cels appears to have had it in cultivation. The root is said by Ventenat to be biennial, and the flowers to be produced in the beginning of summer. This plant has something of the aspect of *Convolvulus tricolor*, but is firmer, and quite smooth. The woody stem produces a few simple branches, a span long, clothed with numerous, scattered, spatulate, obtuse, entire, rather fleshy leaves, above an inch long, tapering down into a bordered footstalk. Flowers axillary, solitary, on simple stalks, half as long as the leaves. Calyx dark brown, dotted with black, white at the edge. Corolla yellow, nearly as broad as that of *Lyfimachia nemorum*.—Capsule when pressed bursting irregularly, sometimes at the sides, sometimes, according to Ventenat, into two or four apparent valves. Lamarck says it has five valves, but he perhaps judged from the notches at the top. The fruit therefore, and the irregular corolla, mark this genus as sufficiently distinct from *Lyfimachia*; to which may be added, on the score of habit, its alternate, not opposite or whorled, leaves.

LUBISCHAW, in *Geography*, a town of Prussia, in the province of Pomerania; 18 miles S. of Dantzic.

LUBISCHMAT, a town of Prussia, in the palatinate of Culm; 5 miles E. of Thorn.

LUBLENIEZ, or LUBENSKA, a town of Silesia, in the principality of Oppeln; 29 miles E. of Oppeln. N. lat. 50° 39'. E. long. 18° 42'.

LUBLIN, a city of Poland, and capital of a palatinate of the same name; part of which is annexed to the new country of Galicia. It is surrounded with a wall and ditch, and though not very large, its castle, which is built on a high

high rock, is seated on the river Bystrza, in a pleasant and fertile country. This town contains many churches and convents; and in its suburbs are many Jews, who are accommodated with a spacious synagogue. It has three fairs in the year, one of which lasts a month; and they are frequented by German, Greek, Armenian, Arabian, Russian, Turkish, and other traders and merchants. The chief tribunal for Little Poland was formerly held here, together with a provincial diet and a court of judicature. Lublin is distant 85 miles S.E. of Warsaw. N. lat. 51° 6'. E. long. 22° 45'.

LUBNEKI, a town of Samogitia; 10 miles N. of Miedniki.

LUBNI, a town of Russia, in the government of Kiev, on the Sula; 8 miles E.S.E. of Kiev. N. lat. 50°. E. long. 32° 54'.

LUBOK, commonly called the *Bavian*, or *Baboon*, an island in the East Indian sea, not far from the coast of Java, not large, but extremely populous. Seventy or eighty vessels are continually passing to and fro between this island and the coasts of Java and Borneo.

LUBOLO, a province of Angola, in Africa, on the banks of the Coanza.

LUBOMLA, a town of Austrian Poland, in Galicia; 32 miles E. of Chelm.

LUBOZ, a town of Lithuania, in the palatinate of Novogrodek; 16 miles N.E. of Novogrodek.

LUBRONG, or TESHOO-LOOMBOO, a town of Tibet, and residence of Teshoo Lama, capital of that part of the country which is immediately subject to his authority, is situated in N. lat. 29° 4' 20", and E. long 89° 7'. This is a large monastery, consisting of three or four hundred houses, the habitations of the Gylongs, besides temples, mausoleums, and the palace of the sovereign pontiff; in which are comprehended also the residence of the regent, and the dwellings of all the subordinate officers, both ecclesiastical and civil, belonging to the court. It is included within the hollow face of a high rock, and has a southern aspect. Its buildings are all of stone, none less than two stories high, flat-roofed, and covered with a parapet, rising considerably above the roof, composed of heath and brushwood, inserted between frames of timber, which form a ledge below, and are fashioned above into a cornice, capped with masonry. All the houses have windows; that in the centre projecting beyond the walls, and forming a balcony: they are not closed with shutters, but black mohair curtains. The principal apartment in the upper story has an opening over it, covered with a moveable shed, which serves the purpose of sometimes admitting light and air, and in the winter season, occasionally, the grateful warmth of the sun. Turner's Tibet.

LUBUNGAN, a town on the north coast of the island of Mindanao.

LUBWACH, a town of Germany, in the bishopric of Bamberg; 8 miles N.E. of Bamberg.

LUBZ, or LUBITZ, a town of the duchy of Mecklenburg; 23 miles S.S.W. of Gullrow. N. lat. 53° 30'. E. long. 12°.

LUC EN DROIS, a town of France, in the department of the Drôme, and chief place of a canton, in the district of Die, seated on the Drôme; 9 miles S. of Die.

LUCALA, a town of Africa, in Angola, on a river of the same name, which runs into the Coanza; 30 miles N.E. of Malanganio.

LUCAN, in *Biography*, a celebrated Roman poet, was born at Corduba, in Spain, about the year 39 before the Christian era. His father, Annæus Mela, a Roman knight,

was the youngest brother of Seneca the philosopher; and his mother, Acilia, was daughter of Acilius Lucanus, an eminent orator. Lucan was brought to Rome during the first months of his infancy, and was committed, at a very early age, to the care of the ablest masters in grammar and rhetoric. He studied philosophy under the stoic Cornutus, from whom he derived the lofty and free strain of sentiment by which he is so much distinguished. It is said he completed his education at Athens. Seneca, then tutor to the emperor Nero, obtained for him the office of questor: he was soon after admitted to the college of augurs, and considered to be in the full career of honour and opulence. He gave proofs of poetical talents at a very early age, and acquired reputation by several compositions; a circumstance that excited the jealousy of the emperor, who valued himself on his powers as a poet and musician. Lucan even ventured to recite one of his own pieces, in competition with Nero; and, to the surprise of every one, the judges decided in favour of Lucan. From this period Nero regarded the poet with all the malignity of a vanquished rival, and made use of his power in forbidding him again to repeat any of his verses in public. In the conspiracy against the tyrannical emperor, Lucan took a part: the plot was discovered, and he was apprehended among the other conspirators. Tacitus and other authors have accused him of the pusillanimity of endeavouring to free himself from punishment, by accusing his own mother, and involving her in the crime of which he was guilty. Mr. Hayley has endeavoured to rescue his name from so terrible a charge, by observing and commenting on the fact, that the mother of Lucan was passed over without punishment: hence he inferred, that no evidence existed of her having been charged by her son, but popular rumour; because it is well known that no other person, however distantly implicated in the conspiracy, escaped without some kind of penalty. At any rate, his confessions were of no avail, and his mind recovered its firmness for the concluding scene. No favour was granted him but the choice of the death he would die; and he chose the same which had terminated the life of his uncle Seneca. His veins were accordingly opened; and when he found himself growing cold and faint through loss of blood, he repeated some of his own lines, describing a wounded soldier sinking in a similar manner: these were the last words which he uttered. He died in the year 65, and in the 27th year of his age. Of the various poems of Lucan, none but his *Pharsalia* remain, which is an account of the civil wars between Cæsar and Pompey, but is come down to us in an unfinished state. Its title to the name of an epic poem has been disputed by those critics, who, from the examples of Homer and Virgil, have maintained that machinery, or the intervention of supernatural agency, is essential to that species of composition. As to the merits of the poetry itself there are various opinions. Lucan certainly possesses neither the fire of Homer, nor the melodious numbers of Virgil. If he had lived to a maturer age, his judgment as well as his genius would have been improved, and he might have claimed a more exalted rank among the poets of the Augustan age. His expressions, however, are bold and animated; his poetry entertaining; and it has been asserted that he was never perused without the warmest emotions, by any whole minds were in unison with his own. The best edition of the *Pharsalia* is the Variorum, Leyd. B. 8vo., 1669. The editions by Oudendorp, 1728; by Burman, 1740; by Bentley, 1760; and by Barbois, 1767, are in good esteem. The *Pharsalia* has been translated into English verse by Mr. Nicholas Rowe. There was no Delphin edition of this poem,

poem, devoted to the interests of liberty; but it was one of the first pieces of ancient literature that was published during the French republic, by Didot, in a splendid folio.

LUCAN, in *Geography*, a village of the county of Dublin, Ireland, pleasantly situated on the banks of the Liffey. It is remarkable for a sulphureous medicinal spring, which is much frequented. It is $6\frac{1}{2}$ miles W. from Dublin.

LUCAN, *Al*, a town of Asiatic Turkey, in Aladulia; 15 miles E. of Marasch.

LUCANAS, a jurisdiction of the diocese of Guamanga, in the viceroyalty of Peru, commencing about 25 or 30 leagues S.W. of Guamanga. Its temperature is cool and moderate. The parts of the former breed large droves of all sorts of cattle; and those of the latter are fertile in grain, herbs, and fruits. It also abounds in valuable silver mines, in which the riches of Peru chiefly consist; and by these means it becomes the centre of a very extensive commerce; great numbers of merchants resorting thither with their goods, and others for purchasing such provisions as their own respective countries do not afford, for which they give in exchange ingots and pinnae of silver.

LUCANIA, in *Ancient Geography*, a province of Italy, bounded on the north by Campania and Apulia, on the east by Sinus Tarentinus, on the south by Brutium, and on the west by the Tusean sea. A ridge of the Apennines, running from north to south, divides this province into two parts.

LUCANUS, in *Natural History*, a genus of insects of the order coleoptera: antennae clavate, the club compressed and divided into short pectinate leaves; jaws projecting beyond the head, so as to resemble horns, toothed; two palpigerous tufts under the lip.

This genus differs chiefly from the **SCARABÆUS**, (to which the reader is referred,) in having the jaws considerably elongated, so as to give the appearance of a pair of denticulated horns; while the antennae terminate in a laterally flattened tip, divided on the interior side into several lamellæ. There are twenty-six species, of which four are British, which will be noticed by asterisks.

Species.

ALCES. Jaws exerted, four-toothed at the tip. It inhabits several parts of Asia. The head is large, depressed, black, sinuate on each side; jaws longer than the head, compressed at the tip, and armed with a strong tooth in the middle within.

GIRAFFA. Jaws exerted, depressed, with many different sized teeth; lip rounded. Inhabits Asia. The jaws are likewise very long; the teeth at both ends larger; thorax with an unequal margin; body black.

* **CERVUS**; Stag-beetle, or Stag-chaffer. Jaws exerted, forked at the tip; a small branch near the middle within. It is the largest of all the European coleopterous insects, sometimes measuring nearly two inches and a half in length, from the tip of the jaws to the end of the body. Its general colour is a deep chestnut, with the thorax and head, which is of a squarish form, of a blacker cast; and the jaws are often of a brighter or redder chestnut colour than the wing-shells; the legs and under-parts are coal-black; and the wings which, except during flight, are concealed under the shells, are large, and of a fine pale yellowish-brown. This remarkable insect is chiefly found in the neighbourhood of oak-trees, delighting in the sweet exudation, or honey-dew, frequently observed on the leaves. Its larva, which perfectly resembles that of the genuine beetles, is also found in the hollows of oak-trees; residing in the fine vegetable mould usually seen in such cavities, and feeding on the softer

parts of the decayed wood. It is of a very considerable size, of a pale yellowish or whitish-brown colour; and when stretched out at full length, measures nearly four inches. It has been supposed by Roefel, that these *larvæ* were the *coffi* of the ancient Romans, which, according to Pliny, were in high esteem as an article of luxury. What renders this supposition the more probable is, that the larvæ of a species of *cerambyx*, as well as of a *cureulio*, are well known to be greatly admired by the inhabitants of the West Indian islands, and are frequently collected at a great expence, as a highly delicate dish, being broiled or fried for that purpose. When arrived at its full size, which, according to some, is hardly sooner than the fifth or sixth year, it forms, by frequently turning itself, and moistening it with its glutinous saliva, a smooth oval hollow in the earth, in which it lies; and afterwards remaining perfectly still for the space of nearly a month, divests itself of its skin, and commences pupa or chrysalis. It is now of a shorter form than before, of a rather deeper colour, and exhibits, in a striking manner, the rudiments of the large extended jaws and broad head, so conspicuous in the perfect insect; the legs are also proportionably larger and longer than in the larva state. The ball of earth, in which this chrysalis is contained, is considerably larger than a hen's egg, and of a rough exterior surface, but perfectly smooth and polished within. The chrysalis lies about three months before it gives birth to the complete insect, which usually emerges in the months of July and August. The time, however, of this insect's growth and appearance in all its states varies much, according to the difference of seasons. It is not very uncommon in many parts of England.

The commonly supposed female differs so much in appearance from the male, that it has by some authors been considered as a distinct species. It is not only smaller than the former, but totally destitute of the long and large ramified jaws; instead of which it has a pair of very short curved ones, slightly denticulated on their inner side: the head is also of considerably smaller diameter than the thorax. In point of colour it resembles the former. Among those who consider it as a distinct species may be numbered the ingenious Mr. Martham, F.L.S., who, in his "*Entomologia Britannica*," assures us that the real female insect extremely resembles the male, but is smaller, and wants the larger denticulation on the inner side of each horn. The generally supposed female he distinguishes by the title of "*Lucanus inermis*."

SAIGA. Jaws exerted, many-toothed; lip abbreviated, emarginate. Inhabits America. Body depressed, smooth, black; jaws hardly forked at the end.

ELAPHUS. Jaws exerted, one-toothed, forked at the tip; lip deflected, conic; hind margin of the head much elevated, emarginate. Female less; the jaws not exerted. Inhabits Virginia.

CAPREOLUS. Jaws exerted, the middle denticles differently shaped, forked at the tip. Inhabits Germany. It is about half the size of the *cervus* above described; jaws with two thick approximate lobed denticles in the middle; body black.

DAMA. Jaws exerted, two-toothed within, as long as the head. Inhabits Virginia. A variety has jaws entire at the end; thighs ferruginous.

FEMORATUS. Jaws exerted, three-toothed; body black; thighs ferruginous. It inhabits Cayenne. The head is plain, almost without lip; thorax more dusky; the fore margin fulvous, ciliate; the hind margin two-toothed each side; scutell fulvous, silky.

BISON. Jaws exerted, many-toothed; thorax and shells edged with red. Inhabits America. Edge of the thorax rufous, with a black line.

GAZELLA. Jaws two-toothed within; body black; shells edged with testaceous. Inhabits Siam. The jaws are short; head with a small plate before the eyes; hind edge of the thorax notched on each side; flanks angular, grooved.

LAMA. Jaws exerted, three-toothed, shorter than the head; thorax angular. Inhabits India.

SETURALIS. Jaws exerted, three-toothed at the base within; body testaceous, with a dorsal black line; the head is testaceous, with a black margin and dorsal line, which is bifid at the tip; thorax testaceous, with a black dorsal line and spot each side at the base.

CABINATUS. Depressed; thorax unarmed, shorter than the head, the hinder angles excavated; abdomen very short; breast ending behind in an acute angle. Inhabits India.

* **PARALLELEPIPEDUS.** Jaws with a lateral elevated tooth within; body depressed. It inhabits Europe. Body black, very small; female with a double prominent dot on the head.

TENEROIDES. Jaws lunate, one-toothed; body black; thorax margined; shells subfriate. Inhabits Russia. Abdomen pitchy.

CACEROIDES. Jaws incurved, with a thick differently shaped tooth within, shells punctured, slightly downy; thorax a little grooved; flanks ferrate. It inhabits Van Diemen's land.

* **CARABOIDES.** Bluish; jaws lunate; thorax margined; varies in being greenish, with reddish legs and abdomen. Inhabits Europe.

PICUS. Black, smooth, friate; antennæ, abdomen, and legs pitchy. Inhabits Sweden.

CAPENSIS. Excuteallate, black; body depressed; thorax friate. Found in Chili, South America.

PILMUS. Excuteallate, black; shells with punctured grooves. Inhabits the Cape.

TARANDUS. Scutellate, black, very smooth; jaws exerted, three-toothed at the tip, two-toothed on the inner side. Inhabits Africa.

ANTILOPE. Jaws exerted, edged on the inner side, the upper margin two-toothed, but the lower five-toothed; body brown, nearly smooth. Found in different parts of Africa.

BUBALUS. Black; jaws bifid; one part projecting, sub-lunate, three-toothed within; the other larger, deflected, arched entire. Inhabits Georgia.

INTERRUPTUS. Antennæ arched; body black, with a recumbent spine on the crown; thorax and abdomen remote; thorax and shells ciliate, with rufous. Inhabits America and the West India islands, under rotten sugar-canes. This is the *pallalus interruptus* of Fabricius.

DENTATUS. Antennæ arched; head many-toothed; thorax punctured at the sides; thorax and abdomen remote. Found in the island of Guadeloupe. This is the *pallalus dentatus* of Fabricius.

MINUTUS. Antennæ arched; thorax and abdomen remote, ferruginous; shells testaceous. This is the *pallalus minutus* of Fabricius, and is found in the South American islands. The body is much depressed, hardly larger than a louse; jaws exerted, short, unarmed, pointed; shells hardly friate.

Dr. Shaw mentions a highly elegant species, that has lately been discovered in New Holland, which differs from the rest in being entirely of a beautiful golden green colour, with short, sharp-pointed, denticulated jaws of a brilliant

copper colour. The whole length of the insect is rather more than an inch. Gmelin's *Linn.* Shaw's *Zoology*. Donovan.

LUCAR, among the Romans, an application given to the money expended upon plays and public shows.

LUCAR de Barrameda, St. in *Geography*, a decayed seaport town of Spain, in the province of Seville, at the mouth of the Guadalquivir, the key of Seville, with a good harbour, but difficult of access on account of a rock in the water. A whole fleet may lie securely in the road. The chief article of its trade is salt; 13 miles N. of Cadiz. N. lat. 36° 45'. W. long. 6° 27'.

LUCAR de Guadiana, St. a town of Spain, in the province of Seville, situated on the Guadiana, on the confines of Portugal, and defended by towers and battions. The tide flows up to the town, so as to bring small vessels into its harbour; 64 miles W. of Seville. N. lat. 37° 35'. W. long. 7° 25'.

LUCAR le Mayor, St. a town of Spain, in the province of Seville, on the Guadiana; 10 miles W. of Seville.

LUCARIA, an ancient feast celebrated by the Romans. Sext. Pompeius observes, that the *lucaria* were solemnized in the woods, where the Romans, defeated and pursued by the Gauls, retired, and concealed themselves. The word, according to Festus and Sext. Pompeius, comes from *lucus*, a grove or wood. Varro derives it from *lucē*, the ablative of the word *lux*, light and liberty. But the former etymology seems the more natural.

It was held in the month of July, in memory of the asylum they found in the wood, which was between the Tyber and the road called Via Salaria.

LUCAS, TUDENSIS, in *Biography*, a Spanish writer and prelate, who flourished in the thirteenth century, was first a deacon in the church, and afterwards bishop of Tuy, a city of Galicia, whence he has his surname. He travelled into several parts of the east and other countries, for the purpose of obtaining information concerning the religion and ceremonies of different nations; and was raised to his bishopric by pope Gregory IX. His principal work was "A Treatise against the Albigenes." He was author, likewise, of "The Life of St. Isidore of Seville;" and he made considerable additions to "The Chronicle of St. Isidore." Gen. Biog.

LUCAS, FRANCIS, a learned divine, who flourished in the seventeenth century, was a native of Bruges, was educated at Louvain, attained to the degree of doctor, and was made dean of the church of St. Omer's. He died in 1619. He was profoundly skilled in the Greek, and in all the oriental languages; and was an expert judicious critic. He was the author of "Notationes in sacra Biblia, quibus variantia discrepantibus Locis, Exemplaribus suarum Studio discutuntur," 4to. 1580; "Commentaria in Evangel." in 5 vols., folio; "Nota ad varias Lectiones in Evangel.;" "Concordantie Latinarum Bibliorum Vulgata Editionis," and of many other learned works.

LUCAS, PAUL, a celebrated traveller, was born at Rouen in 1664. He felt an early inclination to travel into foreign countries, which he gratified by several tours through the Levant, Egypt, Turkey, and other parts. He brought back a rich treasure of medals and other curiosities for the king's cabinet, who ordered him to draw up an account of his travels, and who, in 1714, nominated him one of his antiquaries. He was afterwards employed by the dukes of Burgundy. In 1723 he took another voyage to the Levant, by order of Lewis XV., and collected many curious and valuable manuscripts and medals. From this period to 1736 he lived a life of repose: but in the last

named year he visited Spain, a country which he had never before seen, and was well received by the king, who engaged him to arrange his cabinet of medals: but during this employment he was taken ill, and died in 1737, at the age of seventy-two. He was author of a work, entitled, "Travels of Paul Lucas," in seven volumes. In four of them is an account of his voyage to the Levant, to Greece, Asia Minor, Macedonia, and Africa. His travels in Turkey, Asia, Syria, Palestine, and Egypt, were published at Rouen, in three volumes.

LUCAS, RICHARD, a native of Wales, was born at Presteigne, in Radnorshire, in the year 1648; and when he had laid a good foundation in grammar learning, he was sent to the university of Oxford, and entered a student at Jesus college in 1664. He took his degree of arts in 1668, and in 1672; and was some time master of the free-school at Abergavenny, in Monmouthshire. From this place he removed to London, and obtained the vicarage of St. Stephen's, Coleman-street, and became lecturer of St. Olaves, Southwark, in 1683. In 1691 he took his degree of doctor of divinity, and was installed prebendary of Westminster in 1696. Soon after this, an infirmity which he had experienced in his eyes, from his youth, deprived him totally of his sight. He died in 1715, at the age of sixty-seven, and was buried in Westminster Abbey. He was highly valued by his contemporaries for his piety and learning; and his writings have transmitted his name with honour to posterity. Of these the most important is his "Inquiry after Happiness," in two volumes, 8vo., which has gone through many editions. It is remarkable that it was composed by the author, after he had lost his sight, and was rendered incapable of public services. His other works are "Practical Christianity," and "The Morality of the Gospel;" "A Guide to Heaven;" "Five Volumes of Sermons," and some smaller pieces. He translated into the Latin language "The whole Duty of Man," which was printed in 1680. Biog. Brit.

LUCAS, *St.*, in *Geography*, a town of Mexico, in the province of Guatemala; 12 miles E. of Guatemala.—Also, a small island near the coast of Mexico, in Salinas bay. N. lat. 10° 15'. W. long. 85° 22'.

LUCAU, or LUCCA, in *Geography*, a town of Saxony, in the principality of Altenburg; 8 miles N.N.W. of Altenburg. N. lat. 51° 6'. E. long. 12° 18'.—Also, a town of the duchy of Carinthia, near the Gail; 32 miles E. of Brixen.

LUCAYA ISLANDS. See BAHAMA.

LUCAYO, one of the Bahama islands; 20 miles long, and five broad. N. lat. 27° 25'. W. long. 78°.

LUCAYONEQUE, one of the Bahama islands; 75 miles long, and five or six broad, but of an irregular form. N. lat. 27°. W. long. 77° 0'.

LUCCA, a small republic of Italy, on the coast of the Tuscan sea, in N. lat. 43° 50'. It is bounded N. by the late duchy of Modena; on the S.W. by the Mediterranean; and every where else by Etruria. It is computed to be upwards of 35 miles in length, and from 15 to 20 in breadth, and to contain 288 square miles, and within its extent one city, 150 villages, and 120,000 inhabitants, of whom, it is said, that from 20,000 to 30,000 are able, on occasion, to bear arms. The Luccese are the most industrious people of Italy, and no spot of ground is left uncultivated; the hills being covered with vines, olives, chestnut, and mulberry trees, while the meadows near the coast nourish numerous cattle; but the country does not produce corn sufficient for the consumption of its inhabitants. Oil and silk are the chief exports of Lucca, and their motto is LIBERTAS. a

goddeffs, rarely found more amiable than here. Lucca was anciently a Roman colony; when the Lombards overran Italy, it became tributary to them; afterwards it was annexed to the dominion of the Franks, and from them the emperors of Germany claimed its sovereignty. In the reign of Charles IV. it became an independent state, and has, during three centuries, maintained its liberty, under the protection of some foreign power. In the recent revolutions of Italy, this state adopted a constitution similar to the French; and it is now a principality, with the addition of Massa Carrara, and Garfagnana.

LUCCA, the capital of the fore-mentioned principality, and the residence of the government, is delightfully situated in a plain, terminated by eminences, and diversified with villages, feats, summer-houses, vineyards, meadows, and corn-fields. This city is regularly fortified with eleven bastions; its circuit is about a league; it is well-built, and the streets, though irregular, are broad and well paved. Situated near the river Serchio, 12 miles N.E. of Pisa, it contains a state-palace, within which is a large arsenal, a Gothic cathedral, with a richly furnished chapel, 25 churches, 40 convents, and about 40,000 inhabitants; among whom are many artists and manufacturers, especially in silk and gold, and silver stuffs. The bishop holds immediately of the pope, and is entitled to the pallium, or crucifix, as an archbishop. In the cathedral is a *volò fanto*, or wooden crucifix, to which a peculiar veneration is paid. In the year 1799, the French entered this city, and imposed upon it a contribution of 2,000,000 livres. They seem to have taken it under their protection, and to allow it its freedom. N. lat. 43° 54'. E. long. 10° 34'.

LUCCA, a river of Asia, which rises in Persia, and runs into the Indus, about 18 miles above the conflux with the Chunaub.

LUCCHESI, ANDREA, in *Biography*, a native of Venice, and maestro di cappella, in 1772, to the elector of Cologne. A pleasing composer, whose motets were frequently sung by Manfili, and other great singers in the churches of Italy, and whose symphonies were much esteemed, even in Germany, where they have been brought to the greatest perfection. In 1767, he composed a cantata for a grand festival given to the duke of Wirtemberg at Venice.

LUCCI, in *Geography*, a town of Naples, in Calabria Citra; 3 miles S. of Bagnano.

LUCCOS, a river of Morocco, anciently called *Lixos*, which runs into the Atlantic at Laracha.

LUCE, *St.*, a cluster of small islands in the Indian sea, near the east coast of Madagascar. S. lat. 24° 30'. E. long. 47° 40'.

LUCE, *Eau de*. See *Eau de Luce*.

LUCEA, in *Geography*, a bay or harbour, on the N. side of the island of Jamaica, into which run two rivers, called East and West Lucea; 14 miles W. of Montego bay. N. lat. 18° 28'. W. long. 78° 9'.

LUCENA, a town of Spain, in the province of Cordova, in which are ten convents; 29 miles S.S.E. of Cordova. N. lat. 37° 32'. W. long. 4° 29'.—Also, a town of Spain, in Valencia; 18 miles N.E. of Segorbe.

LUCENAY L'ÉVEQUE, a town of France, in the department of the Saône and Loire, and chief place of a canton, in the district of Autun; 7 miles N. of Autun. The place contains 804, and the canton 9163 inhabitants, on a territory of 250 kilometres, in 12 communes. N. lat. 47° 5'. E. long. 4° 20'.

LUCERA, an ancient, inconsiderable, manufacturing town of Naples, capital of the province of Capitanata, and see of a bishop, suffragan of Benevento; containing four

four churches and nine monasteries, and pleasantly situated on an eminence in a plain, near the middle of the province, about 75 miles N.E. of Naples. The jurisdiction of the province is held here, and the manufacture is cloth. N. lat. $41^{\circ} 28'$. E. long. $15^{\circ} 16'$.—Also, a town of Naples, in Calabria Citra; 7 miles S. of Cosenza.

LUCERIUS, in *Mythology*, a name given to Jupiter, as *Luceria* was given to Juno, as the deities which gave light to the world.

LUCERN, in *Geography*, a canton of Switzerland, bounded on the W. and N. by Bern, on the E. by Zurich and Schweitz, on the S. by Underwalden and Bern, lying in N. lat. $47^{\circ} 10'$; being from 30 to 50 miles from N. to S., and from 25 to 30 in breadth, and containing 100,000 inhabitants, who are chiefly employed in agriculture. The southern parts of this canton are chiefly mountainous, and furnish for exportation cattle, hides, cheese, and butter. The northern district is fruitful in corn, which, being more than sufficient for the consumption of the canton, allows of a constant exportation from the weekly market held in the town, to which the inhabitants of the small canton resort for the purchase of that and of other necessaries. This commerce, together with the passage of the merchandize for Italy, is the chief support of the town, and might be much improved and augmented, considering its advantageous situation; for the Reufs issues from the lake, passes through the town, and, having joined the Aar, falls into the Rhine.

Lucern, originally subject to the house of Austria, was exposed to the inroads of Uri, Schweitz, and Underwalden, when these cantons had seized their independence. Her commerce to Italy was interrupted; her fairs unfrequented; and her citizens compelled to be continually under arms, in order to protect their territory from incessant depredations. Under these circumstances, the Austrians loading the citizens with exorbitant taxes, Lucern made her peace with the confederate cantons; and, expelling the Austrian party, entered into a perpetual alliance with Uri, Schweitz, and Underwalden, and became a member of the Helvetic union. The accession of Lucern gave additional credit and power to the confederacy, and enabled it to resist all the efforts of a great and implacable enemy. In 1386, Leopold, duke of Austria, invaded the canton with a numerous army; when the combined troops gained a bloody victory at Sempach, in which Leopold lost his life.

The government of Lucern was entirely aristocratical, or rather oligarchical. The sovereign power resided in the council of 100, comprising the senate, or little council. The great council was the nominal sovereign; but the whole power actually resided in the senate, consisting of 36 members, who were formed into two divisions, exercising the office by rotation. The administration of the current affairs, the care of the police, the management of the finances, and the whole executive power, resided in the senate, which sat constantly; whereas the sovereign council was assembled only upon important occasions. The senate had cognizance of criminal causes; but in case of capital condemnation the sovereign council was convoked, in order to pronounce the sentence. In civil causes, an appeal lay from the senate to the sovereign council, which, in reality, was a matter of mere form, as it was an appeal from the senators in one court, to the same senators in another. The influence of the senate over the sovereign council was absolute; for they constituted above a third of that body, chose their own members, conferred the principal charges of government, and nominated to the ecclesiastical benefices, which are considerable; nearly two-thirds of the revenue of the canton belonging to the clergy. From a view of this constitution, it appears, that

when the spirit of the constitution is oligarchical, all laws enacted for the purpose of counteracting the power of the nobles are mere cyphers. However, in some instances, the authority of the nobles is controlled; for, in declaring war and peace, forming new alliances, or imposing taxes, the citizens were to be assembled, and to give their consent. Lucern, being the first in rank and power among the Catholic cantons, was the residence of the pope's nuncio, and all affairs relating to religion were decided in the annual diet, which assembled in the town, and which was composed of the deputies of those cantons.

Lucern, though an oligarchical state, manifested, at the time of the French revolution, an aversion from all innovation. The people appeared to be satisfied with their government, and resisted all attempts to effect a change. During the progress of the revolution, Lucern acted with great spirit, and was inclined to join in defence of her own independence, as well as in support of the Helvetic union. Even after the surrender of Bern and the desertion of Zurich, a numerous body of peasants demanded the re-establishment of the ancient government, and joined the troops of the small cantons to resist the entrance of the French; and the whole canton did not acquiesce without much opposition and bloodshed. At length a corps of French, after a short investment, entered the town of Lucern, and reduced the people to unconditional submission. Soon after this event, Lucern became the seat of the new Helvetic government. According to the constitution of the 29th of May, 1801, Lucern was one of the 17 departments, or cantons, into which Switzerland was divided: it retained its former extent and deputed five representatives to the diet. Near the town of Lucern is mount "Pilate," formerly called *Mons Pileatus*, from the Latin word *pila*, because its top is generally covered with a cloud or cap. This word has been corrupted into "Pilatus," whence some have ridiculously contended that Pontius Pilate, after having condemned our Saviour to death, was seized with remorse, made an excursion into Switzerland, and drowned himself in a lake at the top of the mountain. At the elevation of 5000 feet, and in the most perpendicular part of this mountain, near the pasture of Brumlen, is observed, in the middle of a cavern hollowed in a black rock, a colossal statue, which appears to be of white stone. It is the figure of a man in drapery, leaning one elbow on a pedestal, with one leg crossed over the other, and so regularly formed, that it can scarcely be a *lusus naturæ*. This statue is called "Dominic" by the peasants, who frequently accost it from the only place in which it can be seen, and when their voices are re-echoed from the cavern, they say, in the simplicity of their hearts, "Dominic has answered us." It is difficult to imagine by whom, or in what manner, this statue could be placed in a situation which has hitherto proved inaccessible to all who have endeavoured to approach it. This is, perhaps, one of the highest mountains in Switzerland, if estimated from its base, and not from the level of the sea; its elevation above the lake being more than 6000 feet. Soon after the French took possession of Lucern, general Brune erected, with great solemnity, the standard of liberty on the top of mount Pilate; thus, as Coxé says, conferring on the Swiss the shadow, while he deprived them of the substance of freedom. Coxé's Switzerland, vol. 1.

LUCERN, the capital of the above-described canton, a small, tolerably built, walled, trading town, containing about 3300 inhabitants, and agreeably situated on a plain almost environed by hills, at the efflux of the Reufs from the lake of Lucern, and at the N.W. extremity of the lake; 50 miles S.W. of Zurich, and 40 N. of Bern. The cathedral

and Jesuits' church are the only public buildings worthy of notice; but they are overloaded with rich ornaments, and disgraced by bad paintings. In the cathedral is an organ of fine tone, and extraordinary size; the centre pipe is 40 feet long, near three in diameter, and weighs 1100 pounds. The bridges which skirt the town, round the edge of the lake, are the fashionable walks of the place, and remarkable for their length; being covered at the top, and open at the sides, they afford a constant view of the delightful and romantic country; they are decorated with coarse paintings, representing the histories of the Old Testament, the battles of the Swiss, and the dance of Death. In the Wallerthurm tower, the treasure of the republic is deposited. The arsenal is well furnished with arms. This place is a thoroughfare from Italy by mount St. Gothard; but it has no manufactures of consequence, and little commerce. Of late the principles of toleration have been better understood and more widely diffused than they were formerly, and a literary society has been established for the promotion of polite learning. The lake is bounded towards the town of Lucern by cultivated hills sloping gradually to the water, contrasted on the opposite side by an enormous mass of barren and craggy rocks. N. lat. 46° 56'. E. long. 8° 6'. See the preceding article.

LUCERN, *Lake of*, called the Waldstätter see, or lake of the four cantons, consists of several branches and gulfs, distinguished by particular names, and affording variety of fine scenery. See LAKE.

LUCERN, in *Botany*. See MEDICAGO.

LUCERN, in *Agriculture*, a plant of the artificial grass kind, chiefly cultivated as a green food for cattle, and which affords a larger produce than most other sorts in proportion to the extent of land. It is known among botanists by the name of *medicago falcata*, and is the *alfalfa* of the Spaniards, and the *grand trèfle* of the French. It has a perennial root, and an annual stalk, which rises full three feet high in good land, and is furnished at each point with trifoliate leaves, the lobes of which are spear-shaped, about an inch and a half long, and half an inch broad, sawed towards the stalks. The flowers grow in spikes, which are from two to near three inches in length, standing upon naked footstalks two inches long, rising from the wings of the stalks: they are of the pea-bloom, or butterfly kind, of a fine purple colour, and are succeeded by compressed moon-shaped pods, which contain several kidney-shaped seeds. It flowers in June, and its seed ripens in September.

There are several varieties of lucern, as those with violet-coloured flowers, with yellow flowers, with yellow and violet flowers mixed, and with variegated flowers: but the editor of Mr. Miller's Dictionary observes, that they are only variations of the same plant, arising accidentally from the seed. However, neither the yellow nor the variegated flowered lucern is ever so strong as that with purple flowers; and cannot of course be so profitable to the cultivator.

It may be remarked, that Columella esteemed this plant as the choicest of all fodder, because it lasted many years, and bore being cut down four, five, or six times a year. In his opinion it enriched the land on which it grew, fattened the cattle fed with it, and was often a remedy for sick cattle. About three-quarters of an acre of it is, it is supposed, abundantly sufficient to feed three horses during the whole year. But though it was so much esteemed by the ancients, and has been long cultivated to advantage in France and Switzerland, it has yet found no great reception in this country, though it will succeed here as well as in either of

the above countries, being extremely hardy, and capable of resisting the cold of our climate.

In the Synopsis of Husbandry, it is noticed, that it is not till within these thirty years that this grass has been much in repute with the farmer, though it was known in England long before that time: but the cultivation of it was chiefly confined to gentlemen who raised it on their own demesnes; for the husbandmen, being well convinced of the extraordinary care required to prepare the land for the growth of it, were deterred from embarking in a business which seemed to be attended with much expence, and contented themselves with raising green fodder from their tares and clover, leaving the cultivation of this useful grass to their landlords, who could better spare the money for that purpose. But now that its virtues are better known, and the method of raising it more perfectly understood, there are few farmers, who do not choose to sow some acres of it, to supply their horses with a wholesome and lasting feed throughout the summer. The seed is of a paler cast than that of clover, and rather larger in size. It is annually provided from Holland by the seedsmen, and sold at different prices, from one to two shillings or more *per* pound, according to circumstances.

Soil—In respect to the soils that are most suitable to the culture of this plant, they are all those of the more deep, rich, and dry kinds, as those of the sound, mellow, loamy, and sandy descriptions; but on such as are retentive of moisture, it should not be attempted, as the roots of the plants are liable to be greatly injured, if not wholly destroyed, by the stagnation of water about them. Weeping gravelly lands, and all such as are not well drained, are of course improper for this sort of culture. Mr. Young suggests, that “the soils that suit lucern, are all those that are at once dry and rich. If they possess these two criteria, there is no fear but they will produce large crops of lucern. A friable deep sandy loam or chalk, or white dry marly bottom, is excellent for it. Deep putrid sands, warp on a dry basis, good sandy loam on chalk, dry marle or gravel, all do well: and, in a word, all soils that are good enough for wheat, and dry enough for turnips to be fed on the land, do well for lucern. If deficient in fertility, they may be made up by manuring, but he never yet met with any land too rich for it.”

Preparation.—The author of the System of Agriculture remarks, that “in the preparation of the land, the soil should be always brought into as fine a condition of mould as possible. This may be effected by repeated ploughing and harrowing, and the previous growth of such sorts of crops of the green kind as have a tendency to clean and render the land more fine and mellow.” In this intention Mr. Young advises the taking of two crops of turnips, carrots, or cabbages, either in succession, or alternating with each other, the turnips in the heavier loams being eaten off upon the land in the second autumn before it is ploughed up. In either of these cases, from the hoeing and constant culture which is necessary while the crops are upon the land, it will be left in a suitable state of cleanness and friability. “Others recommend following as a better practice, the root weeds of every kind being carefully picked out in the different ploughings and harrowings. From the great length of time the ground must remain unemployed in this mode of preparation, it is probably only capable of being practised with advantage where the lands are heavy and very full of weeds.” But whatever mode is employed, the land must be rendered perfectly clean before this sort of crop is ventured upon it.

And it is requisite, that before the seed is put in, the mould

mould should be rendered perfectly fine by ploughing it over as frequently as may be necessary, and breaking it well down by occasional harrowing. It will seldom be necessary to make use of manure; but where the land is found to stand in need of it, the application is best made with the first of the green crops. The object to be constantly kept in view in this business, is chiefly that of rendering the land perfectly clean from weeds, and at the same time highly mellow and friable.

Nature and Quantity of Seed.—As feedmen are apt to keep their seeds from year to year, it may be necessary to apprise the farmer, that that which is perfectly fresh, is the most proper for being sown, as most small seeds vegetate in the most perfect manner when new.

And with respect to the quantity of seed, Dr. Dickson has stated that the proportion that is necessary, is variable according to the nature of the land, and the manner in which the crop is cultivated. In the broad-cast method, from eighteen to twenty pounds may be proper, while in that of the drill, it will be considerably less, according to the distances at which the operation is performed. In two feet equidistant rows, the usual allowance is about six pounds; in those of eighteen inches about eight pounds; in those of twelve inches, ten or twelve pounds; and in nine-inch rows, sixteen or eighteen pounds may be necessary, though Mr. Young only recommends from twelve to fifteen pounds for the acre.

Time and Manner of Sowing.—In his system of agriculture, the same writer states, that “the most proper season for putting this sort of crop into the ground, is as early as can be done in the spring months, as in this way the plants may be fully established before the season becomes too hot. The latter end of March, for the more southern districts, may be the most proper period; and the beginning of the following month for those of the north. When sown late there is more danger of the plants being destroyed by the fly, as has been observed by Mr. Tull. If the plants be intended to be transplanted out in the garden method, it will also be the best practice to sow the seed, as early in the spring as the frosts will admit, in order that the plants may be strong, and fit to set out about the beginning of August.”

In regard to the mode of sowing or putting in the crop, this writer also suggests, that “it should vary with the circumstances of the soil, and the mode of after-management that can be adopted with the most convenience. Where much attention cannot be bestowed on the business of hoeing and keeping the crop clean, the best method is that of sowing the land broad-cast; though in this method the crop may not last so long in the ground. But in cases where the crops are capable of being kept in a sufficiently clean condition by repeated hoe-culture, the drill may be more advisable, particularly in narrow distances. The practice of transplanting can, perhaps, only be done in particular cases, on small pieces of deep land that are in great heart, and require the plants in consequence to stand thin and regular upon the ground, as in these modes they become large and of vigorous growth. In soils that are inclined to moisture at some depth below the surface, it may be a useful method of keeping the roots of the plants from being injured by their penetrating too deeply, as is more the case when the plants rise from seed. The seed may be sown either alone or with grain crops, in the same manner as clover; each method has its advocates, and it is probable that they may be useful under different circumstances, as in the deeper and more fertile sorts of land the first may be the most beneficial method, and in those of the lighter and less deep kinds the latter; as in the deep sorts of land there may be less loss of time in pro-

curing the green produce for hawks or other sorts of stock, as well as a greater certainty of the crop succeeding. But in the lighter and more porous soils, by being sown with corn, the plants may be better protected in their early growth, as well by the shade as the moisture that will, in that way, be preserved. Some indeed speak of its superior utility on the ground of long experience, in its being better preserved from the fly. Wherever this mode is made use of, the grain should, however, be sown thinner than is usually the case, in proportion as the soils are more rich. Oats are preferable to barley for the purpose, as being less liable to lodge, especially when sown thin. From five or six pecks to three bushels, sown as evenly as possible, may be the best proportions, the smaller quantity being necessary on the richest soils.” Mr. Young remarks, that “the greatest success by far that has been known is by the broad-cast method, which is nearly universal among the best lucern farmers, even among men who admire and practise the drill husbandry in many other articles. But as they mostly (not all) depend on severe harrowing for keeping their crops clean, which is a troublesome and expensive operation, he still ventures to recommend drilling, but very different drilling from that which has been almost universally practised, viz. at distances of eighteen inches or two feet. Objections to these wide intervals are numerous. If kept clean good, the lucern licks up so much dirt, being beaten to the earth by rain. See, that it is unwholesome, and the plant spreads into large spaces that it must be reaped, which is a great increase of expense. For these reasons, as well as for superiority of crop, he recommends drilling at nine inches, which, in point of produce, mowing, and freedom from dirt, is the same as broad-cast; and another advantage is, that it admits a scaring once a year, which is much more powerful and effective than any harrowing. These facts are sufficient to weigh so much with any reasonable man, as to induce him to adopt this mode of drilling, as nearer to broad-cast by far than it is to drills at eighteen or twenty four inches, which open to a quite different system, and a set of very different evils. Nine-inch rows might *practically*, but not literally, be considered as broad-cast, but with the power of rearing.” And in regard to “the material point, of with or without corn, two considerations present themselves. One is, the extreme liability of lucern to be eaten by the fly, which does great mischief to many crops, when very young, and against which the growing corn is some protection. The value of the barley or oats is another object, and not to be forgotten. It is also gained in the first year’s growth of the lucern, which is very poorly productive, even if no corn be sown, so that he must own himself clearly an advocate for drilling it among corn, either between the rows of nine-inch barley, or across drilled barley at a foot; perhaps the latter is the best method, as there is less probability of the crop being laid, to damage the lucern. The quantity of food-corn should also be small, proportioned to the richness of the land; from one bushel to a bushel and a half, according to the fertility of the soil; and also taken against the mischief of *lodging*. If these precautions are taken, it would be presumptuous to say that the risk of the fly, &c. being always, and in all things, in our hands, the contrary may prove bad, the fly may eat, and drought prevent vegetation, but, in rich circumstances, the farmer may rest satisfied that he has done what can be done; and if he does succeed, the advantage will be unquestionable.”

In the broad-cast mode, in every case, as soon as possible after the grain has been sown and harrowed properly in, the lucern seed should be immediately put in in that mode, by a regular even cast over the fine surface, covering it with a light

light feed-harrow, but it should not be too deeply covered in, two inches being fully sufficient. In the drill method, the same system should be followed, the lucern seed being drilled in immediately after the corn has been put into the soil.

It need hardly be noticed that the plats of ground sown for the purpose of raising plants, to be set out in the garden method of culture, should always be without grain, or other sorts of crops, in order that they may admit of having the plants properly thinned out and kept clean, and in a vigorous state of growth, for being set out with the most advantage and success possible.

With regard to the proper distance of the rows, it may in addition be observed, where the drill mode of culture is practised, it should probably depend upon the state and circumstances of the soils. Mr. Kent advises two feet as the best distance in all cases; while others think equal distances of a foot in rich soils, such as are worth from thirty to forty shillings the acre, and nine inches in those that are of inferior fertility, as from fifteen to twenty shillings the acre, the best general distances. On soils of less value it is probable that this culture can seldom be had recourse to with much benefit to the farmer. The last distance approaches much to the broad-cast method, which is contended by some as the most appropriate in almost all cases, and of course it may be preferable, as it admits of being plowed between by a suitable plough, in the room of the harrowed method, and the observations made above are decidedly in favour of the method.

In whatever method this sort of seed may have been sown, it is, when good, quick in its vegetation, beginning to sprout in the course of a week, and soon spreading the plants over the surface of the land. And the sooner it obtains its rough leaf the better, as it is then like turnip-plants, out of danger of being destroyed by the fly. But before these plants arrive at this state of growth, they are liable, especially in dry seasons, to be much injured, if not wholly consumed, by the ravages of the same sort of insect as that which is so detrimental to the turnip crops. "Where the greatest part of the plants are injured in this way, the author of *Practical Agriculture* thinks it is probably the best method, when the crop has been put in alone, to plow up the land, and sow it down again with fresh seed, as soon as possible." And this he supposes "is an advantage which the sowing the crop alone has over that of putting it in with those of other kinds."

After Culture.—It may be stated in regard to the after-management of this grass, that, as the economy of the plant is such as to render it incapable of being grown with much advantage, where other sorts of plants, whether of the grass or weed kind, are apt to annoy it; much care and attention should of course be employed in keeping it clean and free from the intrusion of all such vegetable productions. This, the same author thinks, "may be effected in different ways, according to the methods in which the crop has been raised. Where the broad-cast plan has been pursued, little is necessary, where the land has been properly prepared after the grain crop has been removed, except keeping all sorts of heavy stock from coming upon it. In a dry season, if there be occasion, the field may however be fed a little by calves, and other very light stock, but they should never be kept long upon the plants at one time. When the second cutting has been made in the following year, if any grass shows itself the land should be harrowed over in a moderate manner, by a harrow which is not too heavy nor too long in the tines, two or more times, as may be necessary in different directions, the grassy matter being collected by a small light implement of the same kind, and removed from the land.

This business should be executed as soon in the early part of the spring as the nature and state of the ground will admit, as dry a period as possible being taken for performing the work. In the succeeding years two such harrowings may be frequently required, one in the early part of the spring season, and the other in the close of summer. In these cases, especially where there is much grass appearing, a much heavier sort of harrow should be made use of. In the 25th vol. of the *Annals of Agriculture*, one is advised of such a weight, as is sufficient for four horses, and which does not spread more than four or five feet; but in on cases, especially where the work is so frequently performed, one that requires less draught may be adequate to the purpose, as where such large heavy harrows are employed, there is much danger in injuring the crowns of the plants, and thereby causing their destruction; whereas by the use of the lighter ones, they are mostly much benefited from the mould being stirred about their roots. After these operations, as in the above case, the weeds should be brought together, and removed from the ground. When the crops are thin and patchy, seed in proportion to the deficiencies should be sown over such places before the harrowings commence each time. In every case the roller should be applied immediately after the operation has been performed, not only for the purpose of compressing the mould about the roots of the plants, but to render the surface perfectly level and fit for the scythe. In this method of culture, "where the produce is not to some extent, it is probably better to feed the crop by light cattle-stock in the autumn than mow it."

In respect to the drill-sown lucern, it is recommended, "where the rows are sufficiently evident, in the autumn season, after the grain has been secured, that a small shill should be passed between them, in order to extirpate all the weeds and grassy materials, as well as to loosen the mould about the roots of the plants, and that they may be rendered more perfectly clean, the hand-hoeing of the plants in the rows: and that, in the succeeding year, still more particular attention to the use of the shill and hoe will be requisite. The business should be begun as early as the state of the soils will safely admit of its being executed: being continued occasionally in such a manner, as to induce the cultivator to leave it again for the production of this grass. In situations where such grounds could be conveniently flooded or covered with water occasionally, they might therefore be very advantageously converted into good meadow or grass-lands; a sort of application that has long since been recommended by De Serres, a French writer of great respectability: when such lands are perfectly broken up, they afford, in most cases, admirable crops of the grain kind: oats, as being least injured by a luxuriant growth, may, in general, be the most advisable as the first crop."

It has been advised, "as a good rule in these cases, to give good hoeings, either of the horse or hand kinds, as soon as weeds appear every time after the crops are taken off. If the plants are perfectly straight in the rows, which should always be the case, a shill may be had recourse to with the greatest benefit, as it may be drawn so closely to the plants, as in a great measure to save the expence of hand-hoeing, as, in such cases, it will be only necessary to extirpate the weeds or natural grass plants that may have established themselves among the lucern plants in the rows, which is capable of being effected in a very complete manner by the use of a pronged hand-hoe. And it is further recommended never, by any means, to suffer fields of this sort to become weedy, under the supposition, that the produce may not cut well, or be free from dust; as where it is of sufficiently vigorous growth, and of a suitable distance

in the rows, according to the nature of the land, there can be no reason for such an injurious practice, as it is only where the planting is executed at larger distances than the condition of the soil will permit, that any inconvenience can be experienced in this way."

It may be stated, that "where hand-hoeing is the method chiefly depended on for keeping crops of lucern in a proper state of culture, much of the business may be performed by women, or even children, and the expence be thus considerably lessened."

Application of Manure.—In cases where the soils on which this plant is grown are not of considerable fertility, the occasional application of manure may be of great advantage, in thickening and increasing the quantity of crop; for this use clean well rotted dung is probably by much the best manure, as where earthy composts, ashes, or foot are employed, they are apt to promote the growth of, or bring up grasses too much; the latter are, however, sometimes sown over the crop in the winter season. The dung is advised, in the 25th vol. of the Annals of Agriculture, to be applied in the quantity of about twenty tons to the acre, every five or six years. Mr. Kent, however, thinks it a better practice to put a slight coat on annually in the spring season. As much expence might be incurred in the culture, establishment, and after management of this sort of crop, in order to insure a favourable produce, the farmer should not too hastily attempt it, till he has found how far it will suit his convenience and other circumstances.

Expences of Cultivation.—The various expences attending it, as stated by different writers before the late rise in the price of labour, are thus given, as well as the profit in foiling horses. At present, however, a third more may be added, and, in some cases, much more.

Expences.

	£.	s.	d.
Two spring ploughings extra - - -	0	18	0
Harrowings - - - - -	0	2	6
Eight pounds of seed - - - - -	0	8	0
Drilling - - - - -	0	2	6
Horse-hoeing in autumn - - - - -	0	2	6
Hand-hoeing ditto - - - - -	0	5	0
First year	1	18	6

Annual Expences afterwards.

	£.	s.	d.
To rent, tithe, & rates - - - - -	1	10	0
Four horse-hoings - - - - -	0	10	0
Three hand-hoings - - - - -	0	12	0
Five mowings - - - - -	0	12	6
Raking together - - - - -	0	5	0
Loading and carting home - - - - -	0	7	6
Manuring, to amount <i>per annum</i> - - - - -	0	12	0
Clear profit	9	18	6
	14	7	6

Profit in the Practice of Soiling Horses.

	£.	s.	d.
By keeping five horses, from beginning of May to middle of October, at 2s. 6d. <i>per horse, per week</i> - - - - -	14	7	6
	14	7	6

Nearly double this is sometimes made by soiling clover.

Number of Cuttings and Manner of Cutting.—In a late practical work, it is stated that, "as this is one of the most forward of the artificial grasses, it frequently attains a sufficient growth for the scythe towards the end of April, or beginning of the following month; and in soils that are favourable for its culture, will be in a state of readiness for a second cutting in the course of a month or six weeks longer, being capable of undergoing the same operation, at nearly similar distances of time, during the whole of the summer season. In this last sort of soil, with proper management, in the drill method, it has been found to rise to the height of a foot and a half in about thirty or forty days, affording five full cuttings in the summer. But in the broad-cast crops, in the opinion of some, there are seldom so many cuttings afforded in the season, three or four being more common, as the growth is supposed to be less rapid, than by either of the other modes;" this is, however, contradicted by other cultivators, who have bestowed much care on the subject, as will be evident hereafter. And it is stated, that "in order to have new successions of this grass constantly becoming ready to be cut, it has been recommended, for the purpose of soiling, to have the broad-cast plantations formed into so many divisions, as that one of them may be cut daily, as about sixty; and those of the drilled, and transplanted kinds, into from thirty to forty, according to the nature of the land, consuming them in the same manner. These cuttings must, however, be varied in proportion to the differences in the growth of the crops, and the consumption. The most economical mode of cutting the produce is, without doubt, by means of the scythe; though the reaping-hook has been made use of by some; after being cut, the food should be conveyed, as soon as possible, to the animals; this may be done by a light cart, or large barrow, made for the purpose, according to the scale on which the business is conducted. One cutting in the day is only advised by some, but as there is a loss as well as injury done to all sorts of green-cut food by keeping, even for a few hours in hot seasons, it may be a better practice to have two cuttings in the day, especially when the weather is warm, and the lucern at no great distance; besides, the food is eaten better when quite fresh."

Value and Application of.—It is stated, that "the produce of this sort of crop, in converting it to the purposes of soiling cattle, will necessarily be different under different circumstances, but an acre can seldom, when under proper culture and management, support less than from three to five or six horses, or other cattle, during the six summer months, the profit of which cannot be less than from seven to ten or twelve pounds." "And in letting it remain for hay, which is less advantageous, in three mowings, an acre, where the crop is good, will seldom afford less than from three to five tons of dry hay. In Mr. Arbuthnot's trials, as stated in Mr. Young's Tour, the produce was four loads, but in those of others, on rich grounds, it was five. It is likewise remarked, that "in making this sort of plant into hay, the same directions should be attended to as for clover; the less the produce is shaken about the better, provided it be sufficiently quickly dried, as the leaves will be more fully preserved in the stems, and the hay, of course, more valuable. From its greater succulence, it will, in common, require rather more time than clover, or sainfoin, in making into hay. As this sort of hay is held in less estimation than that of either of the above grasses, it should always be consumed at home by the farm horses, or other stock; and that of the other sorts sent for sale."

But the principal and most advantageous practice, in the application of lucern, is that of foiling horses, neat cattle, and hogs; yet as a dry fodder, it may also be capable of affording much assistance in many cases; and as an early food for ewes and lambs, be of great value in particular cases. "As this plant bears repeated cutting, better than most of those of the artificial grass kind, springs in a more quick and expeditious manner, and affords a healthy nutritious food, it must be of vast utility to the farmer, where horses and cattle form a large part of his stock; with horses in this way, it has been found by some, as stated in the fourth volume of Mr. Young's Eastern Tour, 'to answer better than any other sort of green food that has been tried'. The number of cuttings that it admits of, being on different soils, and under different modes of culture, from about three to five, affording a produce of green herbage adequate to the support of from three to four or five horses, for a period of nearly six months in the summer season, as has been seen above; and though much of this vast advantage, in the support of these animals, may with propriety be ascribed to the economy of the consumption of the food, that unavoidably takes place in this excellent practice, the real produce in green food, is, without doubt, larger than in most other grass crops. The broad-cast crops, in the trials of some cultivators, appear to have been more profitable, in this mode of consuming the produce, than those of either the drilled or transplanted methods of culture; in the practice of Mr. Hall, the former supported from four to five horses for twenty-six weeks, while the transplanted crop, in rows two feet asunder, only afforded produce sufficient for the keeping of three. And in those of Mr. Clayton, in the broad-cast method, without grain, five horses were kept from the middle of May till Michaelmas, while that drilled in equidistant rows, at the distance of eighteen inches, only supported four." There are many other facts, that lead to the same conclusion. "On very rich soils, the drilled lucern will, without doubt, when the plants are kept perfectly clean, and the mould well stirred between the rows, and laid to their roots, afford an abundant produce, perhaps

more so than in the broad-cast; but to do this, great attention in the culture must be bellowed." And in "its application, in the foiling of cows, and other sorts of cattle, in the fold yards, and in the feeding and fattening of oxen, its importance is equally great. It is found that in foiling cows, the proportion of this sort of food, consumed in twenty-four hours, is from about sixty or seventy, to upwards of a hundred pounds, in those which are of the middle-sized kinds; an acre maintaining in the proportion of about four for twenty weeks. In other trials, larger proportions of stock have been kept by this practice." In feeding cattle with this sort of food, it is observed, that "in its green state, care is necessary, however, not to give the animals too much at a time, especially when it is moist, as they may be *braken* or *blown* with it, in the same way as with clover." The trials, it is added, that have been made in fattening bullocks or other cattle with this green fodder, are not numerous, but they are sufficiently so to prove its utility in such application. In Mr. Young's trials, cattle have been found to increase fast in flesh by it, paying at the rate of four shillings and sixpence a head *per* week, which is considered as a great proof of the value of the plant in this view. Its superiority to tares is prodigious. It has also been considered of the greatest value in this view, in Ireland, by Mr. Herbert, after much experience of it. The great power which it possesses in fattening is rendered indeed sufficiently evident, by the sudden effects which it produces in this way, in foiling horses; in most instances they get into high condition, in a short time becoming "fat, without oats or hay," in some cases. And "sheep have likewise been fattened on this green food with great success, in Mr. Baldwin's trials." Also, "in foiling hogs in the fold yards, it has been attended with considerable success and it has been suggested that as these animals do not live so closely as sheep, they may be admitted upon the crop with safety."

And the advantage of this mode of application over that of making the crops into hay, and their expense, produce, and profit, are stated by Mr. Young in this way.

Average of Five Crops.

Soils.	Application.	Expense.			Produce.			Profit.		
		£.	s.	d.	£.	s.	d.	£.	s.	d.
Light sandy loam - - - -	Soiling -	1	14	6	13	0	0	11	5	6
Rich black loam - - - -	Soiling -	5	0	8	11	5	0	6	4	4
Good loam - - - - -	Soiling -	3	15	0	14	7	6	10	12	6
Good loam - - - - -	Hay -	3	3	6	9	0	0	5	16	6
Rich deep sandy loam - - -	Soiling -	3	11	1	7	0	11½	3	13	11½
Averages - - - - -	-	3	8	11	10	8	8	7	10	5

Further, the result of the comparative experiment made by Mr. Anderton with this crop, and those of burnet and saintfoin, as stated by the same writer in his Eastern Tour, shews its superiority over them clearly.

Lucern, at four cuttings, green, produced	159
Burnet - - - - -	84
Saintfoin - - - - -	82

And the advantages of making them into hay, are thus stated:

One cutting of each.			
Lucern, in grass, 57½ lb.	in hay,	22 lb.	
Burnet, in ditto, 2½	—	7	
Saintfoin, in ditto, 20½	—	9	

Although lucern crops should not be closely fed down with sheep, it is not improbable but that "in particular cases they may be applied as an early green feed for ewes and lambs with great utility and convenience, as they may be relied on for this sort of feed much sooner than any of the other kinds of artificial grass crops, especially in soils of the rich, dry, and warm descriptions, being often ready for this purpose soon after the middle of March, affording a good bite through the whole of the following month; the most difficult period for the providing of suitable support for this kind of stock. The benefit in the healthy growth and improvement of the lambs in this mode, will much more than counterbalance any loss sustained in the first cut, for the foiling of horses. The sheep

Weep should not, however, remain on longer than while the fresh shoots are eaten down." And it is concluded on the whole, that "though this plant is capable of being thus usefully applied, considering the great expences which are necessary in raising and keeping lucern crops in a state of production, and their affording but little produce, especially when sown without corn, for the two first years, notwithstanding they appear to yield a great advantage in the practice of foiling animals; it is probable that much of the profit depends upon the method of consuming them, and not on that of the particularly advantageous nature of the plant. Its superiority to clover, when the differences in the expences of their culture, and other circumstances, are fairly brought into view, will not perhaps appear so great as many, on a superficial observation, may have supposed. The point in which it most materially excels that almost invaluable plant, is, the duration, or time, which it lasts in the ground, after being once introduced, continuing from ten to fifteen and even twenty years, according to the state and nature of the soil and the attention that is bestowed in the after management. This is a circumstance of the first importance, in cases where the cultivator wishes to avoid the trouble and expence of grain crops, as he can keep a suitable extent of land under this crop, for the purpose of foiling his stock without them, while with clover it is utterly impossible. Where the proportion of land is small, and the quantity of cattle and horse stock disproportionately large, it is a plant admirably calculated for the cultivator's purpose, when grown convenient to the farm-yards, and kept in due order by proper cultivation. It has also been recommended on dairy farms, as of great utility in supporting the cows, and increasing the quantity of milk. Where the soils are suitable, a few acres under this grass, round the house, must in almost all cases be valuable for the purpose of early green food."

The advantages of cultivating lucern are considered by Mr. Young so extremely great, that the "agriculturist should, he thinks, determine at all events to have sufficient at the least, for the summer support of all his teams, and other horses; and if in addition to this quantity, he provides also for thus feeding much other stock in his farm-yard, he will find it a most profitable practice."

Breaking up old Lucern Grounds.—It has been already suggested, that "on attempting to break up lands that have been long under this sort of crop, it has been sometimes found, from the great strength of the roots of the lucern plant, and the consequent difficulty of destroying them, that they have been restored in such a manner, as to induce the cultivator to leave them again for the production of this grass." And that in situations where such grounds could be conveniently flooded or covered with water occasionally, they might be very advantageously converted into good meadow or grass lands. A sort of application, that has long since been recommended.

In cutting lucern crops, the author of the Farmer's Calendar suggests that it should always be performed in a longitudinal direction of the drills, or rows, or of the field, in order that a scarifying may be given to the young growth before it is too far advanced. And the same writer remarks, that this sort of crop requires much manure, for though on good land it may afford a good produce, without such application; to carry its cultivation to the highest state of perfection, "not only of *product* but also of *clear profit*," it should have plenty.

But though this sort of plant is seldom liable to be injured by the frost, in the southern districts of the kingdom, where it is the most extensively cultivated, a writer in an useful pe-

riodical work, complains that in an experiment of his, in which the lucern was drilled about a foot distant in the rows, it destroyed every plant. "A few indeed, (says he,) at distant intervals, recovered in the spring, and grew very decently, pushing out long, strong, and carrot roots; but their number was so inconsiderable, and the weeds so abundant and luxuriant, that it became necessary to plow all down." In this case the land does not seem to have been in a proper state of either preparation or heart for the growth of this sort of crop. And it is suggested, that in giving this sort of food to cows, it is necessary to have the precaution of letting it be made use of the day after it is cut, and not the same day, as in this case the animal is liable to swell. In his trials it was found that a large cow consumed about eighty-four pounds of this food in twenty-four hours, and that if more be given, the animal will probably waste it. And it is added, that the butter made from milk produced from this sort of food, is equal to any made from cows fed on the best meadows and pastures.

LUCERNA, in *Geography*, a town of France, in the department of the Po, lately belonging to Piedmont, in the province of the Four Vallies, to one of which it gives name; five miles S.W. of Pinerolo.

LUCERNA, in *Ichthyology*, a species of *Trigla*; which see.

LUCERNARIA, in *Natural History*, a genus of the Vermes Mollusca class and order. Body gelatinous, wrinkled, branched; mouth placed beneath. There are three species, which inhabit the Northern seas, and live among the "fuci" and "ulvæ," generally adhering firmly to their habitation, and rarely changing their abode; they feed on polypes, or onisci; the body is commonly headless and eyeless, with granulated tubercles.

Species.

QUADRICORNIS. Body long coiled, with four forked arms tentaculate at the tip. Inhabits fuci, and feeds on polypes. The body is without head or eyes, brown, pellucid, quadrangular, each angle running into an arm, the branches of which are terminated by a fasciculus of thirty or forty tentacula; tail flexuous in the middle and disposed in numerous plaits and folds, thickened at the base and tapering gradually, obtuse at the tip, and extensile, like the tentaculæ; mouth white with cinereous stria, and four-toothed.

PURYGIA. Body long papillous, with numerous globiferous arms deflected into an hemisphere; fixed at the base by a byssus or mass of filaments. This is found in the Greenland seas at a considerable depth, and seldom changes its abode. Body varying in shape, about half an inch long, reddish with white globules and papillæ; neck erect, extensile, and beset with numerous exsertile papillæ; arms short, slender, and entangled together.

AURICULA. Resembling an oil-disk; neck round, the lower extremities dilated and furrowed with eight fasciculi of tentacula. This species is likewise found in the Greenland seas, adhering very firmly to the largest ulvæ, from which it rarely moves; feeds on onisci, and is about an inch and a half long. Body black or reddish, rarely chestnut-brown with a gold tinge, lubricose, glabrous, the margin surrounded with eight granulate tubercles, resembling so many fasciculi of tentacula, containing about sixty in each; these are black tint with white; mouth white.

LUCERNATES, in the *Ecclesiastical History*, a term used by the primitive Christians for canticles, which they sung in their nocturnal assemblies; probably from these rites being performed by lamp-light.

LUCHNOW HILLS, in *Geography*, a range of mountains in Hindoostan, between the circars of Ruttunpour and Goondwana; the passage over which is called "Luchnow Pass," and is situated about eight miles W. of Kyragur.

LUCHO, a town of the principality of Pomerelia; 12 miles S.W. of Dantzic.—Also, a town of the principality of Lüneburg, on the Jetze, in a moist soil, so that most of the houses are erected on piles; 40 miles E.S.E. of Lüneburg. N. lat. 52° 58'. E. long. 11° 17'.

LUCHOWICZE, a town of Lithuania, in the palatinate of Novogrodek; 40 miles S.S.E. of Novogrodek.

LUCIA, *St.*, or, as it is called by the French, *St. Oloffe*, from its having been discovered on St. Lucia's day, one of the Charaibe or Caribbee islands in the West Indies, about 27 miles in length from N. to S., and 12 broad. In this island are several hills, two of which are remarkably round and high, and said to have been volcanoes. At the foot of these hills are fine vallies, well-watered, and having good soil, that produces trees, the timber of which serves the planters of Martinico and Barbadoes for building their houses and windmills. The island also supplies plenty of cocoa and fustic. The air, fanned by the trade winds, which, by the arrangement of the hills, are admitted into the island, and thus moderating the heat, is reckoned salubrious. The island has several good harbours and bays, which afford commodious anchorage; particularly the "Little Carénage," which is accounted the best in all the Caribbees, and which induced the French to prefer it to the other neutral islands. This harbour possesses several advantages, such as its depth, the excellent quality of its bottom, and its convenient careening places. Thirty ships of the line may lie here sheltered from hurricanes, without the trouble of mooring them. As to the other harbours, the winds are always favourable for going out, and the largest frigate may be in the offing in less than an hour. In the island are nine parishes, eight to the leeward, and only one to the windward. A high road is made round the island, and two others which cross it from E. to W., and thus afford an easy conveyance of the commodities of the plantations to the barcaderes, or landing places. In the year 1769, the free inhabitants of the island amounted to 2524; the slaves to 10,270. Of cattle it had 1819 horned beasts, and 2378 sheep, besides 598 mules and horses. Its plantations consisted of 1,279,680 plants of cocoa; 2,463,880 of coffee; 681 squares of cotton; and 254 of sugar canes: 16 sugar works were actually at work, and 18 nearly completed. Its produce yielded 112,000*l.*, which was capable of being improved to 500,000*l.* After the English had been settled for some time in this island, the Charaibes, mitigated by the French in the year 1638, either killed or drove from the island the English settlers with their governor. When the civil wars broke out in England, a party of French arrived here, under a person named Rousselan, well provided with stores and ammunition. Rousselan recommended himself to the Charaibes, so that he and his colony carried on an advantageous trade; but upon his death in 1654, he was succeeded by La Riviere, who with his whole colony was massacred by the Charaibes. It is needless to recount the attempts made by the French, and also by the English in 1672, and at a later period in 1723, to obtain and preserve a settlement in this island. At length, when the English were compelled to relinquish all hopes of obtaining this and other islands by force, St. Vincent, Dominica, Tobago, and St. Lucia were declared neutral by the treaty of Aix-la-Chapelle in 1748; and those who remained of the ancient proprietors were left in unmolested possession. The treaty

of neutrality was no sooner concluded, than both English and French appeared dissatisfied with the arrangement they had made. The English, in particular, discovered, that by acceding to the compromise, they had given up St. Lucia, an island worth all the rest, and to which, it must be owned, they had some colourable pretensions, founded on a treaty entered into with the Charaibe inhabitants in 1664, 600 of whom attended an armament that was sent thither by lord Willoughby, and actually put the English publicly and formally into possession. By the peace of Paris, February 1763, the three islands of Dominica, St. Vincent, and Tobago were assigned to Great Britain; and St. Lucia to France in full and perpetual sovereignty; the Charaibes not being once mentioned in the whole transaction, as if no such people existed. The English took this island in the year 1770, but restored it at the peace in 1783; it was retaken by the English in 1794, restored in 1795, and retaken in 1796; restored and recaptured in 1803. N. lat. 13° 37'. W. long. 60° 30'.

LUCIA, *St.*, a town of Sicily, in the valley of Demona; seven miles N. of Messina.—Also, a town of the island of Corfica; six miles N.E. of Corte.—Also, one of the smaller Cape Verd islands, about 24 miles in length, high and mountainous. On the E. side is a harbour, defended by two small islands, which afford good shelter and anchorage. N. lat. 16° 46'. W. long. 24° 30'.—Also, a town of South America, in the government of Buenos Ayres, on the E. side of the river Plata; 140 miles N. of Santa Fé.—Also, a town of Brazil, in the government of Goyas, on the river Tocantins. S. lat. 12° 20'.—Also, a town of South America, in the government of Buenos Ayres, on the Parana; 110 miles S. of Corrientes.—Also, a town of Peru, in the government of Arequipa; 50 miles S.E. of Arequipa.—Also, a town of South America, in the audience of Quito, on the Daülé; 35 miles N.N.W. of Guayaquil.—Also, a town of Italy, in the Trevisan; 20 miles E.S.E. of Trevigio.—Also, a river of Africa, which runs into the Indian sea; S. lat. 28.—Also, a river of America, in East Florida, which runs S.E. along the E. side of the peninsula, and communicates inland with the Indian river.

LUCIA Bay, *St.*, a bay on the E. coast of the island of Borneo. N. lat. 4° 16'. E. long. 117° 18'.

LUCIAN, in *Biography*, a distinguished Greek writer, a native of Samosata, on the banks of the Euphrates, was born in the reign of Trajan, of mean parentage, and in his youth was placed with his uncle to learn the art of a statuary. Having no genius for the profession, and failing of success in some of his first attempts, he withdrew from his master, and went to Antioch, where he engaged in literary studies, and embraced the profession of a pleader. He reported, that he was induced to this step by a dream, in which Learning seemed to draw him to her, and to promise to his efforts fame and immortality. He was soon disgusted with the contention of the bar, and confined himself to the practice of eloquence as a sophist or rhetorician, in which capacity he visited several foreign countries, particularly Greece, Italy, Spain, and Gaul. The emperor M. Aurelius was sensible of his great merit, and appointed him register to the Roman governor of Egypt. He died about the year A.D. 180, when he had attained the great age of 90. The works of Lucian, which are numerous, and written in the Attic dialect, consist chiefly of dialogues, in which he introduces different characters with much dramatic propriety. His style is easy, simple, elegant, and animated, and he has stored his compositions with many lively sentiments, and much of the true Attic wit. His frequent obscenities, and his vulgar manner of exposing to ridicule almost

almost every kind of religion, have drawn upon him the censure of moralists in all ages. The best editions of Lucian's works are those of Bourdelet, Paris 1615; of Grævius, Amst. 1687; of Reitzius, Amst. 1743; and the Bipontine edition in 10 vols. 1789—93.

LUCIAN, (de elect. seu Cygnis,) is the only ancient writer who has dared to doubt of the musical abilities of swans. He tells us, with his usual pleasantry, that he tried to ascertain the fact, by making a voyage on the coasts of Italy; and relates, that being arrived at the mouth of the Po, he and his friends had the curiosity to sail up that river, in order to ask the watermen and inhabitants concerning the tragical fate of Phaeton; and to examine the poplars, descendants of his sisters, whom they expected to shed amber instead of tears; as well as to see the swans represent the friends of this unfortunate prince, and hear them sing lamentations and sorrowful hymns, night and day, to his praise, as they used to do in the character of musicians, and favourites of Apollo, before their change. However, these good people, who never had heard of any such metamorphoses, freely confessed, that they had indeed sometimes seen swans in the marshes near the river, and had heard them croak and scream in such a disagreeable manner, that crows and jays would be sirs, compared with them, in a musical capacity; but that they had never even dreamed of swans singing a single note that was pleasing, or fit to be heard.

LUCIAN, a Christian martyr in the fourth century, is supposed to have been a native of Antioch, of which place he became a presbyter. He was a pious and learned man, very eloquent, and well skilled in the knowledge of the scriptures. He published an edition of the Septuagint, with corrections, suggested by a collation of ancient copies, which version was generally used in Jerome's time by the churches from Constantinople to Antioch. He published also an edition of the New Testament, the canon of which appears to have been much the same with that of other Christians. Jerome does not commend these editions; he depreciates Lucian's Septuagint in comparison with Origen's. It is certain that Lucian was in high esteem with the Arians of the fourth century, and on that account it has been supposed that he adopted their principles; though he is claimed on the other side as the advocate of the doctrine of the Trinity; but Dr. Lardner, who has examined the question with his usual diligence, candour, and impartiality, observes, "Whether Lucian's opinion concerning the Trinity, particularly concerning the *Word*, was the same with that, which is now reckoned orthodox, or not, which is a point not easily determined; we have seen other accounts of him which are unquestioned; and all must be satisfied, that he was a pious, learned, and diligent man; that he believed Jesus to be a divine teacher and the Christ." During the persecution of the Christians in the reign of Maximin, Lucian was apprehended, and conducted to Nicomedia, where the emperor then was. Here he was commanded, in the presence of the monarch, to renounce the Christian faith; this he not only refused, but delivered an able and very eloquent defence of it, of which the following is given in Lardner: "It is no secret, said he, that the God whom we Christians worship, is the one God declared to us by Christ, and by the Holy Ghost inspired in our hearts. I own, that we also once trusted in gods of our own making, but Almighty God, commiserating the errors of mankind, sent his wisdom into this world clothed in flesh to teach us the knowledge of God, who made the heavens and the earth, who is eternal and invisible. He, moreover, gave us a rule of life, and delivered to us the precepts of righteousness; he taught us to practise sobriety, to rejoice in poverty, to be very meek,

to be willing to suffer, to preserve the purity of our minds, to be patient at all times. He likewise foretold the things that have since happened to us; that we should be brought before kings and rulers, and be slaughtered as victims; for which cause also, though he was immortal, as being the Word and Wisdom of God, he yielded himself to death, that, whilst he was in the body, he might set us an example of patience. Nor did he deceive us by dying, but on the third day rose again, being innocent and unspotted, and undergoing death only that he might overcome it by rising again. These things are well attested, and a large part of the world now acknowledge the truth of them." Upon this he was sent to prison, and speedily put to death, but in what manner is not known. He was buried at Heleopolis. Lardner, vol. iii. edit. 1788.

LUCIANA, in *Geography*, a town of Spain, in the province of Seville; eight miles W.N.W. of Ecija.

LUCIANANO, a town of Etruria; 12 miles W. of Cortona.

LUCIANISTS, or LUCANISTS, a religious sect, so called from Lucianus, or Lucanus, a heretic of the second century, being a disciple of Marcion, whose errors he followed, adding some new ones to them.

Epiphanius says, he abandoned Marcion; teaching, that people ought not to marry for fear of enriching the Creator; and yet other authors maintain, that he held this error in common with Marcion, and other Gnostics. He denied the immortality of the soul; asserting it to be material.

There was another sect of Lucianists, who appeared some time after the Arians. They taught that the Father had been a Father always, and that he had the name even before he begot the Son; as having in him the power, or faculty of generation; and in this manner they accounted for the eternity of the Son.

LUCIANO, in *Geography*, a town of Spain, in New Castile; 19 miles W. of Ciudad Real.

LUCID INTERVALS, the fits of lunatics, or maniacs; wherein the phrenzy leaves them in possession of their reason.

It is said, lunatics are capable of making a will in their lucid intervals.

LUCIDA CORONÆ, in *Astronomy*, a fixed star of the second magnitude, in the northern crown. See CORONA Borealis.

LUCIDA Hydra. See COR Hydra.

LUCIDA Lyra, a bright star of the first magnitude, in the constellation Lyra.

LUCIDO, ST., in *Geography*, a town of Naples, in Calabria Citra; 11 miles W.N.W. of Cosenza.

LUCIDUM SEPTUM. See SEPTUM.

LUCIFER, in *Astronomy* and *Mythology*, a name given to the planet Venus, when she appears in the morning before sun-rise.

LUCIFER, in *Biography*, a celebrated bishop of Cagliari, the metropolitan city of the island of Sardinia, flourished in the fourth century. He was one of the deputies sent by pope Liberius to Milan, in the year 354, at the time when the emperor Constantius had summoned a council for the purpose of condemning Athanasius. Lucifer, and Eusebius, bishop of Vercell, adhered most strenuously to the cause of Athanasius, which so enraged the emperor that he banished them into the East. Lucifer was sent to a city in Syria, from whence he was removed to Eleutheropolis in Palestine. Here he wrote two books, in defence of Athanasius and his supporters, with so much boldness, or perhaps violence, that St. Jerome says he must at the time have made up his mind to the suffering of martyrdom. These books he not only made public, but sent a copy of them to Constantius.

in his own name. The emperor, amazed at his intrepidity, desired them to be returned to the bishop, in order that he might have an opportunity to acknowledge or to disavow them. The prelate avowed himself the author, and knowing the probable consequences, said he was ready to suffer death in defence of what he had written and done. Athanasius sent him a letter of thanks for the service which he had performed for the Catholic cause, and requesting a copy of his works, which he either translated himself, or caused to be translated from the Latin into Greek. On the death of Constantius, Lucifer recovered his liberty and came to Antioch, where the Catholics were divided into two parties. Lucifer widened the breach already made, by joining with the opponents of the bishop of Miletus, who, though a Catholic, was ordained by bishops suspected of Arianism, and had communicated with them, and ordained a Presbyter among the malcontents to the episcopal office. This step was condemned by his friend, and formerly fellow sufferer Eusebius, who had been sent to Antioch by the synod of Alexandria, with the view of re-establishing the peace of the church. But Lucifer determined to maintain what he had done, and withdrew from the communion of Eusebius, and he formed a party, called after himself Luciferians, who resolved to avoid all commerce or fellowship with those bishops who had declared themselves in favour of the Arians. With this resolution he went into Sardinia, and thereby produced a schism in the church, which at first spread widely, but did not obtain numerous adherents, and does not appear to have out-lived the century. Lucifer died about the year 370. His works are written in a harsh and barbarous style. According to Lardner, they consist very much of passages of the Old and New Testament, cited one after another, which he quotes with marks of the greatest respect. He farther adds, that the works of this prelate have not yet been published with all the advantage that might be wished. The titles of these works are "Ad Constantinum Imperatorem, lib. ii.;" "De Regibus Apollaticis;" "De non conveniendo cum Hereticis;" "De non parcendo Delinquentibus in Deum;" "Quod moriendum sit pro Filio Dei;" and "Epistola brevis ad Florentium." They were collected together, and published at Paris by John Till, bishop of Meaux, in 1568. Gen. Biog. Lardner, vol. iv. edit. 1788. Moreri.

LUCIFERA, in *Mythology*, a surname given to Diana, under which title she was invoked by the Greeks in childhood. She was represented as covered with a large veil, interspersed with stars, bearing a crescent on her head, and holding in her hand a lighted flambeau.

LUCIFERIANS, a religious sect, who adhered to the schism of Lucifer, bishop of Cagliari, in the fourth century, who was banished by the emperor Constantius, for having defended the Nicene doctrine concerning the three persons in the Godhead.

St. Augustine seems to intimate, that they believed the soul, which they considered as of a carnal nature, to be transmitted to the children from their fathers. Theodoret says, that Lucifer was the author of a new error. The Luciferians increased mightily in Gaul, Spain, Egypt, &c. The occasion of the schism was, that Lucifer would not allow any acts he had done to be abolished. There were but two Luciferian bishops, but a great number of priests and deacons. The Luciferians bore a peculiar aversion to the Arians.

LUCILIUS, CAIUS, in *Biography*, a Roman poet, was born at Suessa, in the country of the Aurunci, about the year 148 B.C. He was of a good family, and in the Numantine war bore arms under Scipio Africanus the

younger, with whom, and his friend Lælius, he lived in terms of friendship. He is looked upon as the founder of satire, and as the first considerable writer of satires among the Romans. From Horace, who refers to them several times in his own satires, it appears that he imitated the old Greek comedians in marking out by his censure individuals notorious for their vices, even those of the very highest rank. Though superior to his poetical predecessors at Rome, and though he wrote with great roughness and inelegance, he gained many admirers. By Horace he is compared to a river which rolls upon its waters precious sand, accompanied with mire and dirt. Of his thirty books of verses only a few scattered fragments are come down to modern times. He died at Naples about the year B.C. 103. His fragments have been collected and published, with notes by Francis Douza, in quarto. They are also given in Maittaire's "Corpus Poetarum."

LUCINA, of *lux, light*, in *Mythology*, a deity who presided over the labour of women and the birth of children. This title is sometimes given to Diana, but most commonly to Juno.

LUCIO, ST., in *Geography*, a town of Etruria; 14 miles E.S.E. of Leghorn.

LUCIOPERCA, in *Ichthyology*, a species of *Perca*; which see.

LUCIPARA, or **LUSIPARA**, in *Geography*, a small barren island in the East Indian sea, near the S. coast of the island of Banca. S. lat. 3° 14'. E. long. 106° 20'.

LUCITO, a town of Naples, in the county of Molise; 11 miles N.E. of Mohse.

LUCIUS I., pope, in *Biography*, succeeded to the high dignity upon the death of Cornelius in the year 252, and after a short pontificate he is supposed to have died in March 253. He was banished Rome immediately after his ordination, under the reign of Gallus; but he soon returned to the great joy of his flock, who crowded to meet him. St. Cyprian wrote him a letter of congratulation, in which he observes, that he was perhaps recalled to be immolated in the sight of his flock, that they might be encouraged and animated by his Christian constancy and resolution. Cyprian in another place calls him a martyr, nevertheless we have no account of the manner of his death, and hence it has been thought that the expression made use of by this father is not to be understood strictly and literally.

LUCIUS II. pope, raised to that dignity on the death of Celestine II. in 1144, was a native of Bologna, who embraced the ecclesiastical life among the canons of St. Augustine. In 1125 he was created a cardinal, and appointed librarian of the Roman church. After this he was nominated the chancellor, and twice was sent papal legate into Germany. A short time before the death of Innocent II. the Romans threw off the papal yoke in temporal matters, restoring the senate, and creating their own magistrates, to whom they would yield obedience. In this attempt to recover their ancient liberties, they persisted after the election of Lucius, whom they acknowledged for lawful pope, but would not own him for their sovereign. They contended that it was inconsistent with the profession of the clergy, that they should possess lordships, estates, and temporal dominion, and that they ought to content themselves with such decent subsistence as they might derive from voluntary tithes and oblations. To Lucius, as their bishop, they paid all due respect; but soon after his election, they veiled the patrician dignity in one of their own body, and submitted to him as their prince. Lucius took every method to oppose their plans; he sought assistance from Conrad, king of Germany, and when he was refused, he put himself

himself at the head of his own troops, and marched against the Capitol, where the senate was sitting. His forces were defeated and himself wounded with a stone, which terminated his life in a few days, after a pontificate of about eleven or twelve months. Some of his letters are extant in the 10th vol. of the Collect. Concil.; and two in the second vol. of Baluze's Miscel.

LUCIUS III., pope, a native of Lucca, was educated to the church, and after various degrees of preferment, he was created cardinal by Innocent II. By Adrian IV. he was sent legate into Sicily; after this pope Alexander III. appointed him legate to the emperor Barbarossa, and on the death of Alexander in 1181, he was raised to the holy see. He was the first pope who was elected by the cardinals alone, to the exclusion of the people and clergy, who had hitherto taken a part in the choice of a new pope. Towards the close of the year 1182, a quarrel took place between the pope and the Romans, owing to his refusal to comply with some customs which had been observed by all his predecessors. The people broke out into insurrection, and drove him out of the city, pursuing him from one strong hold to another, till he retired for safety to Verona. At first he was ably supported by the emperor, who ordered Christian, archbishop of Mentz, to march in his defence at the head of a powerful army. This prelate soon reduced all the strong holds in the neighbourhood of Rome, and so harassed the Romans, that they were ready to receive the pope on his own terms, when the death of Christian produced a sudden alteration in the state of affairs; and the Romans, feeling their power, became more determined than ever in their opposition. Lucius sent nuncios to all Christian princes and bishops to gather contributions; large sums were gained which he spent in bribing the leaders of the opposing parties, and then ventured to return to Rome. A second insurrection drove his holiness to Anagni, whence he went into Lombardy, to implore the protection of the emperor, who was at that time on his march into Italy, for the purpose of holding a council at Verona. In 1184 the council was opened, and the pope preferred his complaints against the Romans, painting, in the strongest colours, the enormities which they had perpetrated; and they were, without hesitation, declared enemies of the church. To this council is to be traced the origin of the inquisition against heretics. For not only were the Albigenses condemned and anathematized anew, under different names, but all who should admit them into their houses, suffer them in their territories, or afford them any sort of relief. Under the same sentence were included all those who held or taught different doctrines from those held and taught by the Roman church. Some grounds of dispute arose between the emperor and the pope, as well with respect to the reinstatement of certain bishops who had been suspended; as also on account of the pope's refusal to crown the emperor's son Henry, and to give him the title of emperor. The pope, however, was not willing to proceed to a direct rupture with the emperor, and the business in dispute was suspended. In 1184, we find Lucius pressing, with great earnestness, the Christian princes to send powerful succours to the assistance of their friends and brethren in the Holy Land. While he was promoting, to the utmost of his power, a new crusade, he died at Verona in November 1184, after a pontificate of little more than four years. He is commended for prudence, piety, and unblemished manners. Two of the "Letters," and a "Decree" of this pope's, are to be found in the 10th vol. of the Collect. Concil. Mr. Gibbon, speaking of the 2d and 3d Lucius, says, "I cannot forget the sufferings of two pontiffs of the same age,

the second and third of the name of Lucius. The former, as he ascended in battle array to assault the Capitol, was struck on the temple by a stone, and expired in a few days. The latter was severely wounded in the persons of his servants. In a civil commotion several of his priests had been made prisoners, and the inhuman Romans, reserving one as a guide for his brethren, put out their eyes, crowned them with ludicrous mitres, mounted them on asses with their faces to the tail, and extorted an oath, that in this wretched condition they should offer themselves as a lesson to the head of the church." Bower. Moretti. Gibbon, vol. xii.

LUCIUS, in *Ichthyology*, a species of *Esox*; which see.

LUCIUS *Martinus*, the *Sea-pike*, a name given by some authors to the fish more usually called the *merlucius*, and in English the *hake*. See *GADUS*.

LUCIUS *Martinus* is also used by many authors for the *judis*, called also by some *sphyræna*.

LUCIUS *Terræstris*, the *Land-pike*, in *Zoology*, the name of a very singular species of American lizard, which has the shape, scales, &c. of the pike-fish; in the place of the fins of that fish it has four legs, but these are so weak and slender that it makes no use of them in walking, but crawls along upon the ground in the manner of a snake, and draws its legs after it; it grows to about fifteen inches long, with a proportionable thickness; it is all over covered with small, strong, and glossy scales, of a silver grey. In the night they retire into holes and caverns, and make a very disagreeable and loud noise, much louder than the croaking of frogs. They seldom stir out of their holes, unless in the dusk of the evening; and if they are ever met with in the day-time, their strange motion surprises all who see them.

LUCKAMPOUR, in *Geography*, a town of Bengal; 70 miles N.W. of Midnapour.

LUCKAU, or LUCCA, a town of Lower Lusatia, in a circle of the same name, on the river Preile, containing four churches, a Latin school, and an hospital; 49 miles N. of Dresden. N. lat. 51° 51'. E. long. 13° 40'.

LUCKENS, a town of Sweden, in the province of Drontheim; 25 miles S.S.W. of Drontheim.

LUCKENWALDE, a town and principal place of a circle, in the duchy of Magdeburg; 50 miles E. of Magdeburg. N. lat. 52° 6'. E. long. 13° 3'.

LUCKERCOOT, a town of Hindoostan, in Guzerat; 30 miles E. of Godra.

LUCKIA, a town of Hindoostan, in Oude; 40 miles N.E. of Gooraspour.

LUCKIDAU, a town of Bootan; 40 miles N. of Beyhar, 46 geographical miles in horizontal distance from Tassafudon. N. lat. 26° 56'.

LUCKIGATCHY, a town of Bengal; 10 miles N.E. of Kishenagur.

LUCKINPOUR, a town of Hindoostan, in the circle of Cicacole; 24 miles N. of Cicacole.—Also, a town of Hindoostan, in Surgooja; 10 miles S.W. of Surgooja.

LUCKIPOUR, a town of Bengal; 40 miles S.E. of Calcutta.—Also, a town of Bootan; 55 miles S. of Tassafudon.—Also, a town of Hindoostan, in Bengal; 35 miles S.S.W. of Comillah.—Also, an island in the mouth of the river Ganges, about nine miles long and two broad. N. lat. 22° 27'. E. long. 90° 48'.—Also, a town of Bengal, on an island of the same name; 50 miles S. of Dacca.

LUCKMIPOUR, a town of Hindoostan, in Bahar; 30 miles E. of Bahar.—Also, a town of Bengal; 32 miles S.S.E. of Curruckpour.

LUCKNADANG, a town of Goendwana; 88 miles N. of Nagpour.

LUCK.

LUCKNORE, a town of Hindoostan, in Bahar; 28 miles S. of Patna. N. lat. $25^{\circ} 8'$. E. long. $85^{\circ} 16'$.

LUCKNOUTI. See GOUR.

LUCKNOW, a circar of Hindoostan, in Oude, bounded on the N. by Kairabad, on the E. by Oude circar, on the S. by Manickpour, and on the W. by Cawnpore; about 75 miles long, and 45 broad. The capital is Lucknow.

Lucknow, a large and populous, but irregular and inelegant, city of Bengal, capital of the fore-mentioned circar, and of the subah of Oude, situated on the Goomty, which runs on the N. side of the town, and is navigable for boats of a common size at all seasons of the year; founded by Lutfehan, or Laeman, and rebuilt by Bikramadit, king of Oude. The spot on which the founder resided is preserved in remembrance by a mosque, erected for this purpose by Aurungzebe. This is a very ancient city, and moderately extensive; many of the houses are of brick, but the greater part consists of mud walls, covered with tiles, and built on scattered eminences, so that the ascents and descents are numerous and fatiguing; and the streets are narrow and filthy, no care being taken to preserve them clean. Most of the old palaces were destroyed by Suja Dowla, and others erected. The magnificent edifices are few. The houses of the merchants are constructed of brick, and are lofty and strong. Lucknow is distant from Allahabad 127 miles; from Agimere 428; from Arcot 1147; from Bahar 388; from Cabul 1118; from Dacca 790; from Dowlatabad 728; from Golconda 794; from Gwalior 211; from Oude or Fyzabad 85; from Patna 316; from Seringapatam 1201; from Villapour 920. N. lat. $26^{\circ} 52'$. E. long. $81^{\circ} 14'$.

LUCKO, or LUZK, a city of Russian Poland, capital of the palatinate of Volhynia, with a castle, where the bishop of Volhynia resided, and where the Jesuits had a college; it is also the residence of a Russian bishop, and has a provincial diet, and court of judicature; 200 miles E.N.E. of Cracow. N. lat. $50^{\circ} 45'$. E. long. $25^{\circ} 19'$.

LUCKOUR, a town of Hindoostan, in the circar of Sohajepour; 20 miles S. of Sohajepour.

LUCKUMRY, a town of Meckley; 35 miles W. of Munnypour.

LUCO, a town of Naples, in Abruzzo Ultra; nine miles S.S.W. of Celano.

LUCON, a town of France, and see of a bishop before the revolution, in the department of the Vendée, and chief place of a canton, in the district of Fontenoy le Comte; 15 miles from it. It is situated on a canal, about six miles in length, communicating with the sea. The environs are marshy, and the air is unwholesome. The place contains 2630, and the canton 8572 inhabitants, on a territory of $332\frac{1}{2}$ kilometres, in 10 communes. N. lat. $46^{\circ} 29'$. W. long. $1^{\circ} 4'$.

LUÇON, or LUZON, sometimes called *Manilla*, from its capital, is the largest and most important of the Philippine isles, being more than seven degrees, or near 500 British miles in length, and about 100 of medial breadth. This island is pervaded in its length by a high chain of mountains towards the east, so that its interior parts are difficult of access; and the examination of it is also restrained by the jealousy of the Spaniards. It is also traversed by the branches of a considerable river, on the banks of which the capital is seated; and its lakes are numerous, the largest of which is the source of the river Manilla. Several volcanoes occur in this island, nor are earthquakes uncommon. Its soil is uncommonly fertile, and its products are gold, copper, and iron. Such is the fertility of the soil, that rice, which in other countries requires much cultivation, grows every where with little

or no attention, and even in the highest mountains, without being watered. Of rice they have different kinds, some of which requires four or five months between the sowing and the harvest, and some which is sown and reaped within 40 days. Although they have no wheat but that which is imported, the soil is very capable of bearing it, as appeared by an experiment, in which one bushel produced 130. The grafts grow, the trees bud, blossom, and bear fruit all the year, not only in the gardens but on the mountains. The richest fruits of the West Indies, as well as of the East, are here abundant, and some that are found nowhere else. Here are 40 different sorts of palms, the most excellent cocoas and cassia, the sugar-cane and cotton of peculiar beauty. In the mountains are found wild cinnamon, wild nutmegs, ebony, sandal wood, together with excellent timber for building and shipping. Gold is found upon the mountains in every part of the island, washed out of the earth by the heavy rains; in the mould of their vallies, carried down by their rivulets; and in the sand and mud of their lakes, brooks, and rivers. The Spaniards obtain about 1000 or 1500 pounds weight every year, as a tribute of the inhabitants. All kinds of cattle abound, so that a large fat ox does not cost above four pieces of eight. Civet-cats are also very common, and their civet is highly valuable. Ambergris is also thrown on their coasts in prodigious quantities. The natives, who are of a mild character, are called Tagals, like all those of the Philippines, and seem to be of Malay origin. They are tall and well made, wearing only a kind of shirt, with loose drawers; but the dress of the women is chiefly a large mantle, and their black and beautiful hair sometimes reaches the ground; their complexion is a deep tawny. Their houses are of bamboo covered with palm leaves, raised on pillars to the height of eight or ten feet. The chief food is rice, which is often eaten with salted fish. M. Sonnerat has given some account of the interior part of the country, as far as he was able to penetrate it. At the distance of about a day's journey from the capital, he found himself buried in woods, no habitation nor appearance of cultivation presenting themselves to his view. Some scattered Indians, having their shoulders covered with the skins of wild goats, the rest of the body being naked, with a bow in their hands and arrows on their back, were discovered. Their looks were haggard, and their countenances very unprepossessing. They seemed to be timid and disposed to flee from the face of man, and even from one another. They have no society; they are solitary wanderers; stopping when night overtakes them, and sleeping in the hollows of trees. They have no families, and they seem to be constrained merely by instinct to sue the females whom chance has thrown in their way. After traversing the wood above-mentioned, M. Sonnerat was led to a large lake, in the middle of which is an island, where some Indian families have taken refuge; here they live by fishing, and preserve their liberty, suffering no one to land on the place, which serves them for an asylum. On the E.S.E. the lake is bounded by high mountains; the soil is fertile, and there are many fruit trees; and hence Manilla is supplied with fruit. These mountains are inhabited by a mild set of people, who employ themselves in making mats, cloth, and different works with the abacca, a kind of banana which bears no fruit, and of which the filaments are very strong. These people have laws, and punish crimes, the chief, in their estimation, being adultery. On the other side of the mountains, which bound the lake on the E.S.E., are immense plains, traversed by large and deep rivers, which diffuse fertility. Here are a few scattered villages inhabited by men, without morals, without virtue, without equity; who

who fear each other, and having no protection from laws, trust to the force of arms alone for their safety. In a word, they live in perpetual distrust and dread of one another. Nevertheless, says our traveller, the arts have reduced this savage nation, without softening their ferocious manners. Columba was the name of one of the largest villages possessed by this savage tribe; and on the day of his arrival the people had a grand festival, which they celebrated with divers spectacles. Part of these spectacles was the exhibition of a tragedy, and this was preceded by a cock-fight, and by other games, at which large sums were won and lost. Two leagues from Columba, in a village of less extent, was a rivulet, whose water was hot and boiling; and yet on the banks of this rivulet were vigorous shrubs; one of these shrubs was an "agnus castus," and the two others "aspalatus." The Spanish governor, conceiving that these waters possess some good qualities, has constructed near them several baths. Fish were found swimming in this water, the heat of which was so great, that our author could not touch it. In the interior of the country, he says, there are many nations, which the Spaniards have in vain endeavoured to subdue. No force is sufficient to subjugate them; but they fly to a distant asylum, and there it is said they swear an implacable hatred against the oppressors of their country, meditating and preparing means of vengeance. From thence they issue in mean boats; but fortified by courage, and animated by hatred, they dare to approach the gates of the capital. Their incursions are a succession of pillages, murders, ravages, and rapes. On leaving the village, traversed by the rivulet of hot water, our author took an easterly route, and after three hours' journey, found himself in an immense plain, which was watered and rendered fertile by a rivulet of clear, light, and wholesome water, that descended from the top of a neighbouring mountain. Large meadows were enamelled with flowers, whose variety of colour and perfume delighted equally the sight and the smell. The inhabitants were friendly and hospitable.

In some provinces of this island there are Pintadoes, that is, painted negroes, whose persons are tall, straight, strong, and active, and disposition excellent; and to the blacks, such as we have described, who live in the mountains and thick woods, the Spaniards have given the name of Negrillos; they are a rude and barbarous people. In the mountains, near springs, and in caves pleasantly situated, there is a nation called the Ilayas, or Tinghianos, who, as some suppose, are descended from the Japanese, as free as the Negrillos, but differing from them in disposition and character; for they are not only very brave, but very courteous and humane. This island is divided into provinces, most of which are under the jurisdiction of the Spaniards. The principal are the Balayan, in which are 2500 tributary Indians; in that of Camarinas is the city of New Caceres, the see of a bishop. Paracale contains 7000 Indians, who pay tribute to Spain; this province abounds in mines of gold and other metals, and of valuable load-stones. In Cagayan are 9000 tributaries; but the richest and most populous province is said to be that of Ilocos, whose coast extends upwards of 90 miles. There are several others, such as Pangasinan, Bahi, Balacan, &c. N. lat. $12^{\circ} 48'$ to $18^{\circ} 48'$. E. long. $120^{\circ} 6'$ to $124^{\circ} 10'$. See MANILLA.

LUCOTTA, a small island in the East Indian sea, near the W. coast of Sumatra. N. lat. $1^{\circ} 43'$. E. long. $97^{\circ} 25'$.

LUCRETIA, in *Biography*, a distinguished Roman lady, was the wife of Collatinus, a relation of Tarquin, king of Rome. Her accomplishments proved fatal to her;

and the praises which a number of young nobles at Ardea, who were attached to the Roman army, among whom were Collatinus and the sons of Tarquin, bestowed upon the domestic virtues of their wives at home was, in truth, productive of a revolution in the state. While each was warm with wine, it was agreed that they should instantly take their horses, and go to Rome to ascertain the fact how the wife of each was employed. The ladies of the Tarquins were found passing the night with their friends and relatives at a banquet, but Lucretia was employed in the midst of her female servants, and sharing their domestic labours. The beauty and innocence of Lucretia, who received her husband and the young princes with the most exquisite female grace, made such an impression upon Sextus Tarquinius, that he resolved, at whatever expence, to gratify the guilty and infamous passion which he had conceived. In a few days after, he left the camp in secrecy, and came to the house of Lucretia, who entertained and lodged him with a noble and unsuspecting hospitality; but, in return for her kindness, in the dead of the night he introduced himself to the virtuous lady, who refused to his intreaties, what her fear and shame granted to his savage threats. She submitted to the cruel wretch, whom he not only, with a drawn sword, threatened to murder, but to blast also her reputation, by killing one of her slaves, and putting him in her bed, that an apparent criminal connection might seem to have met with its deserved punishment. Tarquin left her in triumph, but his exultations were short-lived; she, who had lost her honour, had nothing left in life of any value: she assembled, in the morning, her husband, her father, and nearest relatives, revealed to them the indignities she had suffered, entreating them to avenge her wrongs, at the same time declaring that she was resolved to expiate her own fault by a voluntary death. To their intreaties, their arguments, and remonstrances, she turned a deaf ear, and while they were inventing new reasons why she ought to live to bear testimony against the monster, she drew a dagger that she had concealed for the purpose, and plunged it into her heart. Historians have given the accounts somewhat different; our account is that of Livy, but all agree that the melancholy catastrophe was the immediate cause of the expulsion of the Tarquins, and the change of the Roman form of government.

LUCRETIVS, TITUS CARUS, a celebrated Roman poet and philosopher, born about the year 96 B.C., was sent at an early age to Athens, where he is said to have studied under Zeno and Phaedrus. Here he imbibed the philosophical tenets of Epicurus and Empedocles, which, at that period, prevailed at the great seat of Greek learning; these and other doctrines, popular among the literati, he afterwards explained and elucidated in his celebrated work, entitled "De Rerum Natura;" it contains, in fact, the first complete and accurate statement of the Epicurean philosophy in the Latin language. In this poem the writer has controverted all the popular notions of heathenism, and even those points which are fundamental in every system of religious faith, the existence of a first cause, by whose power all things were and are created, and by whose providence they are supported and governed. Nevertheless, the masterly genius and unaffected elegance of the poet are every where conspicuous; his language and versification sometimes partake of the rudeness of an early period of literature, and in the argumentative parts of his work, the poet is frequently difficult to be understood; but where the subject admits of elevated sentiment and descriptive beauty, no Roman poet has taken a better sight, or exhibited more spirit and sublimity; the same animated strain is supported almost throughout

out entire books. Virgil studied him, and has borrowed much of his diction. This poem was written and finished while the poet laboured under a violent delirium, occasioned by a philtre, which the jealousy of his mistress or his wife had administered. The morality of Lucretius is generally pure, but many of his descriptions are licentious. The absurdities and impiety of his philosophy cannot in this country, and in this age, be accounted dangerous; and persons of high integrity and the greatest respectability have become, in modern times, the editors and commentators of Lucretius's poem. The best editions are those of Creech, 8vo. 1695, Oxon.; of Havercamp, Lugd. B. 4to. 1725, and of the celebrated Gilbert Wakefield, Lond. 3 vols. 4to. The last is exceedingly rare, on account of the fire which destroyed the greater part of the impression. Mr. Good, the translator of the poem, and whose work was published in 1805, has taken advantage of this circumstance, and has given the entire text from Mr. Wakefield's edition, which had been collated and printed with the utmost care by that learned and much-to-be-lamented classical scholar. In the translation just referred to, there are, besides elaborate annotations, a critical account of the principal editions and translations of his author, a history of the poet, a vindication of his character and philosophy from vulgar misrepresentation, and a comparative statement of the rival systems of philosophy that flourished in the time of Lucretius. In this poem the translator imagines he has discovered the inductive method of the illustrious Bacon; part of the sublime physics of sir I. Newton, and various chemical discoveries of our own days, in a surprising degree anticipated, as to their principles and many important results.

LUCRINO, in *Geography*, a lake near Naples, anciently celebrated for its green oysters and other fish, separated from the sea by an artificial bank. In the year 1538, an earthquake formed a mountain near two miles in circumference, and 200 feet in height; consisting of lava, burned stones, scoria, &c. which left no appearance of a lake, but a morass filled with grass and rushes.

LUCULLEUM MARMOR, in the *Natural History of the Ancients*, the name of a hard stony kind of marble, of a good fine black, and capable of an elegant polish, but little regarded from its want of variegations. When fresh broken, it is seen to be full of small, but very bright shining particles, appearing like so many small spangles of tale. It had its name from the Roman consul Lucullus, who first brought it into use in that city. It is common in Italy, Germany, and France. We have much of it imported, and our artificers call it the *Namur* marble, the Spaniards call it marble of *Buga*.

LUCULLIAN GAMES, in *Antiquity*, were annual games decreed by the province of Asia, about the year 70 before Christ, in honour of the exploits of Lucullus.

LUCULLUS, **LUCIUS LICINIUS**, in *Biography*, a Roman commander, who has been celebrated for his fondness for luxury, as well as for his military talents, was born about the year 115 before the Christian era, and being well educated, he soon distinguished himself by his proficiency in the liberal arts, particularly in eloquence and philosophy. As a military man, he was first noticed with applause in the Marston war, and was, on account of his good conduct, made an edile. He was employed by Sylla in many important concerns, and during the siege of Athens was sent by that commander into Egypt and Lybia, to procure a supply of ships. With respect to king Ptolemy he was unsuccessful, but he pleaded the cause of his employer with more effect in other places, and collected a fleet, with which he gave two defeats to that

of Mithridates, and convoyed Sylla's troops from the Thracian Chersonesus. After the peace he was appointed quaestor in Asia, and praetor in Africa, in which offices he rendered himself illustrious by his love of justice, moderation, and humanity. He was raised to the consulship when he was about forty years of age, and entrusted with the care of the Mithridatic war; his first proofs were conspicuous in rescuing his colleague Cotta, whom the enemy had besieged in Chalcedonia. This was soon followed by a celebrated victory over the forces of Mithridates, on the borders of the Granicus, and by the conquest of all Bithynia. His victories by sea were as great as those by land, and Mithridates was driven with great loss towards Armenia, to the court of Tigranes, his father-in-law. His flight was quickly discovered, and Lucullus crossed the Euphrates, and gave battle to the vast army which Tigranes had assembled to support the cause of his son. It is not easy to give entire credit to the account of the numbers said to have been slain on this occasion, but the slaughter must have been prodigious, when Plutarch estimates that not less than 100,000 foot, and 55,000 horse soldiers lost their lives in this battle; and this at the expence of a very few Roman lives. Lucullus is represented by Plutarch as having paid much attention to dreams and auguries, yet he certainly exhibited, at the same time, an avowed contempt of vulgar superstition, for being admonished by some of his officers not to give battle on that day, being the anniversary of a great defeat sustained by the Romans from the Cimbri, he replied to the monitor, "I also will make this a day to be remembered by after-ages." The taking of Tigranocerta, the capital of Armenia, was the consequence of the victory, and Lucullus there obtained the greater part of the royal treasures. This continued success rendered the commander haughty and imperious, and his changed manners were offensive to the soldiers, and displeasing to those who adhered to the cause of Rome. He was accused in the senate with designedly protracting the war for his own emolument, and discontents proceeded so far that he was superseded, first by the consul Glabrio; after which Pompey was sent to succeed him, and to continue the Mithridatic war. His interview with Lucullus began with acts of mutual kindness, and ended in the most determined enmity. Lucullus was however permitted to retire to Rome, and 1600 soldiers, who had shared his fortune and his glories, were allowed to accompany him. At Rome he was coldly received, and he obtained with difficulty a triumph which was claimed by his fame, his successes, and his victories. This was the termination of his military glory, he retired to the enjoyment of ease and peaceful society, and no longer interested himself in the commotions which disturbed the tranquillity of Rome. He now adopted a life of luxurious profusion, scarcely paralleled by a private citizen in any age or country, but under the direction of a refined taste, and not excluding the rational pleasures of literature. He collected a splendid library, which he threw open to all persons of learning and curiosity. It was particularly the resort of the Greeks who visited Rome, and whom he treated with great hospitality, delighting to converse with them on topics of philosophy, with all the doctrines and sects of which he was thoroughly conversant. He was himself principally attached to the doctrines of the old academy, the defence of which is put into his mouth by Cicero, in a dialogue entitled "Lucullus." Toward the close of his life, Lucullus fell into a delirium, and he died in about the sixty-eighth year of his age, and was much regretted by the Roman people, who doubtless had tasted the fruits of his munificence: they would willingly have given him an honourable funeral

in the Campus Martius, but their offers were rejected, and he was privately buried by his brother at Tusculum. Lucullus has been admired for his many accomplishments, but he has been censured for his severity and extravagance. The expences of his table were immoderate; his halls were distinguished by the different names of the gods, and when Cicero and Pompey attempted to surprise him, they were astonished at the collinefs of a supper which had been prepared upon the word of Lucullus, who had merely said to his servant that he would sup in the hall Apollo. In his retirement Lucullus was fond of artificial variety; subterraneous caves and passages were dug under the hills on the coast of Campania, and the sea-water was conveyed round the house and pleasure-grounds, where the fishes flocked in such abundance, that at his death they were sold for a very large sum of money. Lucullus may rank among the great men of Rome, both for his civil and military qualifications. He was also estimable in many points of moral character; he was generous, humane, mild, and equitable. He was a perfect master of the Greek and Latin languages, and employed himself some time in composing a concise history of the Marfi in Greek hexameters. Such are the characteristics of a man who meditated the conquest of Parthia, and who might have disputed the empire of the world with a Cæsar or Pompey, if his fondness for retirement had not withdrawn him from the reach of ambition.

LUCUMA, in *Botany*, the Peruvian name of the Linnean *Achras qummeja*, which Juslieu has separated, under this appellation, as a distinct genus; chiefly, as it appears, on account of the flowers being pentandrous and five-cleft, and the corolla globose rather than bell-shaped. The seeds moreover are round or angular, not of that elliptical compressed form, with the peculiar long fear of attachment, which characterizes *Achras*; see that article. See also Juss. 152, and *Sapota Achras*, Gærtn. t. 104.

LUCY-LE-BOIS, in *Geography*, a town of France, in the department of the Yonne, and chief place of a canton, in the district of Avallon. The place contains 830, and the canton 7886 inhabitants, on a territory of 242½ kilometres, in 16 communes.

LUCZAY, a town of Lithuania, in the palatinate of Wilna; 16 miles S. of Bresslaw.

LUCZYNCZ, a town of Poland, in the palatinate of Bracław; 48 miles W.S.W. of Bracław.

LUDAIA, a town and district of the island of Java, near the S. coast.

LUDAMAR, a Moorish country of Africa, bounded on the N. by the Great Desert, on the E. by Bambarra and Beeroa, on the S. by Kaarta, and on the W. by Jaffnoo. It is governed by a Mahometan prince. The country is not fertile; the principal article of trade is salt, which they procure from the Great Desert, and exchange for slaves, to be disposed of to the Europeans. The capital is Benown, or Benown. N. lat. 15 to 16°. W. long. 5° to 8°. The Moors of this, and the other states adjoining the country of the negroes, resemble in their persons the Mulattoes of the West Indies, to so great a degree as not easily to be distinguished from them; and in reality, the present generation seems to be a mixed race between the Moors (properly so called) of the north, and the Africans of the south; possessing many of the worst qualities of both nations. By these Moors Mr. Park was taken captive, and confined for some weeks at Benown. See **MOORS**.

LUDDINGHAUSEN, a town of Germany, in the bishopric of Munster, on the Stever; 12 miles S.S.W. of Munster. N. lat. 51° 45'. E. long. 7° 36'.

LUDE, *LE*, a town of France, in the department of the Sarthe, and chief place of a canton, in the district of La Fleche. The place contains 3018, and the canton 10,376 inhabitants, on a territory of 237½ kilometres, in 10 communes.

LUDENSCHEDE, a town of Germany, in the county of Mark, the principal trade of which consists in the manufacture of iron; 28 miles N.E. of Cologne. N. lat. 51° 8'. E. long. 7° 42'.

LUDER, a town of Germany, in the bishopric of Fulda, the seat of a jurisdiction; six miles W.N.W. of Fulda.

LUDGERSHALL, or **LUGGERSHALL**, a market and borough town in the hundred of Amesbury and county of Wilts, England. In the year 1800 this place contained 109 houses, and 471 inhabitants, most of whom are employed in agricultural pursuits. Ludgershall is a borough by prescription, and sent members to all the parliaments in the reign of Edward I. The returns were afterwards irregular, till the ninth year of Henry V., since which time it has continued to be represented by two members. Like the generality of small boroughs, this has occasioned some parliamentary investigation, and instances of bribery and corruption have been proved against its members. About seventy persons, who are freeholders, or lease-holders, in the borough, have the privilege of voting. The principal object of curiosity, or historical interest, in this town, is its castle; a small fragment of which only remains. According to a legendary account, but which is not entitled to much credit, this fortress was erected by king Lud, and thence obtained the name of Lud-gars-hall. Stow, in his Annals, relates that Richard I. gave this castle, with another at Marlborough, in the same county, to his brother John, in the first year of his reign. Gough, in his additions to Camden's Britannia, states that it belonged to "Geoffrey Fitz-Piers, the wealthy chief-justice of England, and earl of Essex." It was possessed by this family till the reign of Henry III., when Jolan de Nevill was appointed its governor. In the reign of Edward III. the manor, castle, &c. were vested in John, lord Molins, who obtained a grant from that monarch to impark the woods with 100 acres adjoining. See *Grove's Antiquities of England*, and Britton's *Beauties of Wiltshire*, vol. ii. p. 156, &c. West of this town is Chidbury, or Shidbury hill, said to be the highest eminence in Salisbury plain. Its summit is inclosed with an entrenchment, which is deep, and which Aubrey attributes to the Britons. From the top, a ditch extends down the northern slope, and terminates at the bottom, where the inequality of the ground shews that a permanent encampment, or town formerly existed. The open downs in this part of the county abound with barrows, or tumuli of various sizes, and encampments. See *Stukeley's Account of Stonehenge*, and *Hoare's Ancient Wiltshire*.

LUDHANA, a town of Hindoostan, in the circar of Sirhind, on the Settledge; 18 miles N.W. of Sirhind. N. lat. 30° 2'. E. long. 74° 57'.

LUDHOA, a town of Sweden, in East Botania; 36 miles S.E. of Brahestad.

LUDI CIRCENSES. See **CIRCENSES**.

LUDI Cereales. See **CEREALES**.

LUDI Florales. See **FLORALES**.

LUDI Juveniles. See **DECEMBER**.

LUDI Trojanæ. See **TROJANI**.

LUDIA, in *Botany*, from *ludo*, to sport. The name was given by Commerlon, as Juslieu informs us, because nature, to use a common expression, sports remarkably in the shape of the leaves; which in the young shrub are minute,

with spinous teeth, but in the adult one much larger, and entire.—Juss. 343. Lamarck Dict. v. 3. 612. Illustr. t. 466 Willd. Sp. Pl. v. 2. 1129.—Class and order, *Polyandra Monogynia*. Nat. Ord. *Rosacea*, Juss.

Gen. Ch. Cal. Perianth inferior, of one leaf, in from four to seven deep, nearly equal, roundish, spreading, fringed segments, permanent. Cor. none. Stam. Filaments numerous, thread-shaped, inserted into the receptacle, twice or thrice the length of the calyx; anthers roundish, of two lobes. Pist. Germen superior, sessile, ovate; style columnar, scarcely so long as the stamens; stigma obtuse, three or four-cleft, more or less deeply. Peric. Berry dry, globose, tipped with the permanent style, and standing on the rest of the deformed, permanent calyx, of one cell. Seeds numerous, somewhat angular.

ET Ch. Calyx in several deep segments. Corolla none. Stigma three or four-cleft. Berry dry, superior, of one cell, with many seeds.

Obs. This genus is evidently most nearly allied to *Prockia*, and wherever the latter is placed, in a natural or artificial system, this must go along with it. Both seem to belong to the *Leglandria*, but they have been universally classed in *Polyandria*. Jacquin indeed asserts that the stamens of his *Ludia tuberculata* are inserted into the receptacle; but, on the other hand, the *Prockia integrifolia*, Willd. Sp. Pl. v. 2. 1214, is as truly icelandrous as the strawberry or any other plant can possibly be, though Lamarck's figure, t. 465 f. 2, does not express it. He has, moreover, made the serratures of the leaves too strong, they being very shallow in the original.

1. *L. heterophylla*. Lamarck n. 1 t. 466. f. 1, 2.—Leaves of the adult shrub obovate, coriaceous, shining; of the young one sharply toothed. Stigma slightly notched.—Gathered by Commerçon in the island of Mauritius, where it is called *Bois sans ecorce*, or tree without bark. Lamarck describes and figures the young shrub with small roundish leaves, furnished with strong spinous teeth, somewhat like *Quercus coccifera*, or *Malspigia coccifera*. Jussieu also relates the same. We have seen no specimens in this state. Our's is an adult one, with coriaceous, obovate, obtuse or emarginate, entire, alternate leaves, an inch or an inch and half long, broad, veiny, and shining, paler beneath, on strong footstalks, half an inch in length; see Lamarck's fig. 1. We find no stipulas. The flowers are axillary, solitary or in pairs, on short, thick, scarred stalks, with numerous, minute, imbricated, roundish concave bractlets at the base of the stalks. The calyx is green, finely downy. Stamens long and slender. Style short, erect and thick, with a slightly notched, very little enlarged, stigma.

2. *L. myrtifolia*. Lamarck n. 2. t. 466. f. 3. —Leaves ovate, nearly entire. Style somewhat curved. Stigma with three notches.—Native of the isle of Bourbon.—This is what Jussieu intends when he says the leaves of the increasing shrub (in *Ludia*) are like myrtle or box, and entire; as however the specimens are in flower, Lamarck judged them to be arrived at perfection, and a distinct species from the above; especially as the style is somewhat incurved, and the stigma has only three notches, instead of four. We are totally unable to form any decided opinion on the subject. The leaves of the present plant are much smaller, thinner, and generally more pointed than in the former; but we perceive here and there among them rudiments of teeth, and minute spines, as if they were in a progressive state from one shape to the other. Neither are the differences indicated in the style and stigma very striking or decided. We are therefore not inclined to adopt the opinion of Jussieu, that the present is only the advancing, or first-flowering, state of the

above very extraordinary species. We have moreover a specimen, gathered by Commerçon in Madagascar, which is evidently intermediate in the form, margin, and texture of its leaves, betwixt this *myrtifolia* and the adult *heterophylla*.

3. *L. sessiflora*. Lamarck n. 3. (*L. tuberculata*; Jacq. Hort Schoenbr. v. 1. 59. t. 112.)—Leaves elliptic-lanceolate. Stigma deeply three-cleft.—Native of the island of Mauritius. It flowered under Jacquin's observation, in the stove at Schoenbrunn, in June and July, and formed imperfect fruit, which he thought did not agree with Jussieu's character, and which Willdenow has, from his figure, described as being, in this species, a berry of three cells, with solitary seeds. But we presume nothing can be judged from such an abortion. We should have preferred Jacquin's specific name to Lamarck's, as the flowers are rarely sessile, had it not been equally applicable to both the former. This is a small tree, with drooping, subdivided branches. Leaves scattered, stalked, more or less elliptical, but rather irregular in shape, coriaceous, veiny, smooth and shining, both sides nearly of the same hue. Flowers axillary, solitary; in our specimen nearly as much stalked as in the above. Calyx all over very downy. Germen large, and rather elevated. Style divided, almost half way down, into three blunt cloven stigmas.

LUDITZ, in *Geography*, a town of Bohemia, in the circle of Saatz

LUDLOW, EDMUND, in *Biography*, a distinguished leader of the republican party in the civil wars of Charles I., son of sir Henry Ludlow, knight, was born about the year 1620, and received his academical education at Trinity college, Oxford, whence he removed to the Temple to study the laws and constitution of his country. His father was representative for Wiltshire in the Long parliament of 1640, and having joined the party in opposition to the court measures, Edmund adopted the same principles, and entered into a military association among the students of law, with whom he joined the army as one of the life-guards of the earl of Essex. In this situation he was present at the battle of Edgehill, in which it appears that he endured much personal fatigue and suffering. Speaking of the night after the battle, he says, "No man nor horse got any meat that night, and I had touched none since the Saturday before; (this was Monday,) neither could I find my servant, who had my cloak, so that having nothing to keep me warm but a suit of iron, I was obliged to walk about all night, which proved very cold by reason of a sharp frost." And he farther adds, "when I got meat, I could scarcely eat it, my jaws, for want of use, having lost almost their natural faculty." Soon after this, Ludlow raised a troop of horse, which he commanded at the siege of Wardour castle. Of this fortress, when taken, he was made governor, and he held it ten months against all the efforts of the king's party, till it was battered to ruins. He was taken prisoner on its surrender, but was soon exchanged, and then appointed by the parliament sheriff of the county of Wilts. He took a commission under sir William Waller, was present at the second battle of Newbury, and at several other important actions, in which he displayed equal valour and good conduct. When the leaders of the presbyterian party were thrown out of power by the self-denying ordinance, Ludlow seceded with them, and remained without public employment till he was chosen, in 1645, knight of the shire for the county of Wilts, in the place of his father, who died two years before. At this period the plans of Cromwell began to be developed, and Ludlow was one of those who opposed them with the greatest firmness and openness. He appears to have acted with principle,

iple, and his measures were all the result of integrity and honour. He was one of the king's judges, and soon after that event, Cromwell, to keep him out of the way, caused him to be nominated lieutenant-general of horse in Ireland, and one of the commissioners for civil affairs. After the death of Ireton, the chief command of the army devolved on Ludlow, but as he continued to oppose the ambitious projects of the protector, he was, in a very short time, superseded. He was afterwards imprisoned, but being admitted into the presence of Cromwell, he vindicated his own conduct and the republican principles on which he acted with great freedom and presence of mind, and could not, by any means, be induced to make any engagement for future submission. When Richard was declared protector, Ludlow, with other republicans, joined the army party of Wallingford-house, and was instrumental in the restoration of the Long parliament, in which he took his former seat; was appointed one of the committee of safety, and had likewise the command of a regiment. He was again sent to Ireland as commander-in-chief of the forces there, and his first care was to fix the officers in the interest of parliament. When he found things taking a decided turn towards monarchy, he hastened to London with a view of preventing this change, and when he found the effort hopeless, and that the tide of public inclination in favour of a king was irresistible, he began to consider of his own safety. His name was not among the seven excepted in the bill of indemnity; nevertheless, the proclamation respecting the person who sat in judgment on the late king Charles filled him with just apprehension, and notwithstanding the remonstrances of his friends to the contrary, he determined, as his safest course, to withdraw from the kingdom. He landed at Dieppe in 1665, whence he proceeded to Geneva, where he was joined by two other persons who had likewise been judges of the late king, but thinking themselves not sufficiently secure they withdrew into Switzerland. Even here, the vengeance of the royal family pursued the regicides, some of whom were actually assassinated by the agents of the English government; an attempt was made against the life of Ludlow, but being discovered, he evaded the blow, and passed the remainder of his life in the neighbourhood of Berne, highly respected and esteemed by the magistrates and people of that city, as well for his private virtues as his public character. In 1689 he ventured to come over to England, and appear openly in London; but a motion being made in the house of commons for an address to the king to issue a proclamation for his apprehension, he returned to the continent, and closed his life in exile, at the age of seventy-three. A monument was erected to his memory, in the principal church at Vevay, by his widow, who had been the faithful and courageous partner in all his fortunes. Edmund Ludlow was undoubtedly one of the purest and most disinterested persons who flourished in those times. He was equitable and humane, calm and sedate, yet resolute; virtuous without austerity, and pious without fanaticism. His "Memoirs" were first printed at Vevay, in two vols. 8vo. 1698, to which, in the following year, another volume was added. They were reprinted in one volume folio, London 1751; to this edition was added "The Case of king Charles I.," drawn up by John Cook, solicitor to the high court of justice on his trial. In the same year, the work was printed in three vols. 12mo. at Edinburgh. An edition in 4to. was published in 1771. The "Memoirs" contain an account of the author's own transactions during the civil wars, and the subsequent period, together with many particulars relative to the general history of the times, written in a clear, interesting, and unaf-

fect style. Biog. Brit. Ludlow's Memoirs, three vols. 12mo.

LUDLOW, in *Geography*, a market-town, situated in the hundred of Munslow, and county of Salop, England. It stands on an eminence at the junction of the rivers Teme and Corve, in a fertile and picturesque district, and commands a variety of beautiful prospects. The ancient British name of this place was *Dinan Llys Tywysog*, or the *Prince's Palace*. Hence it is supposed to have been the residence of some prince of the country, prior to the subjection of Wales by Edward I. This town extends about a mile in length, and in its broadest part is somewhat more than half a mile in that direction. It was formerly surrounded by a wall, some part of which is still standing, but in a state of great dilapidation. Towers were placed at certain distances, and there were formerly seven gates, of which only one now remains. The streets are mostly wide, and well paved, and lie in a diverging and inclined direction from the highest or central part of the town. The houses, in general, present rather an elegant appearance, and are more regularly disposed than in most inland towns of the same antiquity. They are chiefly occupied by families of independent fortune, who are attracted by the healthful situation of the place. Glazes constitute the principal manufacture, besides which, however, there is a considerable trade in the tanning, timber, and cabinet-making lines. A number of persons are likewise employed in the various branches of mechanism. There are four markets during the week, but the most important one is held on Monday, and is well supplied with every article necessary for the support of man.

Ludlow, according to the parliamentary returns of 1801, contained 804 houses, and 3897 inhabitants. It was incorporated by charter in the reign of Edward IV. The government is now vested in a recorder, two bailiffs, two capital justices, twelve aldermen, twenty-five common councilmen, a town clerk, a coroner, and several other inferior officers. The election of the bailiffs is usually attended with a degree of magnificence and splendour far surpassing the same ceremony in other towns of similar extent. The quarter-sessions are held here before the recorder and justices of the town, who, in former times, had the power of inflicting capital punishments, but all criminals liable to death are now removed to the county gaol at Shrewsbury. There is a court of record every week, in which the recorder and bailiffs sit as judges. This place sends two members to parliament, who are chosen by the common burgesses, amounting to about 500 in number.

Several of the public buildings of Ludlow are remarkably neat structures. The church, situated in the highest portion of the town, is a very spacious and elegant edifice, in the form of a cross, and seems to have been built in the reigns of Henry VII. and VIII. In the centre rises a lofty square tower, embattled at the top, and very handsomely embellished. This tower adds in no small degree to the beauty of many of the views from the neighbouring country. The principal entrance to the church is under a large hexagonal porch. The nave is divided from its aisles by six lofty pointed arches on each side. The choir is of large dimensions, and lighted by five lofty pointed windows on each side, and one at the east end, which occupies the whole breadth, and nearly the whole height of the choir. This great window is entirely filled with painted glass, representing chiefly the legend of St. Lawrence, the patron saint of the church. On each side of the choir stands a chantry chapel. That on the north exhibits some very splendid remnants of painted glass, portraying the story of the ring presented by some pilgrims to Edward

Edward the confessor; which pilgrims the legend recites were *men* of Ludlow. The whole of this noble church is coiled with fine oak, and embellished with carving. It is 228 feet in length, and 73 in breadth. In the chancel are many fine monuments of the lords presidents of the council of Wales, who resided in the neighbouring castle. A variety of tombs likewise appear in the church-yard, adjoining to which stands an alms-house, founded in 1486, by Mr. John Hoffer, merchant, for aged widows and widowers, and rebuilt by the corporation in 1758. Another alms-house, situated at the bottom of Corve street, was founded in the year 1590. The grammar-school, erected by Edward IV. in Mill-street, is a very excellent institution, where both the ancient and modern languages are taught. Nearly in the centre of the town, at the top of Broad street, stands the cross, a handsome stone building, with rooms over it used as a public school. The market-house, in Cattle-street, is a large building; beneath which is an area, serving as a corn-market, and the upper rooms, which are very extensive, are used for corporation meetings, balls, assemblies, &c. The guild-hall, where the quarter sessions, &c. are held, is a neat, commodious, modern structure, and to the west of the church stands a range of buildings, called the College. There is likewise a prison, named Goalford's tower.

But the object of greatest interest in Ludlow, and that to which it owes its celebrity and importance, is its castle, which stands on a bold wooded rock at the north-west angle of the town. It was founded, according to the generally received opinion, by Roger de Montgomery, about the year 1130, though some writers maintain it to be of earlier origin. Much, however, was added by others at different periods, particularly by sir Henry Sidney. Robert de Belesme, grandson of the founder, having engaged in rebellion against Henry I. it was seized by that monarch. The castle, now made a princely residence, was greatly augmented in the strength of its fortifications, and supplied with a numerous garrison. In the reign of king Stephen it was besieged in consequence of the governor, Gervas Paganel, having been induced to espouse the cause of the empress Matilda. With respect to the event of the siege, different accounts are handed down to us by historians, some asserting that the king succeeded in reducing it, and others, that finding it impregnable, he was compelled to abandon the attempt. Speed says, that the governor, repenting of his conduct in withdrawing from his allegiance, proposed a capitulation highly advantageous to the garrison, which was joyfully accepted. During this siege, Stephen gave a signal proof of his personal bravery, in rescuing prince Henry of Scotland, who had advanced too near the walls, and had been caught from his horse by a grappling iron, fastened to the end of a rope. In the troublesome reign of Henry III. the ambitious Simon Montfort, earl of Leicester, seized upon this castle, in conjunction with Llewelin. From this period nothing remarkable happened till the time of Henry VI. when it was held by Richard duke of York, who laid claim to the crown. Having assembled an army of ten thousand men in the Marches, he drew up a declaration of allegiance to the king, pretending that this large army was only raised for the security of the public peace. Time, however, disclosed the perfidy of his views; for no sooner was he informed of the defeat of lord Audley at Bloreheath, but he threw off the mask, avowed his pretensions to the throne, and appointed the castle of Ludlow as a place of rendezvous for his adherents. Upon this, the king's forces advanced to Ludford, a vill at a little distance from hence. The king's troops preparing for the attack, the duke's forces

began to disband. Sir Andrew Trollop likewise went over to the royal standard with a large body, whereupon the duke and his two sons, with the earl of Warwick and other chiefs, fled with precipitation. Edward, his eldest son, obtained possession of Ludlow in the course of the war, and upon his accession to the throne repaired it, and made it the court of his son the prince of Wales. Here the latter, after his father's death, was proclaimed king before he removed to London, at the instigation of his uncle, Gloucester, whose barbarous usurpation is not paralleled in the annals of England. Arthur, son to Henry VII. fixed his residence at this castle, and held a court here with vast splendour and magnificence after his marriage with Catharine of Arragon, afterwards the wife of Henry VIII. At this time the court of the Marches for the principality of Wales was established here, and continued for many years with much grandeur and solemnity. The power of this court was very extensive, and consisted of a lord-president, as many counsellors as the prince pleased, a secretary, an attorney, a solicitor, and four justices for the counties of Wales. King Charles I., when prince of Wales, visited this castle. It was next distinguished by the representation of the celebrated Masque of Comus in 1634, during the presidency of John earl of Bridgewater. This exquisite effusion of Milton's genius was founded on a real incident. The two sons of the earl, and his daughter lady Alice, being on their way from a house belonging to their family in Herefordshire to Ludlow,

"To attend their father's state
And new intrusted sceptre,"

were benighted in Haywood forest, where the lady was lost for a short time. The adventure being related to the earl on their arrival at the castle, Milton, at the request of his friend Mr. Henry Lawes, who taught music in the family, wrote the Masque. Lawes set it to music, and performed the character of the attendant spirit; the lady herself playing the part which she had already acted in real life. The patronage afforded to the muse of Milton, at this period, by the earl of Bridgewater, does great honour to that nobleman.

During the civil wars in the reign of Charles I. this castle was for some time kept as a garrison for the king. In 1645, a small part of the royal army was defeated in this neighbourhood, and on the 9th of June, in the following year, the fortress was surrendered to parliament. After the restoration, the celebrated Samuel Butler, secretary to the earl of Carbery, then appointed lord president, wrote here a great part of his incomparable poem of Hudibras. From this period nothing remarkable happened till the reign of William and Mary, when the court of the Marches was dissolved by act of parliament, being, as therein recited, "a great grievance to the subject." After this event the castle gradually fell into decay, and was despoiled of its curious and valuable ornaments. In the days of its prosperity it seems to have been one of the most extensive and superb baronial fortresses in Europe. It commands grand and extensive prospects, and is strongly environed by embattled walls of great height and thickness, with towers placed at convenient distances. That portion of it which lies nearest the town, was likewise defended by a deep ditch. The whole was divided into two distinct parts or courts, one of which contained the palace and lodgings, and the other the court of judicature and records, stables, garden, and other offices. The former constituted what was properly denominated the Castle, and the latter was called the Green or Barbican.

bican. This noble fabric now presents a mass of magnificent ruins, retaining, however, ample assurances of its former glory. Of the chapel, a circular building, in the inner court, is all that remains. Over several of the stable doors the arms of Elizabeth and the earl of Pembroke are still visible, and over the inner gate of the castle are the arms of the Sidney family, with an inscription beneath. Along the sides of the eminence on which these splendid ruins are seated are some public walks, which were laid out in 1772, at the instigation of the counts of Powis. Part of Ludlow castle has been recently occupied by Lucien Buonaparte, his family, and suite, who are prisoners of war in this country.

The neighbourhood of Ludlow abounds with gentlemen's seats and agreeable villages. In the village of Bromfield are the remains of a cell of Benedictine monks, formerly belonging to the abbey of St. Peter, Gloucester. These ruins stand on a delightful situation within the grounds of Oakley park, the residence of the dowager lady Clive. Richard's castle lies about three miles from Ludlow. The town contiguous was originally called Gayton or Boytane, but the lustre of the castle afterwards eclipsed that name, and it is now called by the same appellation as the castle. This was once a place of considerable importance, as is evident from several old records prior to the time of Henry II. when it began to decay, in spite of the exertions of the noble family of Mortimer to support its declining state. Some part of the keep and walls of the castle are still remaining. About four miles N.W. of the town is Downton castle, the seat of — Knight, esq., brother to R. P. Knight, author of a poem called "The Landscape," and of several other literary productions. This gentleman built an irregular and singular mansion here, and called it a castle. He also laid out the grounds, immediately adjoining the house, in a style corresponding to his theoretical principles of the picturesque. On this subject both Mr. Knight and his friend Mr. Price have published some essays. The grounds and woods of this demesne are particularly bold, grand, and diversified. See the Ludlow Guide by J. Price, 18mo. 1797. Also an Historical Account of Ludlow Castle, &c. by W. Hodges, 1794.

LUDLOW, a township of America, in Hampshire county, Massachusetts, 90 miles W. of Boston; incorporated in 1784, and containing 650 inhabitants.—Also, a township on Black river, Windsor county, Vermont, containing 410 inhabitants, 10 or 12 miles W. of Weathersfield, on Connecticut river.

LUDOLF, Jon., in *Biography*, a learned orientalist, born in 1624 at Erfurt, in Thuringia, was educated in the university of his native place, paying particular attention to the study of jurisprudence and of the learned languages, especially those of the East. With the view of farther improvement he travelled into foreign parts, and was from home during six years, when he returned to Erfurt, where he exercised the functions of a counsellor for nearly twenty years of his life. He frequently assisted at the diets held upon the subject of the contentions between the dukes of Saxony and the archbishops of Mentz. At length, weary of public business, he obtained leave to retire, and chose for the place of his retreat the city of Frankfort on the Mayne: but scarcely had he settled his family, when the elector palatine placed him at the head of his finances. In his service he made two journeys to France, where he consulted the libraries of Paris, in order that he might make some advances in his favourite studies. At length he returned to Frankfort, and employed himself in finishing and revising the different works which he had composed. He died in 1704, universally esteemed; he has been characterized as equally fitted

for the dispatch of public business, and the retired pursuits of the closet. He was author of a great number of works, of which the principal are, "Historia Æthiopica," folio; "A Commentary on the same;" and an "Appendix." In these works the history, religion, and manners of the Ethiopians are detailed at length. He also published an "Abyssinian Grammar and Dictionary," folio; "Dissertatio de Locustis," folio; "Fasts Ecclesiae Alexandrinae;" "De Bello Turcico feliciter Consiendo." Moreri.

LUDOLF, HENRY WILLIAM, nephew of the preceding, was born at Erfurt in the year 1655. He was well educated, and was particularly instructed in the Oriental languages. He was a man well calculated for public business as well as deeply learned: he obtained the post of secretary to the envoy from Christian V. king of Denmark to the court of Great Britain, who recommended him to prince George of Denmark, by whom he was appointed secretary in 1686. This situation he held some years, till a very violent fever rendered him incapable of discharging its duties, when he retired with a handsome pension. As soon as his health would permit he set out on his travels to foreign countries. He first went to Russia, and having soon acquired its language, he met with a polite reception from the natives, and being a good performer in music, he had the honour of displaying his accomplishments in this art before the czar of Moscow, to the surprize and delight of that prince. The various knowledge which he discovered in his conversations with the Russian clergy led them to consider him as a prodigy of learning. He arrived in London in 1694, when he underwent an operation of cutting for the stone. Having recovered, he applied himself to the composition of "A Russian Grammar;" intended for the use not only of traders and travellers, but of the natives themselves, by exhibiting the principles of their language in a more regular form than had been laid down before. This work was printed at Oxford in 1696. Ludolf's curiosity led him next into the East, that he might obtain information concerning the state of the Christian church in the Levant. He arrived at Smyrna in November 1698, whence he went to Jaffa, from Jaffa to Jerusalem, and from thence to Cairo. As soon as Ludolf had returned to England, his reflections on the deplorable state of Christianity among those who professed that religion under the Turkish government, induced him to undertake an impression of the New Testament in the vulgar Greek, and to present it to the members of the Greek church. He was very desirous that the Protestant powers of Europe should establish a kind of college at Jerusalem, and that the persons selected for such an institution should not be devoted to the propagation of the peculiarities of any particular systems concerning which Protestants differ among themselves, but united by an agreement in the fundamental principles of the gospel, and by universal love and charity. In the year 1709, Ludolf was appointed by queen Anne one of the commissioners for managing the money collected for the relief of the Palatines, who had been driven from their native country. He died in 1710. He was author of several works besides his "Russian Grammar," which were collected and published in the year 1712. Gen. Biog.

LUDOLFFIA, in *Botany*, a genus of Adanson's, (Familles des Plantes, v. 2. 244.) named by him after Michael Matthias Ludolff, author of a catalogue of the plants of the garden at Berlin, where he was professor of Botany and Materia Medica, and where his book was printed in 1746. He published also a German Pharmacopoeia in 1734; and wrote on the subject of botanical classification, in the Mem. de l'Acad. de Berlin for 1745, where, according to Haller, he rejects the flammens as well as the cotyle-

cotyledons for the purposes of arrangement. We have not seen this treatise. What he offers relative to this matter and others, at the end of his work first mentioned, gives no exalted idea of his judgment. The above name has never been established, the plant of Adanson being esteemed a *Tetragonia*. It is curious that Boehmer, in his dissertation upon plants named after botanists, supposes the *Ludolfia* to have been called after Job Ludolf, author of the *Historia Ethiopiae*, being ignorant, as it seems, of the existence of the Berlin professor; but we can have no doubt that Adanson meant to commemorate the latter.

LUDSCHEN, in *Geography*, a town of Prussia, in Oberland; 7 miles E.S.E. of Marianwerder.

LUDSWIGSBURG, a town of Wurtemberg, containing two churches, one for Roman Catholics and another for Lutherans, and a fine picture gallery, a pleasant garden, and an old castle. The manufactures of this place are cloth, damask linen, and marble paper: 16 miles S. of Heilbronn. N. lat. 48° 54'. E. long. 9° 18'.

Though Stuttgart was in 1772 the nominal capital of the duchy of Wurtemberg, it had not, for the preceding ten years, been the residence of its sovereign. And though the operas and musical establishments of this prince used to be the most splendid in Europe, during the seven years' direction of Jomelli, they were, at the time just mentioned, but the shadow of what they had been. In Burney's German Tour, there is a list of his serene highness's musical establishments, at their most flourishing time, as well as at that of their declension.

In 1771 he had two new serious operas, the one composed by Jomelli, and the other by Sacchini, entirely at his own expence. The theatre is immense, and is open at the back of the stage, where there is an amphitheatre in the open air, which is sometimes filled with people to produce effects in perspective. It is built, like all other German theatres, on the Italian model.

The prince who reigned in 1772 was himself a good harpsichord player; Emanuel Bach dedicated to his highness the best book of six sonatas which he ever composed, printed at Nuremberg. At one time this duke had in his service three of the greatest performers on the violin in Europe; Ferrari, Nardini, and Lolli: on the hautboys, the two Pla, and Schwartz, a famous bassoon, with Walther on the French horn, and Jomelli to compose, for the best serious and comic singers of Italy. At Solitude, a favourite country palace, a conservatorio was established for the education of two hundred poor and deserted male children of promising talents; of these a great number were taught music, and from these his highness had already drawn several excellent vocal and instrumental performers for his theatre; some were taught the learned languages and cultivated poetry; others were initiated into the practice of the stage, as actors and dancers. At Ludwigsburg there was a conservatorio for a hundred girls, who were educated in the same manner, and for the same purposes. The building constructed at Solitude for the reception of the boys, has a front of six or seven hundred feet. It used to be the favourite amusement of the duke to visit the school, to see the children dine and take their lessons.

LUDUS HELMONTII, so called from Van Helmont, who extolled its medicinal virtues, in *Natural History*, an opaque fossil of an irregular shape, but of a very regular and singular internal structure. It is of an earthy hue, and always divided into separate masses, by a number of veins of a different colour, and purer matter than the rest. These masses, into which it is divided, are sometimes small and pretty regularly figured; in which case, they are called *talli*

or *ludi, dice*; but they are more frequently of no regular shape at all. There are others of them crullated, or composed of many coats, disposed one over another about a central nucleus. In these the *septa*, or dividing veins, are very thin and fine, in the others thicker.

These septa were used in medicine, being given in nephritic complaints, as it has been said, with success: the dose from a scruple to a drachm.

LUDWIG, CHRISTIAN THEOPHILUS, in *Biography*, was born in Silesia in 1709, and educated for the medical profession. Having a strong bias towards natural history, he was appointed to accompany Hebenstreit in his expedition to the north of Africa. (See *HEBENSTREIT*.) Soon after his return in 1733, he became Professor of Medicine at Lipsic. The first thesis defended there under his presidency, in 1736, related to the manner in which marine plants are nourished. These he shewed to differ essentially from the generality of the vegetable kingdom, as not deriving their nourishment by the root. In 1737 he published a *Programma* in support of the doctrine of the sexes of plants, from his own observations upon the date palm. Two years afterwards he, nevertheless, advanced some objections to the Linnæan system of arrangement by the organs of impregnation, under the title of *Observations in Methodum Plantarum Sexualem Cel. Linnæi*. This work begins with much just commendation of Linnæus, and even with great admiration of his system; accompanied however by an attempt at depriving him of the merit of originality, by insinuating that this system had been "indicated by others;" without saying by whom. These words are underlined by Linnæus in his own copy of the dissertation. They are as little to the purpose as the similar charge of plagiarism brought against the immortal Harvey. He proceeds to detail various difficulties and mistakes, which occurred to him in his scrutiny of this system, some of which relate to matters of opinion, others to anomalies or variations in Nature herself. His remarks however are free from asperity or illiberality. He chiefly fails, in point of judgment, when he blames Linnæus for making any particular character important in one genus or family, and not in all; not perceiving that the very essence of skill, in technical discrimination and arrangement of natural productions, consists in discovering, in each particular case, what is the most essential for the purpose in view. We do not see why his dissertations, "*de minuendis plantarum generibus*," published in 1737, and "*de minuendis plantarum speciebus*," in 1740, should be deemed inimical to Linnæus, to whom he gives full credit for having established the surest principles for the advancement of botany, though he criticises him here and there in the detail of their application. He also wishes to indicate some sources of discrimination, which Linnæus has less regarded, for the accomplishment of the same objects; particularly mentioning the anatomy of plants. He points out the colours of flowers as sometimes affording permanent specific distinctions, though Linnæus has in general discarded them from his characters. It must be allowed that Ludwig, in this and other instances, seems prompted by a desire to differ and to find fault; for Linnæus himself founds his primary divisions of species in *Mesembryanthemum* and *Cnaphalium*, no matter whether judiciously or not, upon this very circumstance. Such critics however are useful to science, as they promote enquiry and examination. Ludwig justly blames Linnæus for confounding the bulbous *Fumaria* as one species, and he may also be correct in some other remarks. The late lord Bute has well observed, that Ludwig, like Haller, was only a Linnæan in disguise, having frequently applied principles in unison with his, if not imbibed from him,

him, to build systems, and to exercise criticism, against him. Ludwig, in 1756, 1758, and 1759, published three dissertations on the colours of flowers, tending to shew their variableness! If he has in one instance suggested an example to the contrary, he is in that surely most unfortunate. Haller says he points out the *Fraxinella* (*Dictamnus albus* of Linnæus) as a case in which colour makes a specific difference. As this plant is frequently raised from seed, and the progeny differs, under every body's eyes, in having some white-flowered plants, perhaps in every crop, we presume the question may be readily decided; whether the lesser White *Fraxinella*, figured in Rivinus, Fl. Pentap. Irr. t. 135, be a distinct species, of which we see little probability, or a variety in size as well as colour. Rivinus himself says the common one, t. 134, is either red or white.

Ludwig published in 1737 his *Definitiones Plantarum*, in 8vo. for the use of his pupils. In this the genera of plants are arranged in a method supposed to be natural, founded on the corolla in the first place, the subordinate characters being taken from the fruit. The generic distinctions are derived from the herbage, flower, smell, taste, colour, or any thing that came in the author's way; certainly with no advantage whatever over the laws and practice of Linnæus, but rather evincing, at every step, the superiority of the latter to the vague scheme of his opponent. In another little volume of Ludwig, the *Apherismi Botanici*, published in 1738, the assertion of his being "a Linnean in disguise" is strongly justified. In vain does the writer try to forget the *Philosophia Botanica*, and to seek originality, at any rate, by wandering from its light. In vain does he extol the system of Rivinus in preference to all others. He is brought back by his own judgment, in spite of himself, at every step; and as he could never give the least degree of popularity to the system he extolled, the slightest study of his works will shew it to have been a mill-stone about his own neck. Boehmer gave a new and improved edition of the *Definitiones Plantarum* in 1760. Whether any use is made of this work at present, among the various botanical schools on the Continent, we have never heard, but we believe it has fallen into oblivion.

In 1742, and again in 1757, our author published his *Institutiones Historico-Physicæ Regni Vegetabilis*, in 8vo.; still in pursuit of novelty rather than of truth, he rejects the Linnean distinctions between animals and vegetables, founding the characteristic mark of the latter on the supposed propulsion of their fluids through a cellular texture, and not through a vascular system as in animals. This distinction is now known to have no foundation. In this work at length even the disguise of a Linnean is almost laid aside, a system of arrangement being proposed in which the stamens and styles make an essential, if not a leading, feature. The favourite old system of Rivinus still takes precedence, though it serves only as an additional impediment in the way of natural affinities, which defect is in some measure concealed by the primary characters not being strictly followed. Thus, though *Eryngium* is violently separated by its inflorescence from its natural allies, *Ilex* is silently left amongst the *Tetrapetalæ regulares*. The *Umbellati* are kept together by their inflorescence, in spite of the diversity of their flowers, as to regularity or irregularity; a difficulty which Rivinus had previously been obliged to overlook. It is remarkable that our author, in thus professedly adopting the principles of Rivinus and Linnæus combined, and disclaiming as he does, p. 86, all pretensions to originality, never mentions those persons from whom he had long ago asserted that Linnæus borrowed his system. This volume may therefore be considered as a tacit tribute of respect to

the illustrious Swede, arising from its author's progress in judgment and experience. He had no motive to withhold this tribute, as Linnæus never resented nor repelled his attacks. The latter says in a letter to Haller, "I have read the Characters of Dr. Ludwig entirely through. He has given very great attention to the subject; but I with the authors whom he chiefly follows may not have led him astray. All that comes from Boerhaave is not oracular. I every day augment or correct my own characters, which are nothing but generic descriptions, and therefore differ from those of Ludwig and Tournefort, as a specific name (or definition) differs from the description of a plant. Both are necessary in Botany." *Epist. ad Hallerum* v. 1. p. 12. We give this passage entire, because Haller in his index says Linnæus here "carps at Ludwig," than which surely nothing can be more unjust.

Our author began, in 1760, to publish impressions, chiefly of medicinal plants, taken from the dried specimen with printer's ink, or with smoked paper, in folio, under the title of *Etypha Vegetabilium*, which he continued from time to time. Such impressions give undoubtedly a correct outline, at least if the plant be fully displayed, but the rest is a mass of confusion; especially as the more elevated parts, which should be light, are necessarily the darkest. He wrote also occasionally on medico-botanical subjects, as on the effects of extract of *Stramonium*, and of the *Belladonna*, or Deadly Nightshade, in the epilepsy. His opinion seems not to have been favourable of either.

Ludwig died at Leipzig in 1773, aged 64. He left a son named Christian Fredrick, born in 1751, who became Professor of Natural History in the same university, and is the author of various tracts on Botany, Anatomy, and Physiology.—Ludwig's Works. Hall. Bibl. Bot. Dryandr. Bibl. Banks. S.

LUDWIGIA, in Botany, named by Linnæus in honour of Christian Theophilus Ludwig, Professor of Medicine in the university of Leipzig. (See the preceding article LUDWIG C. T.) Linn. Gen. 60. Schreb. 83. Willd. Sp. Pl. v. 1. 672. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 1. 205. Juss. 319. Lamarck Illustr. t. 77. Gærtn. t. 31.—Class and order. *Tetrandria Monogynia*. Nat. Ord. *Calycaethæzæ*, Linn. *Onagres*, Juss.

Gen. Ch. Cal. Perianth superior, of one leaf, permanent, cloven into four, lanceolate, widely spreading segments, equal in length to the corolla. Cor. Petals four, inversely heart-shaped, flat, greatly spreading, equal. Stam. Filaments four, awl-shaped, erect, short; anthers simple, oblong, erect. Pist. Germen inferior, quadrangular, clothed with the base of the calyx; style cylindrical, as long as the stamens; stigma slightly four-sided, capitate. Peric. Capsule of four valves, the partitions opposite to the valves. Seeds numerous, small. Recept. columar, membranaceous, four-winged; wings at the angles of the partitions, bearing seed at each side.

Ess. Ch. Corolla of four petals. Calyx four-cleft, superior. Capsule square, inferior, of four cells, and many seeds.

1. *L. alternifolia*. Linn. Sp. Pl. 173. Trew. Rar. p. 2. t. 2. (*Lythmachia non papposa*, flore luteo majore; Pluk. Alm. t. 203. f. 2.)—Leaves alternate, lanceolate. Stalks axillary, single-flowered. Stem erect, angular. Calyx-leaves remarkably large.—Native of Virginia, and sent from thence, to Miller, by Dr. Dale before 1752. It flowers in June and July.—Root annual. Stem about a foot high, upright, branching. Flowers solitary, small and yellow, situated at the base of the leaf-stalks.

2. *L. kirilowii*. Willd. n. 2. Lamarck Dict. v. 3. 614.—Leaves

Leaves alternate, lanceolate. Flowers axillary, solitary, nearly sessile. Stem round, diffuse.—A native of South Carolina.—Lamarck observes that this is very nearly allied to the last species in the form and arrangement of its leaves. The whole plant however is hairy. Stem woody, cylindrical, branched. Leaves alternate, oblong-lanceolate, entire. Flowers solitary, axillary, on such short stalks as to be nearly sessile, furnished at their base with two opposite, very long bractæas. Fruit less angulated than in the other species.

3. *L. jussiaeoides*. Willd. n. 3. Lamarck Dict. v. 3. 614.—Leaves alternate, linear-lanceolate. Flowers axillary, solitary. Germen very long.—A native of marshy ground in the Isle of France.—This is said particularly to resemble *Jussiaea* in its habit, whence the specific name.—Stem about a foot and half high, shrubby, branched. Leaves alternate, scattered, pointed, entire. Flowers solitary. Petals yellow, the length of the calyx.

4. *L. oppositifolia*. Linn. Syst. Veg. ed. 14. 161. Willd. n. 4. (*L. perennis*; Linn. Sp. Pl. 173.)—Lower leaves opposite, lanceolate. Stem diffuse.—A native of the East Indies.—Stems procumbent, six or eight inches long. Branches nearly all radical. Leaves smooth, entire, striated, three or four pair of the lower ones only opposite, the rest alternate. Flowers yellow. Petals shorter than the calyx.

5. *L. erigata*. Linn. Syst. Veg. ed. 14. 161. Mant. 40. Willd. n. 5. (*L. triflora*; Lamarck Dict. v. 3. 615.)—Leaves opposite, lanceolate. Stem erect.—A native of the East Indies.—Root annual. Stem a foot high, herbaceous. Leaves on footstalks, quite entire, smooth. Flowers so small as to be scarcely visible.

L. repens, Swartz Ind. Occ. v. 1. 273, proves, by a specimen from himself, to be *Iguardia palustris* of Linnæus, as Willdenow mentions.

Michaux, in his *Fl. Boreale Amer.* v. 1. 87, defines nine species as natives of North America, chiefly Carolina, of none of which we have any precise information. They are called *nitida*, *pedunculosa*, *microcarpa*, *angustifolia*, (which he supposes to be *ramosissima* of Walter,) *jussiaeoides*, (taken for *decurrens* of Walter,) *macrocarpa*, (which is the *alternifolia* of Linnæus,) *virgata*, *mollis*, and *capitata*. The last is said to be *jussieuifolia* of Walter.

LUDWIGSBURG, in *Geography*, a town of Anterior Pomerania, on the coast of the Baltic; five miles E.N.E. of Griefswalde.

LUDWIGSTAT, a town of the principality of Culmbach; 13 miles S. of Saalfeld.

LUDWIGSTEIN, a town of the principality of Hesse Rhinels; 14 miles E. of Cassel.

LUDWIGSTHAL, a town of Wurtemberg, famous for its iron forges; about one mile from Duttlingen.

LUDWIGWALL, a town of Prussia, in Natangen; four miles S. of Königsberg.

LUC, ST., the chief town of the captainship of Petagues, in the north division of Brasil.

LUES, in a general sense, is used for a disease of any kind.

LUES, in a more particular sense, is restrained to contagious and pestilential diseases.

LUES *Veneræ*, the venereal disease; called also *morbus gallicus*, *syphilis*, *morbus neapolitanus*, *morbus aphrodisius*, &c. In French, *la maladie vénérienne*, or *la verole*, or *grande verole*; in German, *huss-uche franzosen*.

The venereal distemper arises from a peculiar and specific morbid animal poison, which, when applied to the human body, is capable of producing both local and constitutional effects, such as primary sores or chancres, buboes, spots on

the surface of the body, nodes, ulcerations of the throat, pains in the bones, secondary ulcers, &c. Excepting chancres, none of these complaints can occur, unless some of the syphilitic virus has been taken up, and conveyed into the constitution by the absorbents proceeding from the primary sore, or surface originally infected. The venereal poison affects the human species alone, and has not the property of imparting the disease to any other animals. When applied to the human body, "it has the power of propagating or multiplying itself;" that is to say, it gives rise to a sore, from which is secreted matter containing a virus of the same specific nature. Of its appearance in an unmixed state we really know nothing; for we never see the poison in any other form than that in which it is blended with fluid matter. Its general properties are equally unknown; so that, if we put out of consideration its peculiar and remarkable effects on the human body, our ignorance of its nature is complete. It is not contagious through the medium of effluvia, or any volatile invisible matter in the air, the infection never being communicated, except by actual contact. The virus must be applied to a part of the body; the usual local effect is a particular sore, called a chancre; and some of the poisonous matter at length being imbibed by the absorbents, buboes, eruptions, &c. follow. Many cases seem even to prove that the poison may be absorbed from the skin, and buboes and constitutional symptoms take place, without the occurrence of any primary sore at all in the part to which the infectious matter was first applied.

Before entering into a more detailed account of a distemper which, as being a kind of scourge to illicit pleasure, and a curb to the most impetuous of passions, has made the generality of mankind very feelingly interested in the subject, we shall solicit the reader's attention to a point that is in the highest degree curious, and has afforded matter for numerous disputations.

Of the first Origin of the Venereal Disease.—Several writers have endeavoured to prove the great antiquity of this distemper. The principal of these are, Mr. William Becket, whose papers are contained in the 30th and 31st vols. of the Philosophical Transactions; Dr. Charles Patin, and Dr. Sanchez, authors of dissertations on the origin of the disease. The opinion has even been maintained, that the venereal malady has existed from time immemorial, and passages in support of this sentiment are referred to in Hippocrates, Galen, Avicenna, Celsus, and likewise the holy scriptures. "The Lord shall smite thee in the knees, and in the legs, with a sore botch, that cannot be healed, from the sole of thy foot unto the top of thy head." (Deuteronomy, chap. xxviii. ver. 35.) This, and many other ancient quotations, however, cannot be received as proofs, that syphilis was the affliction alluded to, because the leprosy, elephantiasis, and several other diseases, attended with ulcers, or eruptions, might be signified, as far as a judgment can be formed, from the words actually employed. (See Lombard sur la Mal. Vénérienne, tom. i. p. 39.) That the Greeks and Romans were at all acquainted with the venereal disease seems extremely improbable, and is an assertion quite unestablished. As Dr. Adams has well observed, the ancient physicians, being ignorant of the medical powers of mercury, must have been infinitely more familiar with every form of the disease than ourselves. Yet, till near the close of the 15th century, we have no description of local appearances that can be mistaken for venereal; and during the following century, the industrious Astruc enumerates more than one hundred writers on the subject. If other proofs are required, let us mark the difference between the licentious

licentious poets of former times and our own. Can a reader of common sense suppose that Horace, Juvenal, Persius, or Ovid, could have been silent on a subject so perpetually occurring in the satirical writings of Pope and Swift? On Morbid Poisons, p. 88. edit. 2.

But though it must be owned that the attempts to trace the existence of the venereal disease as far back as the times of Moses, and of the Greeks and Romans, have entirely failed, we must not infer that the people of those remote periods were not subject to maladies of the generative organs. Celsus has expressly treated of such complaints, and they probably afflicted mankind at a much earlier period than the reign of Augustus. The ancients were certainly liable to sores on the genitals; but these ulcers, like many which are met with at the present day in the same situation, were not syphilitic, notwithstanding they might sometimes put on a very bad aspect.

Giving up the supposition of lues venerea being of such antiquity, still it is contended that the disorder prevailed in Europe long before the return of Columbus from his voyage to America, or Charles VIII. besieged Naples; two events which happened at the close of the 15th century, when it is commonly thought that the disease first began its ravages in Spain and Italy, and thence spread to other parts of the old world. We are told that Gulielmus Salicetus, who practised at Verona in 1210, was well acquainted with the cause and effects of syphilis, and, in confirmation of this remark, we are referred to his work on surgery, where may be found a chapter, intitled, "De pustulis albis, et scissuris et corruptionibus quæ fiunt in virga et circa præputium, propter coitum cum meretrice, vel alia causa." Gordon, who lectured on physic at the university of Montpellier in 1289, mentions, in chap. 5, "De passionibus virgæ," the affections originating from connection with women whose wombs are foul, virulent, fanious, infectious, &c.; and he likewise specifies a remedy for a chancre proceeding from such a cause. See Lombard sur la Maladie Vén. tom. i. p. 40.

In the 30th and 31st vols. of the Philosophical Transactions, Mr. W. Becket published his papers in support of the antiquity of lues venerea. In his first dissertation, he labours to prove that a venereal gonorrhœa was known in England some ages before the year 1494, under the name of *ardor*, *arsura*, *incendium*, &c. in English, *brunning* or *burning*, of which, indeed, there is frequent mention made by British historians. In confirmation of this opinion, Mr. Becket produces authorities, of which some are earlier, and others later than the year 1494, the period when lues venerea is generally imagined to have first shewn itself in Europe.

The earliest of these authorities being the most material, will alone be noticed by us.

1. The first is a manuscript treatise of John Arden, an eminent surgeon in England, about the close of the 14th century. In this book mention is made of *burning*, which, according to Becket, is defined "a certain inward heat and excoiation of the urethra."

2. The second authority rests upon certain physical pieces supposed to have been written about the years 1390 and 1440. These works are said to contain some receipts for the cure of this *brunning*, both in men and women.

3. The third and last that we shall notice is founded upon the manuscripts, rules, and ordinances of the stewes, which were by public authority allowed to be kept at London, in the Borough of Southwark, under the controul of the bishop of Winchester. These documents are supposed to have been drawn up about the year 1430. One of them begins thus: "Of those, who keep women having a wicked infirmity," and further, it is ordered, under a severe penalty, that no

stew-holder keep any woman "wythin his hous that hath any sycknefs of brenning."

The celebrated Dr. Astruc, on the other hand, has deduced a different inference from these productions, without denying that they may be authentic; for he will not admit that this burning was the same disease as a venereal gonorrhœa, or that a venereal gonorrhœa was at any time expressed by such a term. His arguments are supported by considerations of the following kind.

1. The leprosy of the Arabians, which was formerly a common disease in England, as well as in other parts of Europe, was exceedingly contagious and infectious; and, therefore, lepers were, by several severe edicts, prohibited from having intercourse with the rest of mankind.

2. In case any person had carnal knowledge of a leprous woman, the leprosy was communicated to him by almost immediate infection. That the disease was thus imparted, is proved by Forellus, Obs. Chirurg. lib. iv. Obs. 8. Palmarius de Elephantiasi, cap. 2. Paræus, Op. lib. xx. cap. 8. Fernellius de Partium Morbis et Symptomatis, lib. vi. cap. 19. Valesius de Taranta, Philon. 7. cap. 39. Gordon's Lillii Partic. i. cap. 22.

3. When the case did not turn out to be leprosy in the worst form, yet the pudenda were for the most part affected with an inflammation, erysipelas, herpetic or miliary exulcerations, cuticular eruptions, &c.; whence arose a dysuria, called, in old language, *ardor*, *arsura*, *incendium*, *calcfactio*, and, in English, *brunning*.

4. In confirmation of this statement, Astruc cites Theodorici's Chirurg. lib. vi. cap. 55; a manuscript treatise on surgery, intitled Rogernia; Gilbert's Compend. Medicin.; Glanville's Breviarium Medicinæ, lib. ii. cap. 4; John of Gaddisden's Rosa Anglica, cap. de infect. ex concubitu cum leproso vel leprosa; and, lastly, John Manardus, of Ferrara, in Epist. Med. lib. vii.

5. All these writers describe the complaints caught by commerce with leprous women, and, on the whole, Astruc infers that the *burning*, or *brunning*, referred to by Mr. Becket, was the same disorder as, according to the doctor's authorities, might arise from connection with a leprous woman, or one who had lately cohabited with a leprous man. As for the *nefanda infirmitas*, mentioned in the laws of the stewes, Dr. Astruc conceives it must have been the leprosy itself. De Morb. Veneris.

We shall not follow these gentlemen through the whole of their arguments. The most important are set before the reader, and he must judge of them himself. That discharges from the urethra, attended with heat and pain in making water, must have existed from time immemorial, we decidedly believe; because experience has well proved that such complaints may often proceed from causes which are decidedly not venereal. Nay, it is even a question among modern surgeons, whether any claps at all originate from the same poison as lues venerea. This point, though so highly interesting, is far from being settled; and notwithstanding the sentiments of Mr. Hunter, we think the arguments and facts at present on record are rather more weighty in favour of the doctrine, that a gonorrhœa does not depend upon the same virus as syphilis. According to Fallopius, what has been called a venereal gonorrhœa did not shew itself among the symptoms of this disease before the year 1545, or 1546, that is, above fifty years after the period commonly assigned for the first eruption of syphilis. (Tract. de Morb. Gallico, cap. 23.) Supposing that a gonorrhœa really depended on the same infectious matter, is it credible that the complaint should never occur for half a century, during all which time chancres, and other venereal affections,

are known to have prevailed to a very great extent? As we shall be obliged to touch upon this subject again, and have already mentioned it in the article ΓΟΣΟΚΗΘΕΑ, we shall not pursue it at present. In our opinion, Becket has fully proved that inflammations, discharges, &c. existed long before the year 1494; but his evidence fails in establishing that they were actually venereal.

Astruc himself has very sensibly remarked, "that the genitals are no less subject to violent diseases than the other parts of the body, that they are equally exposed to all the causes of indisposition, and that they enjoy no prerogative above the rest to guard them against the attack of distempers. From the very infancy of physic, and long before the venereal disease was known, several writers have treated at large of an abscess, ulcer, cancer, and mortification in the genitals." (See Galen, lib. vi. de locis affectis, cap. 6, and Cornelius Celsus, lib. ii. cap. 1. lib. v. cap. 20. and lib. vi. cap. 18.) Astruc also quotes the historian Flavius Josephus, who, in his second book against Apion, related, that that vile slanderer of the Jews was afflicted with an ulcer in the penis, of which disease, after several incisions to no purpose, he died in exquisite torments, the genital parts being mortified. And again, (Hist. Jud. lib. xvii. cap. 8.) he says, that Herod, king of the Jews, died consumptive and convulsed, his private parts being putrefied and eaten up by worms. Astruc likewise quotes passages from Eusebius, Pliny, and other ancient authors, shewing, beyond all doubt, that complaints and diseases of the generative organs existed and prevailed in the earliest times. The phimosis, paraphimosis, and hyperærosis, or caruncle of the urethra, among other cases, were undoubtedly known to the Greek physicians; but then, these disorders proceeded from an ordinary cause, and not from any venereal contagion, as will be plain to any one who will take the trouble to consult the old writers.

Dismissing the idea of the venereal disease being so ancient as some have supposed, let us examine what grounds there are for believing that the close of the fifteenth century was the era, when the disorder first commenced its ravages in Europe.

The authorities in support of the opinion, that the venereal distemper first made its appearance in this quarter of the world towards the latter end of the year 1494, are the united testimonies of all the medical writers who at that time flourished in Italy, and who could not confound it with the leprosy, which, being then a common disease, was well known to them. The practitioners of that period were astonished at the novelty of the malady; and finding, from experience, that the medicines, which were usually given in analogous cases, proved ineffectual, were at a loss what method to pursue, and, for a time, gave up the treatment into the hands of quacks.

Joseph Grunpech, a German physician, published, in the year 1496, "Tractatum de Pestilentiali Scorra, sive Malade Frantzoz," in which he affirms, that it was a disease so lately inflicted on mankind, that it seemed to be a plague sent down from heaven; that it was a new kind of disease, hateful to nature, a most horrid and terrible prodigy, and altogether unknown to mortals before that time.

Alexander Benedict of Verona, who was physician in the Venetian army, which Charles VIII. of France destroyed in the battle of Fornova, in the year 1495, and therefore had the opportunity of observing the first appearance of this new disease, asserts in his work, "De omnibus Morbis," published in 1496, that, "by the venereal contact, a new French disease, or, at least, one that was unknown to former physicians, owing to the pestiferous aspect of the stars, had

burst in upon them from the west;" and, in another part of his work, that "the French disease, a new plague which had sprung up in the world, contracted by lying together and contact, was reckoned in his time incurable."

Nicolas Leoniceus of Vicenza, professor of physic at Ferrara, in a treatise, which he wrote in 1496, "De Morbo Gallico," observes, that "new diseases had appeared in Italy, which were unknown to former ages, after the manner of the lichenis, which, according to Pliny, Hist. Nat. lib. xvi. were never known before the time of Claudius." Then he continues: "Something like this has happened in this age; for now a new disease, of an unusual nature, has attacked Italy, and several other countries; however, this disease has obtained no proper name hitherto by our present physicians, but they commonly call it the French disease; as if the contagion had been imported by the French into Italy, and that this country was infected both by the disease and the arms of France at the same time. I, for my part, am forced to believe, (nor, indeed, can I conceive the case to be otherwise,) that this infectious disease, which has lately sprung up, has harassed this present age as it never did any former one."

Coradinus Gilinus, in his "Opusculum de Morbo Gallico," begins thus:

"Last year (1496) a very violent disease attacked great numbers of people, both in Italy and on the other side of the mountains, which the Italians call the French disease, affirming that the French introduced it into Italy; which the French call the Italian or Neapolitan disease, because, they say, they were first infected in Italy, and especially at Naples, with this cruel plague; or, because the disease appeared first in Italy, at the time of the passage of the French over the mountains. And as this disease is yet unknown to the moderns, and there have been, and still subsist great debates about it amongst physicians, I have therefore determined to write something upon it."

Dr. Astruc further confirms the opinion, that the disease was regarded quite as a novelty at the close of the fifteenth century, by numerous other citations from the works of the medical writers, who published within a moderate space after that period: as, for instance, Bartholemew Montagnana, Gaspar Torella, Anthony Bonevenius, Wendelinus Hock de Brackenaw, Jacobus Catanus, Peter Trapolinus, John de Vigo, Peter Maynard of Verona, Ulrich Utten, a German knight, who published his own cure by guaiacum, James à Bothincourt, Lawrence Philius, Peter Andrew Matthiolus, Alphonfus Ferrus, Jerome Fracastorius, Anthony Musa Brassavolus, Gabriel Fallopius, &c.

Not only is the foregoing statement corroborated by medical writers, it receives additional testimonials from several historians; particularly Mark Anthony Coccius Sabellius, in his *Chapod* Hist. lib. ix. first published at Venice in 1502; Baptiste Fulgosius, in his treatise on Memorable Actions, written in 1509; Jean de Bourdigné, in his History of the Province of Anjou, published 1529; Guicciardini, in his History of Italy, &c.

That the venereal disease first began to make ravages in Europe, and in particular that it afflicted many soldiers of the army of Charles VIII. at the siege of Naples, towards the close of the fifteenth century, appears then to be proved beyond dispute. But still other questions remain for determination. Was the venereal infection originally produced in Italy? or, was it conveyed thither from America, which had been discovered a little before the breaking out of the distemper in Europe?

We learn from history, that the new world was first found out by Christopher Columbus. In August 1492, he set sail

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fell with three ships and 120 men, arrived at Hispaniola in December of the same year, and returned to Spain in March 1493. On the 25th of September following, he departed from Cadiz again with 17 ships and 1500 men, besides mariners and workmen; and, in November, he arrived once more at Hispaniola. In the following year, 1494, he dispatched 14 ships back to Spain. In April 1494, Barth. Columbus, the brother of Christopher, arrived at Hispaniola with three ships, which returned to Spain, about the conclusion of the same year, with Pedro de Margarit, a Catalonian gentleman, and father Bayl, a Benedictine monk: the former was, at that time, severely afflicted with the venereal disease. In August 1494, four other ships arrived at Hispaniola from Spain, under the command of Antonio de Torrez, and returned at the same time as those last specified. Lastly, in October 1495, John Aguado, the envoy of their Catholic majesties, came to Hispaniola with four ships, to inquire into the crimes of which Christopher Columbus stood accused; and, the year following, departed for Cadiz, where he arrived with Christopher on the 11th of June 1496, and with 200 soldiers, who were infected with the venereal disease.

The first conveyance of this distemper from the West Indies to Europe, by the followers of Columbus, is supported by numerous testimonies; among which are those of Anthony Musa Brassavolus, John Baptista Montanus, Gabriel Fallopius, and Roderic Diaz. These confirm the disease to have originated in the West Indies, and to have been brought over by Columbus's men; that it appeared in Spain first in 1493, at Barcelona, and there spread immediately through the whole city; that, in Hispaniola and the adjacent West India islands, the disease was very frequent and familiar to the natives, who had found out an antidote, called guaiacum wood; and, lastly, that the distemper in America was milder than in Europe, where, on its first breaking out, it was undoubtedly more severe than at subsequent periods.

This last circumstance is referred by some authors to the treatment being now better understood, and, in particular, to the efficacy of mercury, with which practitioners were formerly unacquainted. Others appear to think the distemper actually milder in its nature. Mr. Foot entertains the first of these opinions; while Astruc and Sydenham profess the latter. Our own observations have induced us to believe, that the disease has actually become somewhat milder within the last fifteen years: for, we are sure, not half so many bad and fatal cases are now met with in the London hospitals, as were seen about the close of the preceding century. If this be a fact, it cannot be ascribed to our more familiar acquaintance with mercury, though it may perhaps be imputed to better treatment: for there can be no doubt that many cases have been exasperated by the long, unremitting, and violent salivations, which the old surgeons, who were blinded by false fears and prejudices, deemed so essential to the radical cure of the distemper.

There is only one other sentiment, which we have to notice, respecting the first origin of syphilis, namely, that it was not brought from the West Indies, but began in Europe, as an epidemical affection. Mr. Hunter seems inclined to think, that the distemper did not originally come from the West Indies; and he was led into this persuasion by reading a short treatise, entitled, "A Dissertation on the Origin of the Venereal Disease; proving, that it was not brought from America, but began in Europe from an epidemical Distemper. Translated from the original Manuscript of an eminent Physician. London, printed for Robert Griffiths, 1751."

In our opinion, however, Astruc has adduced abundant proofs of the distemper having existed in Hispaniola, before it was at all known in Europe; and he has explained, as satisfactorily as can reasonably be expected, how the disease was conveyed from the West Indies to Barcelona in 1493, and to Italy shortly afterwards.

The subject, which we are about to quit, is highly interesting; though the time that has now elapsed, since the commencement of lues venerea in Europe, forbids any advantageous investigations of the controverted points. That the ancient leprosy could not be syphilis, Dr. Astruc has entirely satisfied us; and we join him in the belief that the latter disease was originally imported into Europe from the West Indies. It is unquestionably a matter of infinite curiosity, that the leprosy, common as it was in former times, should scarcely ever have made its appearance after the venereal disease spread over Europe; but this may not be more curious and unaccountable than the departure of the plague, and the access of the small-pox. See Astruc De Morbis Venereis, and Foot on Lues Venerea.

General Observations.—As Mr. Hunter has remarked, in whatever manner the disease arose, it certainly began in the human race; for we know of no other animal that is capable of being infected with this poison. It is probable, too, that the parts of generation were the first affected; for if the disorder had occurred in any other part of the body, it might probably never have gone further than the person in whom it first arose, and, therefore, never have excited public attention; but as it was seated in the parts of generation, where the only natural connection takes place between one human being and another, except that between the mother and child, it was in the most favourable situation for being propagated. Besides, as no constitutional effect of the poison can impart the disease to others, we are obliged to conclude that the first effects were local.

We know little about the syphilitic poison, if we exclude from consideration its effects upon the human body. It is commonly in the form of pus, or united with pus, or some such secretion, and, when applied to parts, it has the peculiarity of giving rise to a process, in which is produced matter of similar qualities to its own. In most cases, it excites an inflammation in the parts contaminated: but there is not simply inflammation: a peculiar mode of action is super-added, different from all other actions attending inflammation; and, according to Mr. Hunter, it is this specific mode of action that produces the specific quality in the matter. The peculiar mode of action, however, may exist without the presence of inflammation: at least, this inference is drawn, since the poison continues to be formed, and a healing chancre will communicate the disease to another person.

The formation of matter, also, though a very general, is not a constant attendant on this disease; for sometimes the syphilitic poison produces a kind of inflammation, which does not terminate in suppuration. But, according to Mr. Hunter, no venereal poison can exist, unless matter is formed. A person, therefore, having the venereal irritation in any form, not attended with a discharge, cannot communicate the disease to another. To impart the disorder, the venereal action must first have taken place; matter must have been formed in consequence of that action; and such matter must be applied to the person who is to be infected. We have no examples of this distemper being communicated by vapour, or effluvia, like many other diseases.

Mr. Hunter believed, that the circumstance of the virus being more or less diluted, in different cases, is not the cause of any variety in the effects produced, provided the dilution

is not so considerable as to prevent the poison from having any action at all. The same matter appears to affect very differently different people; and the diversity of the symptoms is, therefore, attributed to causes existing in the constitution and habit.

In treating of GONORRHOEA, we have adverted to the long disputed question, whether the virus of that disease is of the same nature as that which gives rise to lues venerea? We have there explained Mr. Hunter's reasons for believing in the identity of the two poisons, and mentioned the motives which have hitherto kept us from giving credit to the doctrine. Mr. Hunter declares that he has seen all the symptoms of lues venerea originate from gonorrhœa only; that he had even produced venereal chancres by inoculating with the matter of gonorrhœa; and that he had repeated these experiments in a manner in which he could not be deceived. (On the Ven. Disease, p. 293, &c.) He has referred the different effects of the virus, in these cases, to the difference in the nature of the parts affected. He maintains that the matter of a chancre will produce either a gonorrhœa, a chancre, or the lues venerea. Supposing the poison to be the same both in the chancre and gonorrhœa, why do not these complaints always happen together in the same person? For one would naturally think that the gonorrhœa, when it has appeared, could not fail to become the cause of a chancre; and that such fore, when it happens first, must produce a gonorrhœa. Mr. Hunter believes that this sometimes really occurs, although he confesses it is only seldom; and he suspects that the presence of one irritation in general becomes a preventive of the other.

The experiments made by Mr. Hunter with the matter of gonorrhœa and chancre, have been repeated with a different result. (See B. Bell on Lues Venerea, chap. 1.) On the other hand, the defenders of Mr. Hunter's opinion contend, that we cannot wonder at this contrariety, when we consider from how many causes gonorrhœa may arise, and how impossible it is to distinguish the venereal from any other. See Adams on Morbid Poisons, p. 91, edit. 2.

Having already touched upon this controverted subject, in speaking of *Gonorrhœa*, we shall here refrain from commenting on the arguments adduced against the identity of the virus, from mercury being requisite for the cure of chancres, and not necessary in the treatment of gonorrhœa. Neither shall we expatiate on the asserted experiment, that venereal matter, applied to the urethra, will produce a chancre in that canal, and not simply a discharge. We wish, however, in this place, to call the reader's attention again to the circumstance of gonorrhœa not being described as a symptom of syphilis, till nearly half a century after the other symptoms of the venereal disease were known. Fallopius was the first who set down a clap as an effect of the syphilitic virus. The fact of gonorrhœa not having been remarked as a symptom of lues venerea till so long a time after this last disease had been known, has been brought forward as another argument against the identity of the poisons from which these disorders arise. A late writer endeavours to place this matter in a very different point of view, remarking, that if the venereal gonorrhœa remained unnoticed till fifty years after the other forms of the disease were described; what does this prove, but that contagious gonorrhœa was so common, as to be disregarded as a symptom of the new complaint? Can there be a doubt (says Dr. Adams), from the caution given by Moses, that gonorrhœa was considered as contagious in his days? During the classical age we find inconveniences of the urinary passages were imputed to incontinence, and the police of several states, before the siege of Naples, made laws for preserving the health of such as would content them-

selves with public stews, instead of disturbing the peace of families.

In the opinion of the foregoing author, this is enough to lessen our surprise that gonorrhœa should be unnoticed for some time after the appearance of the venereal disease. But, according to his sentiments, so far is it from proving the difference of the two contagions, that the fairest inference we can draw is in favour of their identity. For, if fifty years after the breaking out of typhils, this disease began to be so far understood, that secondary symptoms were found to be the consequence of primary ones in the genitals, it is most probable that the first suspicion of venereal gonorrhœa arose from the occurrence of such secondary appearances, where no other primary symptoms could be traced. Adams on Morbid Poisons, p. 95, edit. 2.

We are glad that this gentleman does not mean these observations to afford any material support to an argument, which, as he acknowledges, rests on the basis of experiment. Every one will coincide with him that gonorrhœas must have prevailed from time immemorial, and hence, perhaps, were not regarded as a novelty, or even suspected of being syphilitic for many years after the first breaking out of lues venerea in Europe. Nor shall we dispute the probability of Dr. Adams's conjecture, that the occurrence of secondary venereal symptoms, where no primary ones could be traced, excepting a gonorrhœa, caused this last complaint to fall under the suspicion of being itself syphilitic. In these points we rather agree with the author; but we cannot perceive how they at all warrant an inference in favour of the identity of the virus of the two diseases. The antiquity of gonorrhœas certainly weighs against such opinion, inasmuch as it proves that some species of claps prevailed when the venereal disease was unknown, and could not possibly have any share in their origin. The silence of medical writers for fifty years after the venereal disease was known, in regard to gonorrhœa being a symptom of it, undoubtedly militates against the identity of the virus producing these affections, since it tends at least to prove that practitioners were unable all that time to discern any evidence in proof of the gonorrhœa depending upon the same poison as lues venerea. And when the occurrence of secondary symptoms, apparently unpreceded by any primary ones, excepting a gonorrhœa, first gave rise to the supposition of this last affection being itself syphilitic, the notion might be erroneous, and the secondary venereal complaints admit of explanation in another way. Among the received doctrines concerning lues venerea, the possibility of the syphilitic virus being absorbed from the surface of the body, without any ulceration of the skin, seems to have gained the general assent of modern practitioners. In this manner buboes, sore throats, nodes, eruptions, and other secondary venereal symptoms, may be occasioned. Such absorption is the more likely to occur where the cuticle is moist and thin. Many cases, where neither gonorrhœa nor chancre has existed, can be explained in no other way; unless, indeed, we suppose the sore to have been so trivial, and to have healed so quickly, as to have escaped the patient's notice or recollection. Secondary venereal symptoms may be produced in either of these modes, and yet, though no chancre can be traced, and a gonorrhœa, as happening to be a previous malady, falls under suspicion of being the original cause of the constitutional complaints, the notion may be on the above account entirely erroneous.

We are aware of the sentiment entertained by Dr. Adams and many other practitioners, that it is the nature of a chancre to increase in all directions till mercury is exhibited. However true this may be as a general observation, few surgeons of extensive experience will be persuaded that there are

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no exceptions. We have heard it confessed by a surgeon, who has seen as much of the venereal disease as any man, that syphilitic sores, instead of spreading to an unlimited extent, will sometimes heal up without any mercury being given, the disease afterwards breaking out, however, in another form. Besides, who can doubt that guaiacum, and some other remedies, have healed venereal sores, though they may not have extirpated the disease in such manner as to hinder the access of future mischief? We shall presently find, on the authority of Mr. Pearson, that even bark, and other articles, will make primary venereal complaints give way, without the assistance of mercury. Mr. Clutterbuck, in a letter addressed to Dr. Adams, makes the following remarks: "I have seen cases which induce me to believe that the venereal disease, in some of its stages, and in certain circumstances, may get well without mercury, or any other remedy. But this is contrary to the doctrine of Mr. Hunter, who supposed that venereal actions go on increasing, without any tendency to wear themselves out."

"That lues venerea is much modified by climate and other circumstances, is generally allowed; that it has been cured by other means than mercury, we have also very sufficient evidence in the older writers on the subject: not to mention the late successful trials with acids and other substances." See Remarks on some of the Opinions of John Hunter, &c. by Henry Clutterbuck, p. 27.

Dr. Adams informs us, that according to the laws of morbid poisons, when a chancre has existed and been cured, a perpetual memorial of the event must be left, because the sore heals without granulations. In practice, we have so frequently seen this observation contradicted, that we are somewhat surprized at its ever having been advanced. Chancres are not only often filled up by granulations before becoming covered with skin; but there is actually a redundancy of such new substance, and we are obliged to repress it with lunar caustic. Mr. Clutterbuck has remarked, in his letter to Dr. Adams, "With respect to what you suppose a law of morbid poisons, that loss of substance in their primary ulcers is never supplied, but that skinning takes place immediately, as soon as the poison ceases to act, whilst, in the secondary ulcers of these diseases granulations as constantly take place and supply the lost substance; I suspect the difference to be rather owing to the nature of the affected parts, according to the greater or less readiness with which they take on and complete the healing process. Thus, for instance, in the confluent small-pox, the face alone suffers materially from pitting, though the skin on other parts has been equally crowded with pustules, &c. The traces of previous chancre are much more visible on the glans than on the prepuce." P. 71.

These and other reflections, stated in the article GONORRHOEA, make us disbelieve in the identity of the virus of this malady and lues venerea, as well as the possibility of secondary venereal symptoms ever in reality being the consequence of any kind of gonorrhoea.

The Hunterian doctrines respecting lues venerea produced a sudden and considerable revolution in the theories concerning the nature and treatment of this distemper; and, as they are still highly interesting, and continue to have vast influence over modern practice, we feel it our duty to enter a little further into the explanation of them.

The effects produced by the venereal poison appeared to Mr. Hunter to arise from its peculiar or specific irritation, joined with the aptness of the living principle to be irritated by such a cause, and the part so irritated acting accordingly. He therefore considered it as a poison, which, by irritating

the living parts in a manner peculiar to itself, produced an inflammation peculiar to that irritation, and occasioned the formation of a specific kind of matter, that could alone arise from that particular sort of inflammation. P. 19.

The following seems to us a very fair summary of the principal opinions promulgated by this philosophical and original character, on the subject of lues venerea.

1. That the venereal poison, being taken into the system, becomes universally diffused, and communicates such parts as are susceptible of the venereal action; and that it is soon afterwards expelled the system, along with some of the excretions.

2. That the parts contaminated do not immediately go into venereal action; but that they acquire a new state, or condition, which is termed a *disposition* to take on the venereal action.

3. That the number of parts contaminated does not depend on the quantity or strength of the virus absorbed.

4. That the *disposition* once formed in a part, necessarily goes on to action at some future period.

5. That mercury can cure the *venereal action*; but cannot remove the *disposition* which has been previously formed, and has not yet come into action.

6. That although mercury does not destroy the disposition already formed, yet that it prevents it from forming.

7. That although the disposition continues, it does not go into action during the use of mercury.

8. That the action, having once taken place, goes on increasing, without wearing itself out.

9. That parts once cured never become contaminated again from the same stock of infection.

10. That the matter of the secondary ulcer is not infectious.

11. That the venereal action is as soon destroyed in a large chancre as in a small one, the mercury acting equally on every part of the sore.

We shall now endeavour to describe the different forms in which syphilis presents itself to our notice; we shall then introduce some general observations on the treatment of the disease; and afterwards conclude with such remarks as seem necessary to convey the requisite information respecting the management of each particular case.

Of Chancres—Whatever may be the effect arising from the application of venereal matter to a secreting surface uncovered with cuticle, whether gonorrhoea, as Mr. Hunter represents, or a syphilitic sore, as Mr. B. Bell has asserted, it is admitted by all parties, that when the venereal virus is applied to any part of the common skin, a peculiar sore, called a chancre, is apt to be occasioned. This, which is the primary venereal ulcer, is generally caught on the parts of generation, in consequence of a connection between the sexes; but any part of the body may be affected by the application of venereal matter, especially if the cuticle is thin. In men, chancres usually occur upon the frænum, glans penis, prepuce, or upon the common skin of the body of the penis, the most frequent situation being the frænum, or corona glandis. The reason why chancres commonly affect these parts depends upon the manner in which such sores are caught, and not upon any greater specific tendency in the parts to catch the disease, than exists in other situations. They affect the frænum thus frequently, because that part is irregular, and the infectious matter is apt to lie undisturbed in the folds, by which means it has time to irritate and inflame the place where it lodges, and to produce there the suppurative and ulcerative inflammation. On

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the other hand, since the matter is easily rubbed off prominent parts by every thing that touches them, they oftener escape the disease. In his common instances, chancres are seen on the scrotum, and even on the skin of the pubes.

In women, chancres mostly take place on the labia and nymphæ. In a few examples they are met with on the perineum. They are generally formed on the inner surface of the labia, though sometimes just on their edge, or even on their outside. Chancres have been observed in the vagina; in these cases Mr. Hunter suspected, that the sores never occupy such situation originally; but arise there from the spreading of ulcer on the inside of the labia. In women the ulcerations are apt to be more numerous than in men, because the surface, for the occurrence of chancres, is more extensive.

From what has already been observed, it must be obvious, that chancres may be caught in other ways besides coition. Whenever venereal matter accidentally comes into contact with any part of the skin, where a sore, cut, or scratch exists, or whenever such matter is applied where the cuticle is thin and moist, a chancre is likely to be the consequence. Mr. Hunter saw on the red part of the lip a chancre, which was as broad as a sixpence, and caught the patient knew not how; it was attended with bubo under the jaw, and might have been the consequence of infectious matter inadvertently conveyed to the part by the patient's own fingers. (P. 217.) In Dr. W. Hunter's lectures, mention is made of a midwife in extensive practice, who, having caught a chancre on her right fore-finger in examining a pregnant woman that had the disease, infected no less than eighty other women in the course of her business. That surgeons occasionally catch chancres by venereal matter lodging in a slight cut, or scratch, on their hands or fingers, is universally known.

It does not follow, as a matter of certainty, that because venereal matter has been applied to the surface of the body, a chancre is sure to ensue. The thickness of the cuticle, no doubt, frequently hinders infection, and the disease is often prevented by the matter being washed or rubbed away. It is believed, that some persons cohabit with diseased women with little risk, and we are told they are, for the most part, strong subjects, with a short prepuce, and of course the glans always uncovered.

It is a circumstance worthy of attention, that when a chancre is caught upon the hands or fingers, as related above, the virus seems constantly to operate more powerfully than when such a sore is formed in one of the usual situations. "I know a midwife," says Swediaur, "who having been infected in this manner several years ago, still suffers from the disease; and we have another instance in this metropolis of an eminent male practitioner in the same art, who, by delivering an infected woman got ulcers in his hand, and at this present time still labours under the consequences, though it is now three years since he received the infection. I know a gentleman, who wounding his finger by accident with a pen-knife, exposed it the same evening to infection, without suspecting any bad consequences; the wound changed in two days to a very bad venereal ulcer, accompanied with a painful and obstinate swelling of the whole arm, together with a bubo under the arm-pit, and symptoms of a general infection." *Practical Observations on Venereal Complaints*, p. 194, edit. 2.

The time, which elapses between the application of the virus and the appearance of a chancre, is exceedingly different in different cases, depending however, in some measure, on the nature of the part affected. According to Mr.

Hunter, the disease generally begins earlier in the frænum, or termination of the prepuce in the glans, than on the glans itself, the scrotum, or the common skin of the penis. This celebrated surgeon was acquainted with examples, in which chancres made their appearance as early as twenty-four hours after infection; but on the other hand, he mentions instances in which such sores did not begin till seven or eight weeks after the application of the virus.

The inflammation which precedes a chancre, like most other inflammations which terminate in ulcers, begins first with an itching in the part. If it is the glans that is inflamed, a small pimple generally appears full of matter, without much hardness, or seeming inflammation, and with very little tumefaction, the glans not swelling so much from inflammation as many other parts do, especially the prepuce. Chancres on the glans are also less painful and annoying than those on the prepuce. When, however, an ulcer of this kind affects the frænum, or in particular the prepuce, the inflammation is more extensive and visible. The itching gradually changes into pain. In some cases the surface of the prepuce is first excoriated, and ulceration afterwards takes place; while, in other instances, a small pimple or abscess is the forerunner of the ulcers as on the glans. The fore becomes surrounded by a thickening, which, at first, and while of the true venereal kind, is very circumscribed, and instead of diffusing itself imperceptibly into the surrounding parts, has rather an abrupt termination. The base of a chancre is hard, and the edges somewhat prominent. When the sore begins on, or near the frænum, it often happens that this part is quite destroyed, or else a hole is made through it by the ulceration. Hunter, p. 218, 219.

The indurated base, or surrounding thickening of a chancre, is a most remarkable symptom, and one to which surgical writers exhort us to pay considerable attention; for if the chancre heal, and a hardness remain, it will either break out again, when the constitution becomes infected, or the hardness will still be increased, as ominous and indicative of a constitutional infection. "This symptom, therefore, will always explain, by its presence, that the local infection is not radically removed; and by its absence that it is." If, by embracing the part, which was the seat of the chancre, the appearance be thin, so that the finger and thumb do almost meet, the cure may then be concluded to be perfect; but if a hardness and thickness remain, although it be healed, and if there be a scale upon the part where the chancre was, then the case must be deemed as not cured, and as requiring much more to be done for it." *Foot on Lues Venerea*, p. 413.

When chancres occur on the scrotum, or body of the penis, they generally first appear in the form of a pimple, which turns to a scab, and this being rubbed off, is succeeded by a larger one. Chancres, thus situated, are attended with less inflammation than such as take place on the frænum or prepuce; but with more than those on the glans.

When the disease advances, it sometimes partakes of the inflammation peculiar to the habit, and becomes more diffused, so as to produce phymosis, paraphymosis, and other disagreeable complaints, which tend to retard the cure.

The local or immediate effects of the venereal disease are seldom wholly specific, but partake of the constitutional inflammation. The first appearance and progress of chancres, therefore, should be watched, as the nature of the constitution may thereby be ascertained. If, says Mr. Hunter, the inflammation spreads fast and considerably, it shews a constitutional

constitution more disposed to inflammation than natural. If the pain is great, it shews a strong disposition to irritation. A strong tendency to mortification is also sometimes betrayed by chancres beginning in an early stage to form sloughs.

According to Mr. Hunter, venereal ulcers have no disposition to heal, which, generally speaking, is undoubtedly true. We may add, that the edges of a chancre are commonly jagged and vertical, instead of shelving, like those of most other sores; and its surface, before the administration of remedies, is smeared with a greyish viscid matter, which is in very small quantity, and said to have a peculiar smell. If a bit of lint is applied to the sore in this state, it becomes adherent to the part, the matter secreted not being enough to moisten and loosen the connection.

When there is a considerable loss of substance, either from sloughing or ulceration, a profuse bleeding is no uncommon circumstance, more especially if the ulcer is on the glans, the blood escaping from the corpus spongiosum urethrae. The ulcers, or sloughs, often go as deep as the corpus cavernosum penis, and give rise to still more copious hemorrhages.

A surgeon should never be too hasty in pronouncing sores to be chancres; the genitals, the common seat of a chancre, are, "like every other part of the body, liable to diseases of the ulcerative kind, and from some circumstances rather more so than other parts, for if attention is not paid to cleanliness, we have often excoriations, or superficial ulcers from that cause; also, like every other part that has been injured, these parts, when once they have suffered from the venereal disease, are very liable to ulcerate anew." Hunter, p. 215.

Until some of the virus has been absorbed from the surface of a chancre, such sore is to be regarded as entirely a local affection. Unfortunately, the time when this absorption happens can never be exactly known, so that, in the earliest stage of the ulcer, most practitioners are fearful of acting, altogether, as if there were no possibility of the constitution being already contaminated.

Some consequences of chancres will be hereafter spoken of.

Of Bubo.—A venereal bubo is an inflammation of an absorbent gland, and arises from the absorption of the syphilitic virus, which, in being conveyed from the surface to which it was first applied, towards the trunk of the lymphatic system, has to pass through glands, and in doing this, it often makes these parts inflame and suppurate. Venereal matter may be taken up by the absorbents under various circumstances. The least frequent way is where it has only been applied to some sound surface, without having produced any local effect on the part, but has been absorbed immediately upon its application. According to Mr. Hunter, another mode of absorption is where some of the matter of a gonorrhoea is taken up by the lymphatics, and carried into the circulation. A third mode is the absorption of the matter from an ulcer, and is by far the most common. A fourth way is the absorption from a wound. Mr. Hunter, perhaps, with great propriety, used to call every abscess in the absorbing system, arising in consequence of the absorption of venereal matter, a bubo, whether in the vessels or the glands themselves.

As these vessels and glands are immediately irritated by the specific virus before it has undergone any change in its passage, the consequent inflammation must, therefore, have the same specific quality, and the matter secreted in the swelling be venereal.

In considering the subject of buboes, Mr. Hunter di-

vided the absorbent system into the vessels themselves, and into their convolutions, or lymphatic glands.

The absorbent vessels are not so often inflamed as the glands, but when they are thus affected, in consequence of a chancre upon the glans, or prepuce, they generally appear like a hard cord, running from the fore along the dorsum of the penis. Such inflammations of the lymphatics sometimes arise from a thickening of the prepuce in cases of gonorrhoea, that part being usually at the time in a state of excoriation. These cords often terminate insensibly near the root of the penis, or the pubes. In other instances they extend further to a lymphatic gland in the groin.

The lymphatics, thus inflamed in consequence of imbibing venereal, or, at least, irritating matter, often suppurate, and this sometimes in several places, so as to produce as many buboes, or small abscesses, on the body of the penis.

Inflammation of the lymphatic glands is much more frequent than the foregoing affection, and is caused by the venereal matter being carried into them. The structure of these parts appears to consist of the ramifications of lymphatic vessels, which, after branching it, re-unite again. We may infer, from this kind of arrangement, that the fluid absorbed is, in some measure, detained in the glands, and thereby has a greater opportunity of communicating the disease to them, than to the lymphatic vessels, through which its course is probably more rapid.

Since the lymphatic glands are liable to inflame from many different causes, surgeons should be careful to discriminate such swellings as arise from the venereal poison, from others of a diverse nature. They should first enquire, whether there is any venereal complaint at a greater distance from the heart, as chancres on the penis, or, whether there has been any preceding disease in such situation. They should enquire, whether any mercurial ointment has been rubbed on the leg or thigh of the affected side, as mercurial frictions, thus practised for the cure of a chancre, will sometimes give rise to a glandular swelling in the groin, that may be erroneously taken for a venereal bubo. We are also advised by Mr. Hunter to observe, whether there has been any previous disease in the constitution, as a cold, fever, &c. He directs us, moreover, to pay attention to the quickness, or slowness, with which the tumour has formed, and warns us of the possibility of mistaking a rupture, lumbar abscess, and an aneurism of the crural artery, for a bubo.

Some cases seem to evince, that a bubo sometimes does not begin till several days, and even longer, after the virus has been absorbed, the chancres having been healed this length of time, before the gland begins to inflame.

The glands nearest to the seat of absorption are, in general, the only ones attacked. Thus, when venereal matter is absorbed from a sore on the penis, the glands in the groin are in danger of being affected. When the matter is absorbed from the vulva in women, the glands liable to be inflamed, are those situated between the labium and thigh, and the round ligament.

Mr. Hunter believed, that, commonly, only one gland is affected at a time by the absorption of venereal matter, and he suggests this circumstance as a distinguishing mark between venereal buboes and other diseases of the lymphatic glands.

The absorbent vessels and glands, situated beyond the first order of glands, or such as are nearest to the seat of absorption, are never affected. Hence, those near the iliac vessels and back always escape the effects arising from the absorption of venereal matter from the genitals. It is also observed by Mr. Hunter, that when the disease has been

contracted by a cut, or fore upon the finger, the bubo takes place a little above the bend of the arm, upon the inside of the biceps muscle; and that, when such bubo has occurred, none is, in general, produced in the arm-pit, which is the most common place for the glands to be affected by absorption. This celebrated surgeon, however, mentions two rare exceptions, in which buboes occurred as well in the arm-pit as above the elbow.

Mr. Hunter once suspected, that the reason of the second and third series of glands not being affected, might be owing to a change produced in the matter by the first glands, through which the virus passes. Reflecting, however, that the matter of a bubo is infectious, like that of a chancre, and that some of it can hardly fail to be taken up by the absorbents, he perceived that the above explanation failed. He therefore altered his sentiment, and concluded, that the internal situation of the glands, more remote from the seat of absorption than the first order, might prevent the venereal irritation from taking place in them. We may remark, that this reasoning will not account for the occasional production of a bubo in the arm-pit above another at the bend of the arm. It is possible, however, that, in this last kind of case, some of the virus from the chancre on the finger may arrive at the axilla, without being conveyed at all through the absorbent glands, which are situated at the inner side of the arm, a little above the internal condyle.

In men, buboes from a venereal complaint on the penis are situated in the groin. Mr. Hunter, we know, comprehended gonorrhœa among the causes, and, in this case, he thought, that both groins were equally exposed to bubo. When the swelling in the groin originates from a chancre, it is generally on that side of the body to which the fore is nearest, though cases happen which are exceptions to this observation, and admit of explanation by the anastomoses of the lymphatics.

Mr. Hunter apprises us, that the inguinal glands are not constantly arranged in one exact manner, and that, therefore, the course of the absorbent vessels must be subject to variety. Hence a bubo, from a venereal sore on the penis, has been a considerable way down the thigh, or in front of Poupart's ligament, or near the pubes.

As, in men, chancres are almost always caught upon the penis, so buboes in them are commonly situated in the groins; but we have already noticed, that chancres occasionally form in other parts of the body, and, of course, buboes are not necessarily confined to one situation, the nearest external glands, between the heart and the seat of absorption, every where in the body, being liable to share the same fate as those in the groin.

When buboes arise in women, unpreceded by any chancre, it is more difficult to find out whether they are venereal or not, than in men. For, in the latter examples, when they arise without any local complaint, it is known that no such complaint exists, and, therefore, that the bubo cannot be venereal, except by immediate absorption from a found surface. But, says Mr. Hunter, in women, it is often difficult to discover whether any infection is present or not; and the nature of the bubo can only be made out by paying attention to the way in which it began, its progress, and other circumstances.

When chancres are situated near the meatus urinarius, nymphæ, clitoris, labia, or mons veneris, the absorbed matter is carried along one or both of the round ligaments, and the buboes are formed in those ligaments, just before they enter the abdomen. Mr. Hunter believed that they never extended further, and he supposed them to be inflammations

of vessels, and not of glands. When chancres are situated far back, near or in the perineum, the absorbed matter is carried forwards, along the angle between the labium and the thigh, to the glands in the groin. Throughout this course small buboes may occur; or the virus, entering the inguinal glands, a bubo in the groin is frequently produced.

The bubo, says Mr. Hunter, commonly begins with a sense of pain, which leads the patient to examine the part, where a small hard tumour is to be felt. This increases, like every other inflammation that has a tendency to suppurate; and, unless prevented, it goes on to suppuration and ulceration, the progress of the matter to the skin being very quick. There are, indeed, some cases which are slow in their progress: in these, Mr. Hunter thought the inflammatory process was kept back by mercury, or other means; or else retarded by a serofulous tendency, such a disposition in the parts not so readily admitting the true venereal action.

At first, the inflammation is confined to the gland, which is moveable in the cellular membrane; but as the swelling increases in size, or as the inflammation, and, more especially, the suppuration advance, the specific distance is exceeded, the surrounding cellular membrane becomes more inflamed, and the tumour is more diffused. Some buboes become erysipelatous, by which means they are rendered more diffused and œdematous, and do not readily suppurate.

The following is then, according to Mr. Hunter, the true character of a venereal bubo: it is confined to one gland; it keeps within the specific distance, till suppuration has taken place, and then becomes more diffused. It is rapid in its progress from inflammation to suppuration and ulceration. In general, the suppuration is copious, considering the size of the tumour, and the abscess is single. The pain is very acute, and the inflamed skin exhibits a florid red colour.

Where no local disease has existed, the nature of a bubo will always be attended with more uncertainty, than when there has been some disease on the penis. As, however, every inflammation of the inguinal glands is suspected, the patient runs but little risk of not being cured if his case is venereal; but, (continues Mr. Hunter,) "I am afraid, that patients have often undergone a mercurial course, when there has been no occasion for it." P. 266.

The same distinguished practitioner thought, that there were two sorts of buboes arising without any visible cause. One kind inflame and suppurate briskly, as those buboes usually do which arise from chancres, or gonorrhœa. The manner of their progress made him always suspect them to be venereal.

The second kind are generally preceded and attended with slight fever, or the common symptoms of a cold, and they are generally indolent and slow in their progress. If they are more quick than ordinary, they become more diffused than the venereal, and probably are not confined to one gland. When very slow, they give but little sensation; and though the sensation is more acute when they are quicker, yet it is not so sharp as in the true venereal bubo. Besides, they do not commonly suppurate; but become stationary. When they do suppurate, it is slowly, and often in more glands than one, the inflammation being more diffused, and yet not very severe, considering the size of the swelling. The matter makes its way to the skin slowly, unattended with much pain, and the colour of the swelling is somewhat purple, instead of the florid redness which the surface of the venereal bubo displays. Sometimes the abscesses are very considerable; but then they are not painful.

In judging of the nature of a bubo, Mr. Hunter recommends us first to consider, whether or not there are any venereal complaints existing. If there are none, this is a presumptive proof, that the glandular swelling is not venereal. If the tumour is only in one gland, very slow in its progress, and gives but little pain, it is likely to be scrofulous. If the swelling is considerable, diffused, and attended with some inflammation and pain, then, in all probability, a constitutional action prevails, attended with lassitude, loss of appetite, want of sleep, small quick pulse, &c. Such swellings, (adds Mr. Hunter,) are slow in their cure, and are not affected by mercury, even when it is applied very early.

This gentleman likewise adverts to other cases, which he terms mixed, when the venereal matter, like a cold, or fever, has only irritated the glands to disease, producing in them scrofula, to which they were predisposed. In these examples, the swellings commonly arise slowly, give but little pain, and seem rather to be hastened in their progress, if mercury is given with a view of destroying the venereal disposition. Some suppurate under such treatment, while others, which probably had a venereal taint at first, become so indolent, that mercury has no effect at all upon them, and in the end, they either get well of themselves, or by other remedies. See Hunter on Ven. Disease.

With respect to the bubo which arises from gonorrhœa, we believe it is only sympathetic, or the consequence of irritation, though, as we have already stated, Mr. Hunter looked upon some of these cases as actually venereal, and originating from the absorption of the gonorrhœal matter.

Dr. Adams avers, that he is unacquainted with any instance in which the constitution has become affected in consequence of a bubo, without a previous chancre, or gonorrhœa; for the reader should understand, that even a venereal bubo does not imply a general contamination; the virus is only on its way towards the circulation, when it gives rise to the swelling in the groin. Dr. Adams moreover assures us, that he has never seen reason to repent the not having treated such buboes as venereal. "If," (says this gentleman,) "a bubo has been the consequence of an ulcer on the penis, which healed spontaneously, we may be certain that it is not venereal. It may be the effect of a morbid poison, as probably many of Celsus's were; it may be assisted by, and even heal under, the use of mercury; but this will be no proof of its venereal origin." On Morbid Poisons, p. 128. 2d edit.

Some additional remarks on buboes will be introduced when we consider the treatment.

Of Secondary, or Constitutional Symptoms.—By secondary, or constitutional symptoms, are commonly understood those effects which arise from the syphilitic virus being absorbed and carried into the common circulation. It is most likely, that in cases of chancre, the contamination of the system takes place about the beginning of the local complaints; for, in most instances, the chance of such infection happening afterwards is greatly lessened, by the patient having speedy recourse to the use of mercury, which generally acts as a preventive.

The absorption of venereal matter into the system mostly arises from a chancre, and Mr. Hunter joined in the belief, that it may also sometimes originate from a gonorrhœa. We have already adverted to the opinion, that the virus may possibly be observed, in some instances, without there being any fore at all produced in the seat of absorption, that is, where the matter is applied. Mr. Hunter thought, that this might

happen upon a half-internal surface, like that of the glans penis, though, perhaps, not on the sound skin. Venereal matter may likewise be received into the constitution by being applied to common ulcers, although not necessarily rendering these ulcers themselves venereal. Wounds also afford a surface for such absorption, but Mr. Hunter believed, that ulceration was always first produced.

Some parts of the body are much less susceptible of lues venerea than others; and many parts, as far as present evidence extends, seem quite incapable of being affected. Mr. Hunter never saw the brain, heart, stomach, liver, kidneys, &c. thus diseased. This celebrated writer divides the parts which are capable of becoming contaminated, in consequence of the absorption of the virus into the circulation, into two orders. The first order consists of the skin, tonsils, nose, throat, inside of the mouth, and sometimes the tongue. These are the parts commonly affected at an early period, after the passage of the virus into the constitution. The second order consists of the periosteum, fasciæ, tendons, and bones; parts which become diseased less early.

Mr. Hunter, with much appearance of reason, has endeavoured to account for this seeming greater susceptibility in some parts than others, by the manner in which the former are exposed to cold. Thus, he observes, the skin is continually subjected to more cold than the internal parts are; and the venereal disease always more readily affects parts so exposed than others. This may be the reason why the mouth, nose, and skin are affected with particular frequency, and also why the periosteum, and most superficial surfaces of the bones, are most liable to be diseased. The distemper, however, seems to shew some preference to such bones as are particularly hard.

In treating of chancres and buboes, we had occasion to observe, that the matter, in both these cases, partook of the specific quality, and, of course, was capable of communicating the disease. We have now to notice, that this is not the case with the matter of secondary venereal ulcers, or such as arise in consequence of the introduction of the virus into the system at large. Indeed, none of the secondary symptoms are infectious. As Mr. Hunter has stated, this form of the disease has not the power of contaminating parts, not already under its influence, even in the same constitution. Probably, the poison only irritates just after its absorption, and is soon expelled with some of the secretions, instead of circulating with the blood during the whole time of the disease.

Mr. Hunter has concluded one of his most interesting chapters with the following inferences.

First; that most parts, if not all, that are affected in the lues venerea, are affected with the venereal irritation at the same time.

Secondly; that parts exposed to cold are the first that admit the venereal action; then the deeper parts, according to their susceptibility for such action.

Thirdly; the venereal disposition, when once formed in a part, must necessarily go on to form the venereal action.

Fourthly; that all parts of the body, under such disposition, do not run into action equally fast, some requiring six or eight weeks, others as many months.

Fifthly; in the parts that come first into action, the disease goes on increasing, without wearing itself out; while those which are second in time, follow the same course.

Sixthly; mercury hinders a disposition from forming; or, in other words, prevents contamination.

Seventhly;

Seventhly ; mercury does not destroy a disposition already formed.

Eighthly ; mercury hinders the action from taking place, although the disposition be formed.

Ninthly ; mercury cures the action.

Secondary Venereal Ulcers.—These are of a very different nature from chancres, or such sores as originate directly from the application of venereal matter to the skin. They are generally much less painful than the latter, attended with less inflammation, and do not secrete matter, that can communicate the disease to others, or cause buboes in the patient himself. They are more readily formed on mucous membranes, than on the common integuments, and therefore are very frequent on the tonsils, and other parts of the throat. Sores of this description are often of a round shape, though, in certain examples, they eat away the parts, like herpetic or phagedenic ulcers, spreading from one part to another, destroying the skin, and healing on one side, while they are extending themselves on another. Richerand has seen ulcers of this kind, spread in this manner nearly all over the patient's body, producing one vast cicatrix ; and he adverts to a particular species of secondary venereal ulcer, which is of a round shape, and begins to heal at its centre, so that towards the termination of the complaint the sore represents an ulcerated circle, encompassing a round cicatrix. When this variety of the disease makes progress, the ulcerated ring becomes larger, while the cicatrix in the centre undergoes a proportional increase in size. (Nof. Chirurg. tom. i. p. 331, 332. edit. 2.) It may be doubted whether the latter cases are really syphilitic : they certainly yield to many remedies besides mercury, as our own observation has convinced us. They may be cured by guaiacum, nitric acid, a decoction of sarsaparilla, and elm bark, &c.

Venereal Eruptions.—On this subject Mr. Hunter has pointed out to us the following circumstances.

The appearances on the skin generally occur all over the body. The discolourations make the skin appear mottled, and many of the eruptions disappear, while others continue, and increase with the disease.

In other cases, the eruption comes on in distinct blotches, which are often not observed till the scurfs have begun to form. At other times, the eruption assumes the appearance of small distinct inflammations, containing matter, and resembling pimples, not being, however, so pyramidal, nor so red at the base. Mr. Hunter also observes, that venereal blotches, on their first coming out, are often attended with inflammation, which gives them a degree of transparency, which is generally greater in the summer than the winter, especially if the patient be kept warm. In a little time this inflammation disappears, and the cuticle peels off in the form of a scurf. The latter occurrence often misleads the patient and the surgeon, who look upon this dying away of the inflammation as a decay of the disease, till a succession of scurfs undeceives them. Mr. Hunter adds, that the discolourations of the cuticle arise from the venereal irritation, and are to be seldom regarded as a true inflammation, since they rarely have any of its characteristics, such as tumefaction and pain. However, he explains that in parts which are well covered, or which are constantly in contact with other parts, there is more of the true inflammatory appearance, especially about the anus.

The parts affected next begin to alter their appearance, and form a copper-coloured, dry, inelastic, cuticle, called a scurf. This is thrown off, and new ones are formed. Mr. Hunter relates, that these appearances spread to the breadth of a sixpence, or shilling ; but seldom more extensively, at

least for a considerable time. In the mean while, every succeeding scurf becomes thicker and thicker, till at last it becomes a common scab. Then the disposition for the formation of matter takes place in the cutis underneath, and a true ulcer is formed, which commonly spreads, although in a slow way.

These appearances arise first from the gradual loss of the true sound cuticle, which the diseased cutis cannot re-produce. As a kind of substitute for this want of cuticle, an exudation takes place, and forms a scale. The matter afterwards acquiring more consistence, at last forms a scab. However, before the disease has attained this condition, the cutis has ulcerated, after which the discharge is more like true pus. When this form of the lues venerea attacks the palms of the hands and soles of the feet, where the cuticle is thick, this latter part first becomes separated, and peels off. A new one is immediately formed, which also separates. In this manner, a series of new cuticles take place, in consequence of scurfs not being so readily formed as on the common skin. When the disease is confined to the palms of the hands, or soles of the feet, Mr. Hunter mentions, that there is difficulty in determining whether it is venereal or not : because most diseases of the cutis, in these situations, produce a separation of the cuticle, attended with the same appearances in all, and having nothing characteristic of the venereal disease.

When the affected part of the skin is opposed by another portion of skin, which keeps it in some degree more moist, as between the nates, about the arms, between the scrotum and the thigh, in the angle between the two thighs, on the red part of the lip, or in the arm-pits, the eruptions, instead of being attended with scurfs and scabs, become accompanied by an elevation of the skin, which is swollen with extravasated lymph into a white, soft, moist, flat surface, which discharges a white matter.

A venereal eruption often attacks that part of the fingers on which the nail is formed. Here the disease renders that surface red, which is seen shining through the nail ; and if allowed to continue, a separation of the nail takes place, similar to that of the cuticle in the above cases. However, Mr. Hunter states, that there cannot be the same regular succession of nails, as of cuticles in other instances.

Such surfaces of the body as are covered with hair may also be attacked, and the hair separates, and cannot be produced as long as the disease lasts.

Venereal Affections of the Parts about the Throat.—According to Dr. Adams, the venereal ulcer in the throat is always, what may be termed, a foul ulcer. Though its edges are defined, its surface is always ragged and uneven, of a complexion which can never be mistaken for a clean or healthy sore, that is, for a sore disposed to heal. The pus is of various colours, from the ashy-colour to the dusky brown. From the nature of the parts, a scab cannot be formed, so that the ulcerous appearance is never interrupted. Its progress is more rapid than on the skin, as every action of inflammation, ulceration, or healing, is always more rapid in these very sanguiferous parts. It is rarely attended with pain. On Morbid Poisons, p. 167. edit. 2.

When the throat, tonsils, or inside of the mouth, are affected, it is the nature of the disease to make its appearance at once in the form of an ulcer, without much previous swelling.

The venereal fore-throat should be most carefully discriminated from others, a thing that is not always at first very easy ; for sores in this situation, which are really syphilitic, sometimes have much the same appearance as others which

are not so. It is the character, however, of a venereal fore-throat to begin with ulceration of the surface of the parts. Now, as Mr. Hunter has explained, it is the nature of several other diseases, in the same situation, not to produce directly this kind of ulceration. One of these is common inflammation of the tonsils. The inflamed place often suppurates in the centre, so as to form an abscess, which bursts by a small opening; but never looks like an ulcer, that has begun upon the surface, like a true venereal sore. The case, just now mentioned, is always attended with too much inflammation, pain, and swelling of the parts, to be venereal. Also, when it suppurates and bursts, it subsides directly, and it is generally attended with other inflammatory symptoms in the constitution.

Notice is likewise taken, by this most celebrated surgeon, of an indolent tumefaction of the tonsils, which is peculiar to many persons of a scrofulous constitution. The complaint occasions a thickness of speech.

Sometimes coagulable lymph is thrown out on the surface of the parts affected, and produces appearances which are by some called ulcers, by some sloughs, and occasionally by others, putrid fore-throats. The case is attended with too much swelling to be venereal; and, with a little care, it may easily be distinguished from an ulcer, or loss of substance. However, when this difference is not obvious at first sight, it is proper to endeavour to remove some of the lymph, and if the surface of the tonsil underneath should appear to be free from ulceration, we may conclude, with certainty, that the disease is not venereal. Mr. Hunter states, that he has seen a chink filled with coagulable lymph, so as to appear very much like an ulcer; but, on removing that substance, the tonsil underneath was found perfectly sound. He adds, that he has seen cases of a swelled tonsil, having a slough in its centre, which slough, before its detachment, looked very like a foul ulcer. The stage of the complaint, he says, is even more puzzling, when the slough has come out; for then the disease has most of the characters of the venereal ulcer. Whenever he met with the disease in its first stage, he always treated it as if it had been of the nature of erysipelas, or a carbuncle. When the complaint is in its second stage, without any preceding local symptoms, he recommends the practitioner to suspend his judgment, and to wait a little, in order to see how far Nature is able to relieve herself. If there should have been any preceding fever, the case is still less likely to be venereal. Mr. Hunter informs us, that he has seen a fore-throat of this kind mistaken for venereal, and mercury given till it affected the mouth, when the medicine brought on a mortification of all the parts concerned in the first disease.

Another complaint of these parts, which Mr. Hunter represents as being often taken for a venereal one, is an ulcerous excoriation, which runs along their surface, becoming very broad and sometimes foul, having a regular termination, but never going deeply into the substance of the parts, as the venereal ulcer does. No part of the inside of the mouth is exempted from this ulcerous excoriation; but Mr. Hunter thought, that the disease most frequently occurred about the root of the uvula, and spread forwards along the palatum molle. He remarks, that the complaint is evidently not venereal, since it does not yield to mercury. He has seen these ulcerous excoriations continue for weeks, without undergoing any change, and a true venereal ulcer makes its appearance on the surface of the excoriated part. He says, that the excoriations in question have been cured by bark, after the end of the mercurial course, which cured the syphilitic sore.

This author describes the true venereal ulcer in the throat

as a fair loss of substance, part being dug out, as it were, from the body of the tonsil; it has a determined edge, and is commonly very foul, having thick white matter, like a slough, adhering to it, and not admitting of being washed away. Ulcers in such situations are always kept in a moist state, and the matter cannot dry and form scabs, as it does on sores upon the skin. The ulcer is also much more rapid in its progress, and generally has thickened edges. Hunter on Venereal Disease.

Dr. Adams, after reminding us not to consider every ragged ulcer of the throat as certainly venereal, takes occasion to remark, that he has seen more than one of this description, which has healed whilst he has been making up his mind, whether he should salivate his patient. He says, "the only distinction I know between these and true venereal ulcers, is that the former are usually attended with more pain, the edge is also for the most part less defined, and the surface itself is more irregular; the fever too, if any attends, is not such as we have described in syphilis. But the venereal ulcer is not always entirely free from pain, and there is generally some irregularity in its surface; the fever too, we have remarked, is often slight. Happily, this intricacy does not often occur, but often enough to teach us not to value ourselves on a hasty decision, when a little delay will be unattended with danger, and perhaps save our patient a tiresome and unnecessary process. By watching the ulcer attentively, we shall be able to observe whether it continues to spread regularly, though slowly, still retaining its character, and not healing in any part. If this should continue a few days, we shall have no reason to doubt its syphilitic character; but if the progress is slow, there can be no harm in a further delay, the only inconvenience attending which, will be the importunity of your patient. If, as is sometimes the case, from the nature of the part, and the irritability of the constitution, the progress of the ulcer should be quicker, the character in all other respects well defined, and the history of the case leading to a similar conclusion, we may, by using every possible means of introducing mercury, easily accelerate our course. This will rarely be very difficult, because the same irritability of constitution which produces an ulceration more rapid than usual, is for the most part attended with quicker susceptibility of the mercurial irritation.

"The same directions are applicable, whether the ulcer is seated on the tonsils, uvula, or palatum molle, or any of the neighbouring parts, excepting the tongue, in which case the progress is slower, the edges consequently thicker from the structure of the part, and the pain and inconvenience greater from the same causes, and also from its particular offices." (Adams on Morbid Poisons, p. 167, 168.) According to Mr. Hunter, lues venerea sometimes produces a thickening and hardening of the tongue. We have seen a case or two, in which this part has been studded over with large tubercles, or hard lumps, which yielded to mercury. We doubt, however, whether these instances were really syphilitic.

Venereal Affections of the Bones, Periosteum, Falcia, and Tendons.—Nodus-syphilitic Pains.—These complaints are nodes and pains in the bones. A swelling of the parts enumerated, originating from a syphilitic cause, receives the appellation of a node. We have already observed, that Mr. Hunter divided the parts in which secondary symptoms manifest themselves into two orders; the first comprehending the skin and parts about the throat and mouth; the second, the bones, periosteum, falcia, and tendons. These latter structures do not in general become affected till the disease has troubled the patient a considerable time, nor

before it has made its attack on the first order of parts. Mr. Hunter, however, had seen a few cases which were exceptions to this observation, the malady affecting the bones before any complaints of the skin or throat had happened.

When the deeper-seated, or second order of parts become affected, the progress of the disease is more gradual than in the first. The complaints produced bear a great resemblance to scrofulous swellings, and the effects of chronic rheumatism, excepting, however, that the joints are less subject to be affected. At a time when there has been no possible means of catching the infection for many months, a swelling will be formed on a bone, and having given little pain, will not be taken much notice of till it is of considerable size. In other instances the pain may be severe, and yet no swelling occur at all, or be perceptible for some time afterwards. The same remarks are equally applicable to swellings of the tendons and fasciæ. As it is the character of nodes to increase by slow degrees, they are not attended with much inflammation. When they attack the periosteum, the tumour being closely connected with the bone, seems in fact to arise from it.

The malady continuing to grow worse and worse, supuration takes place in the node; but the matter which is produced is not good pus. Some nodes, both of the tendons and bones, last for years, before they form any matter at all. These cases, Mr. Hunter suspected, might not invariably be venereal.

In cases of nodes the pain is sometimes very considerable, while at other times it is hardly such as to deserve notice. In certain instances, the tendinous parts, when inflamed, occasion a heavy kind of pain; and in other examples, they will swell very much, and yet excite no pain worth mentioning.

The pains arising from a syphilitic affection of the bones, are usually periodical, having exacerbations mostly in the night. Rheumatic pains, which the venereal much resemble, are also generally worst in the night. See Hunter on Venereal Disease, p. 328, 329.

Having described the secondary symptoms of lues venerea, as occurring in the first and second orders of parts, it remains for us to notice a few other diseases frequently supposed to be syphilitic.

Warts, Excrecences, &c.—Parts acquire, from the irritation of venereal matter, a disposition to form excrecences, or cutaneous tumours, called warts. These are most prone to grow where chancres have been situated, which sores, indeed, not unfrequently heal into warts. Such excrecences are liable to be hurt by bodies rubbing against them, and often a similar cause will make them exceedingly painful, and bleed very profusely. They are considered, by the generality of surgeons, not simply as a consequence of the venereal poison, but as possessed of its specific disposition, and, therefore, have recourse to mercury for the cure of them. Mr. Hunter observes, however, that he never saw mercury have such an effect, although given in sufficient quantity to cure, in the same person, recent chancres, and sometimes secondary symptoms. We cannot say that our experience is in support of this last observation, though we join in the belief, that warts are never venereal. In St. Bartholomew's hospital, it is the common practice to give mercury for the cure, and it is done with unequivocal success. But then the same excrecences might be cured much more judiciously either with the knife, ligature, or escharotics, according to the shape, size, and situation of them. In all these ways we have seen a lasting cure accomplished, without any employment of mercury. On the whole, therefore, we think with Hunter and Dr. Adams, that such complaints

never partake of the specific nature of the venereal disease.

With respect to other excrecences, those called rhagades, fici, and condylomata, were described long before lues venerea was ever heard of. The first are common in warm climates, particularly about the ends of the fingers, and are never venereal. "There are (says Dr. Adams) a number of soft excrecences about the anus, to which various names have been given. They arise sometimes in consequence of a discharge from the rectum, stimulating the neighbouring parts to ulceration. If such ulcers are prevented from healing by the discharge continuing, or by the friction of the parts, they must either ulcerate deeper and wider, or the cuticle will send out processes to defend them. These, on account of the pressure they receive, grow in various shapes, from which they have acquired their names.

"They will arise from a venereal origin in two ways. If a secondary ulcer is seated in these parts, that ulcer having no power of healing itself, will take the character above described, from the nature of the parts. Sometimes, also, the matter of gonorrhœa, by falling from the vagina along the perineum, will produce ulceration, and the same consequences follow. In either of these cases, the remedy which cures the first disease will cure these local complaints; or, if they afterwards remain, they will no longer retain their syphilitic property, and may readily be cured by topical remedies." (On Morbid Poisons, p. 173, edit. 2.) On this subject we must observe, that we have never seen more reason for considering such excrecences about the anus, as really syphilitic, than for regarding warts on the genitals in the same light. We speak of the excrecences alone, and not of any ulcers which may exist with them. These tumours may always be extirpated without any bad consequences, and mercury is unnecessary in the cure.

Among the secondary symptoms of syphilis, the venereal ophthalmia might be considered; but as we shall have an article expressly on the various species of inflammation affecting the eye, we shall postpone this subject till a future opportunity. See OPHTHALMY.

General Observations on the Treatment of Lues Venerea.—From the remarks already delivered, the reader must be apprised, that mercury is the grand remedy for all complaints unequivocally venereal. This is so much the case, that this medicine is usually regarded as a specific, and the only one to be depended upon for a cure. That mercury is powerfully efficacious in checking and curing syphilitic affections, is a truth as well established as any in the practice of surgery. But whether there may not be other substances which possess anti-venereal qualities sufficiently to be of service, and even preferable to mercury, under particular circumstances, and whether such remedies alone can ever be confided in for a permanent and radical cure, are questions of more difficulty and uncertainty. As long as many diseases present themselves, having nearly the same appearance as syphilitic complaints, and as long as mercury cures not one, but a hundred disorders, there will always be obstacles in the way of an easy settlement of these contested points. All men must first agree, that the cases in which the trial of any medicine is made, are decidedly venereal, or else the experiment will avail nothing.

If it be supposed that mercury is the only medicine to be trusted in the treatment of the venereal disease, of course we can have little more to do than relate the various plans of using this renowned remedy, and explain the principles by which its administration ought to be regulated. We mean, however, to be more impartial, and not totally silent respecting other medicines.

When lues venerea first invaded Europe, towards the conclusion

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elusion of the fifteenth century, the consternation which the new distemper excited may be more easily conceived than depicted. The mode in which the malady was most commonly communicated, the unrelenting fury with which it proceeded from one order of painful and disgusting symptoms to another, and above all, the inefficacy of the several methods of treatment which were adopted by the physicians and surgeons of that period, furnished reasons but too cogent for regarding it as one of the most destructive scourges that had ever visited the human race. See Pearson on Lues Ven. Introduction.

The disease, however, had not raged long in this quarter of the world, when the efficacy of mercury in curing it was ascertained. The Arabian physicians had long been in the habit of applying mercury to the purposes of medicine. Rhazes, the Arabian author, by whom most of the oriental practice was communicated to European practitioners, recommended an ointment, in which quicksilver was an ingredient, for the cure of cutaneous eruptions. It was probably, therefore, from analogy, that Vigo, Berengarius Carpus, Fallopius, and others who practised at the time when the venereal disease first made its appearance in Europe, were induced to try the effect of mercury in the form of ointments and plasters, for the cure of cutaneous complaints proceeding from a syphilitic cause.

That the disease was unknown to Europeans before the return of Columbus from America, appears to derive material confirmation from the consternation, despair, and ignorance of the distemper, which are confessed by all the most learned practitioners of that time. Many of them at first refused to have any thing to do with the unfortunate patients, some of whom were expelled from human society, and compelled to seek refuge in the fields and woods. Fortunately, things did not long go on in this wretched manner. The analogical application of mercury was soon tried, and found strikingly beneficial. Berengarius of Carpi, who was the first that tried the effects of mercury in the cure of syphilis, soon made an ample fortune by the practice of the secret, according to the report of Fallopius. Berengarius and Vigo were almost the only practitioners who were acquainted with the important discovery of mercury being a cure for the new and dreadful distemper, and it was from their success, and the candid representations of Vigo and Fallopius, that mercury became the accepted and established antidote for the venereal disease. The old practitioners employed mercury in the form advised by Rhazes; they used it as an ointment, and, without knowing that the mineral was taken into the constitution by means of the absorbents, they continued the practice entirely from the beneficial consequences demonstrated to them by experience. When patients were afflicted with pains in the bones, the plan of applying mercurial plasters to the parts affected soon became a custom. The physicians and surgeons, at the time when mercury first began to be used for the cure of the lues venerea, were not acquainted with many chemical preparations of that mineral, and indeed, as it was regarded as a poison when internally taken, external ointments and plasters were alone deemed justifiable. The *hydrargyrus nitratus ruber*, however, was known to John de Vigo, who has recommended it as an application to chancreous ulcers. The internal exhibition of mercury was at first generally condemned; and so fearful were practitioners of the effects of this mineral, that even its external employment was conducted with the most extreme caution. In fact, the ointment which was at first used only had in its composition one-fortieth part of quicksilver; the proportion was afterwards increased to one-fourteenth, and lastly, to one-eighth. Besides ointments and plasters, fumigations were

soon introduced into practice; for as it was supposed that mercury produced a cure altogether by coming into contact with the part affected, it was judged necessary to contrive some mode of introducing mercury to sores in the throat, and for that purpose fumigations were adopted.

At length the chemists set themselves to work in making numerous mercurial preparations, to some of which superior efficacy was imputed. It was as early as the year 1553, that lotions of sublimated mercury were first employed by Angerius Ferrerius. Two ounces of it were dissolved in six pounds of distilled water. With this mixture the whole body was washed and rubbed, excepting the head, breast, stomach, and arm-pits; and this method was continued once, twice, or thrice a day for ten days, according to the strength of the patient, and other circumstances. The patient was at the same time sweated most profusely; for sweating was conceived to assist in the cure, because the distemper was more easily overcome in the West Indies, where diaphoretic means had long been used in aid of guaiacum. Quicksilver girdles for the loins and wrists were also in fashion. The fumigations were made with mercury extinguished in turpentine, or else with cinnamon blended with inflammable ingredients.

John de Vigo was the first who avowed giving mercury internally, about the year 1535. The medicine that he exhibited in this manner was the *hydrargyrus nitratus ruber*, which had been previously praised both by Vigo himself and Nicholas Massa, as a most beneficial application to venereal ulcers. The violent effects of this preparation, when administered internally, soon brought it into disrepute, and then pills of crude mercury came into use.

If, however, the first employment was generally conducted with extreme caution and timidity, there were many exceptions, and afterwards, when the profession became more familiar with the method, they became of course bolder. For we learn that, after a time, the flagrant evils arising out of the improvident use of the medicine, and the frequent instances of death from its poisonous action, excited an universal clamour against it, and many preferred enduring the disease to the mercurial remedy. It is no wonder, therefore, that guaiacum, when brought into Europe in 1517, China-root in 1535, sassafras about the same time, and salaparilla a little afterwards, were received with wonderful applause, as delivering the afflicted from a dreaded distemper, and a more dreaded remedy. (See Foot on Lues Ven. lect. 19.) What degree of merit such medicines possess, we shall presently enquire.

As soon as it was ascertained that pharmaceutical preparations of mercury might be internally given, without the degree of danger formerly apprehended, myriads of secret formulæ began to be obtruded upon every town and every country of Europe. Among the most famous remedies were the *mercurius dulcis*; the common *Æthiops*; *mercurius alkalizatus* ground with oyster-shells; *mercurius antithifiscus* with dry balsam of Peru; *mercurius antiscorbuticus* with gum guaiacum; *mercurius dulcis* with manna; *mercurius diureticus* with juniper gum; and *mercurius catharticus* with scammony. Afterwards rougher preparations were made use of, such as *mercurius precipitatus albus*; a solution of red precipitate in aquafortis corrected, red precipitate, turbith mineral, green precipitate, besides numerous high sounding panaceæ. Even a solution of corrosive sublimate, mixed with barley-water, or water-gruel, was long ago execrated as "the vile practice of London quacks" by our countryman Wiseman.

With such a farrago of mercurial preparations it is hardly to be expected that any regular and rational plan of treatment could be pursued by the generality of the old practitioners.

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tioners. The common methods were chiefly empirical, and it was not until towards the beginning of the eighteenth century, that the treatment of the venereal disease began to be regulated by scientific principles.

In the elegant edition of *Aphorismi* by Boerhaave, a full account may be seen of circumstances confirming the preceding statement.

Whoever will consult Wiseman, one of the most respectable authors we have in surgery, will find that the symptoms of the venereal disease were in general much more severe in his time than they are at present, and at the same time that the mode of practice was still much severer. In claps, large and repeated doses of drastic purges, calomel, and turpeth mineral were the medicines employed, even in the inflammatory state of the disease, and some turpentine remedies were given to complete the cure. Venereal sores were powdered with red precipitate, and dressed with the most acrid and stimulating applications. In confirmed syphilis, the hot salivating method of treatment was adopted; the patient was crammed into a small room heated with a stove; the admittance of fresh air was prevented by blankets put up at the door and windows; and the patient himself was surrounded with a screen. There he sat, half suffocated in his own hot putrid atmosphere, and was rubbed with mercurial ointment, until his tongue generally lolled out, and the inside of his mouth was covered with sloughs. In this hideous pickle it was customary for him to lie from twenty-five to thirty days.

It is no wonder, as Mr. Dease has observed, that many fell victims to this preposterous mode of treatment, few constitutions being able to endure it, and no constitution escaping without material and permanent injury.

Our English Hippocrates, the great Sydenham, lays it down as an axiom, that, as the venereal virus is of a very inflammatory nature, the principal end to be aimed at in the treatment ought to be evacuation. In gonorrhœa he advises strong drastic purges, which are to be perfomed for a long time. The first fourteen days of the disease he purges the patient every day; then every second day; and, towards the latter end of the case, twice a week. Should the cure advance but slowly, eight grains of turpeth mineral, given twice or thrice, at due intervals, Sydenham reckons extremely effectual. Where purgatives are rejected by the mouth, he substitutes clysters. Balsam of Mecca, or Cyprus turpentine closes the cure. He thinks injections do much more mischief than service; and is averse, in these cases, to the use of mineral waters, and decoctions of the woods.

As Sydenham does not account mercury a specific, in the cure of lues venerea, only inasmuch as it is possessed of a superior efficacy in exciting salivation, he considers as useless and hurtful all preparation, as bleeding, purging, or bathing, before putting the patient into a salivation. He thought that the less the patient was weakened, the greater was the probability of a cure. His whole attention, in the treatment, is to keep up a high degree of salivation. If the rubbing does not have this effect, he gives turpeth mineral, or calomel; and, of the latter medicine, he gives a dose once a week, for some months after the cure is apparently effected, for fear of a relapse. He is against carrying off, by purging, any remains of the spitting after the course is over; and, during the whole treatment, allows the patient such light meats as may be desired.

The methods of treating lues venerea, as laid down by Wiseman and Sydenham, were for a long time followed, throughout Europe, with no material variation. At length the celebrated Astruc gave one of the most elaborate treatises on this distemper ever published.

The treatment of a gonorrhœa he considers at three dif-

ferent periods. In the first, or inflammatory stage, he directs us to employ large and repeated bleedings; and thinks, that the indication for copious bleeding is as strongly pointed out in this case, as in that of a peripneumony, or dysentery. He orders large quantities of cooling emulsions to be frequently drunk, the bowels to be kept open with emollient glysters, opiates, if the symptoms are violent, cooling injections, fomentations, poultices to the penis and perineum, and a very slender regimen. In the second stage, when the inflammatory symptoms have subsided, after purging two or three times with jalap, diagridium, or calomel, he has recourse to mercurial frictions every second day, to be more immediately employed about the parts of generation and perineum. He continues the same severe regimen. In the third stage, he completes the cure by some of the turpentines, mineral, acidulated, vitriolic, or steel waters, or the common astringents. He reprobates astringent injections. In what he terms the dry gonorrhœa, he pushes the antiphlogistic treatment much farther; for he even bleeds every fourth hour.

In the cure of syphilis, Astruc prefers salivation by mercurial frictions. He enters into a long description of the necessary previous preparation; bleeding, purging, warm bathing, medicated broths, and slender regimen. He says, it is seldom we can dispense with less than ten baths; more generally, he orders twenty. After this course of bathing, the bleeding and purging must be repeated. He then has recourse to the mercurial frictions, which he so directs as to keep up unremittingly a full regular spitting, from two to three pints in twenty-four hours, until the cure is completed. The patient is then cleansed in a warm bath, and purged.

Not long after Astruc's work made its appearance, practitioners became extremely divided in opinion as to the method of administering the mercurial frictions, for the cure of lues venerea. Some of the most respectable followed the plan laid down by Astruc; while the greater number of practitioners in France followed the Montpellier method of extinction; that is, after having first made the patient take twenty or thirty warm baths, and kept him for some time on a very slender regimen, the frictions were so administered as not to raise any spitting, and thus continued for three or four months, until the venereal virus was totally eradicated.

The celebrated Van Swieten, in the fifth volume of his *Commentaries on Boerhaave's Aphorisms*, adopts, in a great measure, the opinion of his illustrious master in treating of this disease. In the treatment of gonorrhœa, if we except his disapprobation of bleeding, which he thinks is very seldom necessary, we find nothing new: for he follows the general mode of practice, and effects a cure chiefly by purgatives.

In the treatment of strictly venereal cases, he gives a preference to salivation raised by internal mercurials, instead of employing the unction. He thinks that the quantity of mercury, introduced into the system, is much better ascertained, when mercurius dulcis three times sublimed, or white precipitate, is made use of, in lieu of frictions with mercurial ointment. He considers that the quantity of mercury, introduced in this latter method, must be uncertain; and that as it does not pass out of the system as readily as saline mercurials, it may accumulate, and be deposited in dangerous quantities, in different parts of the body, and be productive of the worst consequences. But, above all other methods of curing the disease, Van Swieten prefers the well known solution of corrosive sublimate in brandy, or spirits. By this medicine, which was in general use in St. Mark's hospital,

hospital, Vienna, four thousand eight hundred and eighty persons are said to have been perfectly cured of the venereal disease, in the course of eight years, without undergoing any tedious preparation, or having any dangerous symptom intervene.

The ingenious author of the *Parallel of the different Methods of treating the Venereal Disease* (supposed to have been the physician Petit) is extremely severe in censuring this method of treatment, and asserts that, from repeated experience, he has found the administration of the solution to be very precarious, and by no means productive of the good effects so lavishly promised by the Vienna practitioners. See *Obs.* on the different Methods of treating the Venereal Disease, by W. Dease, 1779, the Introduction.

From these observations on the mercurial remedies employed, and plans adopted, by the old surgeons, in the treatment of syphilitic affections, let us pass on to the consideration of the practice of modern times, which has been vastly influenced by the doctrines promulgated by Mr. Hunter. The leading points of his theory having been already stated in the foregoing columns, we shall not repeat them at large in this place. Suffice it to say, that this surgeon inculcated, that when the venereal poison was absorbed, it contaminated the system at once, leaving only a disposition behind it, which is brought forth into action in various parts at various times; that the local cause of this disposition, and its effects, may be cured by mercury, but that the disposition itself cannot; and that parts, once cured, cannot be contaminated again from the same stock of infection.

It must not be dissimbled, that the theories of Mr. Hunter, respecting lues venerea are in some respects obscure and questionable. Much difficulty has been experienced in rightly comprehending his exact meaning; and he has even been accused of inconsistency and contradiction. Dr. Adams, in his *Commentary on Hunter's Treatise*, has published the substance of a conversation, which he once had with this famous character, with regard to the difficulty attending the comprehension of the doctrines in question. On this occasion, Mr. Hunter related the following case, to shew how easily his opinions might be understood, even by a person altogether unaccustomed to such inquiries.

"A gentleman," said Mr. Hunter, "who had been cured of a chancre at a distance from home, called to consult me whether he might consider himself as perfectly free from the disease. Whilst he was taking great pains to explain to me how he had been salivated, and how long he had continued the use of mercury, after the chancre was healed, I interrupted him by observing, that if he had continued the use of mercury till now, I could not pretend to say whether he was free from the disease—How then, said the gentleman, am I to ascertain my real situation?—If, replied I, you find no symptoms in the course of three months, the probability is that you will remain well, till you expose yourself to a new source of infection.

"In about six weeks he returned, with a sore throat and copper spots. I explained to him, that he should not blame his surgeon, who, even if he had known what was to happen, could not have prevented it. The patient went through a very necessary course of mercury, till he was cured of every symptom, and then demanded, with some impatience, whether he was then secure—You are secure, replied I, from every return on your genitals, and on your skin and throat; but as it is impossible for me to know whether your bones are contaminated, I cannot pretend to say whether you will have nodes in a few weeks' time. He now began to comprehend the doctrine, and submitted to await the result. In about six weeks he actually had nodes;

after the cure of which, by a severe salivation, I made no scruple to assure him that he was perfectly free from the disease."

According to Mr. Hunter's principles, then, if mercury were exhibited for ten years, it could not prevent the disposition, after it is once formed, from proceeding to action some time or another; and although this author admits that this remedy may altogether hinder the disposition from taking place at all, yet that it has no power of eradicated any forms of the disease, except what is positively in action, and consequently more or less palpable. And it was likewise a position in Mr. Hunter's theory, that the parts contaminated, or those to which the disposition was imparted, became thus infected all about the same time, and very soon after the first absorption of the virus into the constitution, the inference necessarily followed, that mercury could seldom avail in hindering the formation of the disposition, except in an early stage of the case. According to the Hunterian opinions, mercury given as a *preventive*, on any other principle, was entirely useless. The parts contracted the disposition soon after the virus had been absorbed into the system, unless, by good luck, mercury had been employed so early and efficiently as entirely to prevent such disposition from taking place. If it had not been used early enough, and with sufficient effect to prevent the formation of the disposition in the parts susceptible of contamination, these could not fail of falling afterwards, but at an uncertain period, into a palpable state of syphilitic action, and in that state alone were capable of being cured by mercury. The disposition, though it might have been prevented, could not be cured by mercury. That part of the doctrine, also, which inculcates that parts, which have been once cured, cannot be contaminated again from the same stock of infection, tends strongly to shorten a mercurial course; because, as the foregoing case illustrates, when one order of parts have been cured by mercury, there is no danger of a recurrence of the dilemma in them: and though the disposition may exist in another order of parts, and, of course, must come into action, it would be absurd to continue mercury on that account, both because this mineral absolutely has not the power of destroying the disposition, and it can never be known, *a priori*, whether these other parts are contaminated or not.

The employment of the term *disposition* has led to much dispute. Many have not been able to understand the word, and others have raised several objections to it. The critical examiners of Mr. Hunter's doctrine ask, how is it possible to prove that a venereal disposition has, or has not, existed at any particular time? If, after a certain course of mercury, and the consequent removal of a chancre, blotches should appear, then, says Mr. Hunter, a disposition had been formed, which no quantity of mercury could have destroyed. But, observe the critics, may we not, with at least equal probability say, that in such cases mercury had been insufficiently used? If, on the other hand, after such a course, no blotches should occur, the friends of the doctrine tell us, the secondary order of parts had not been contaminated; but, in this case, it may be contended by the opposite party, that the mercurial course had been judicious and efficient. It is insisted by Mr. Hunter's opponents, that the evidence of this incurable disposition cannot be proved: nor by his friends can it be justly and confidently assumed: for if it be action, then its coincidence with other actions is admitted contrary to their principles: if it be not action, then the disease which follows is motion without impulse, and effect without a cause. This opinion, indeed, with regard to the difference of disposition and action, it is maintained, was not

readily

steadily and uniformly contemplated by Mr. Hunter himself in his practice, or even in his theories; for he sometimes talks of the cure of lues venerea in the state of disposition, and generally continued the exhibition of mercury, after the disappearance of the symptoms. (See London Medical Review, No. 11, p. 248, 249.) For our own part, without undertaking to defend the inconsistencies into which Mr. Hunter has undoubtedly fallen, we have no hesitation in declaring our belief, that his opinions and doctrines in general concerning lues venerea, and the power of mercury over it, are the best and most rational that have ever been promulgated. In particular, we cannot concur with the anonymous critic quoted above, when he thinks it as reasonable to refer the perfection, or imperfection of the cure, to mercury having been sufficiently, or insufficiently used. We have known instances in which patients have been almost constantly employing mercury for twelve and eighteen months for the cure of local complaints, succeeded by sore throats and eruptions, and yet, after all this time, and after all this perseverance in the use of mercury, nodes on the cranium, skin, or ulna, have arisen. Certainly, when a patient has been for many months in a state of salivation, and has thereby got rid of all his palpable symptoms, we are not justified in concluding that because future complaints begin, these might have been hindered by a further continuance of the mercurial course. Mercury is so often used in immoderate quantities, and for so unreasonable a length of time, without preventing a succession of secondary symptoms, that we cannot bring our minds to believe, that the recurrence of the disease, in such cases, can be hindered by any judicious or practicable perseverance in the employment of this mineral. At the same time we are not such bigots to the Hunterian theory as to suppose, that the use of mercury ought not to be continued an instant after a chancre, or bubo, is either healed or apparently converted into a common sore. It is generally impossible to ascertain, with precision, the exact moment when venereal action ceases. The disposition, or contamination of other parts, may possibly sometimes happen later than Mr. Hunter supposed, and we have every reason to conclude that such disposition may be imparted at any time, while the venereal action in a chancre, or bubo, is not completely subverted. Mr. Hunter supposed, that the syphilitic poison could only be absorbed when blended with pus. Perhaps the virus may exist, and be taken up by the absorbents in other forms. The induration left after a chancre is healed is not always free from the venereal action, though not a drop of matter is now secreted; yet as there are so many inexplicable circumstances in certain cases of the present disease, it seems almost warrantable to believe that the virus may exist, and be imbibed by the absorbents, so as to impart the disposition to the distemper at later periods than Mr. Hunter conjectured, and under an additional number of states and circumstances. According to Mr. Hunter, the matter of secondary ulcers is not possessed of the specific venereal quality, and cannot produce the disease, when absorbed, as the matter of a chancre or bubo does. Supposing this to be true, whatever opinions may be entertained respecting the continuance of mercury, after the venereal action of a chancre or bubo has apparently ceased, there can be no diversity of sentiment in regard to the utility of persevering in that medicine, after secondary sores are either healed or have had their character entirely altered.

Having detailed the ancient practice, mentioned the forms in which mercury was formerly exhibited, and endeavoured to give some idea of the degree of power which this medicine possesses over syphilitic affections, it is our place to

make a few observations on the mercurial preparations, to which modern practitioners generally give the preference.

As long ago as the days of Berenger of Carpi, who, as we have recited, was the first person that ascertained the efficacy of mercury in the treatment of syphilis, it has been well known that this metal, in its reguline state, possesses no medicinal virtue. Its power of acting against disease only exists when it is in the state of a salt, or oxyd. Its preparations have also very different degrees of efficacy.

The most active of all the preparations of mercury is the oxygenated muriate, the oxymurias, or, as it is generally called, the corrosive sublimate, which is, in fact, a violent poison. We have already stated, that the celebrated Van Swieten was exceedingly partial to this medicine in syphilitic cases. He dissolved it in brandy, or alcohol, and diluting this mixture with a certain proportion of water, prescribed the remedy in a fluid state. The ordinary dose is a quarter of a grain every day; but the quantity may, in particular instances, be increased to half or three quarters of a grain every 24 hours. Sublimate is, even at the present time, usually prescribed after the manner directed by Van Swieten, the solution in alcohol being ordinarily taken, either in some warm milk, a decoction of sarsaparilla, or blended with some syrup, which vehicles are supposed to prevent the sublimate from disordering the stomach and bowels. Notwithstanding these correctives, this preparation of mercury often produces considerable sickness and griping pains, and it is reckoned extremely improper for patients labouring under pulmonary affections. It should only be tried in cases where the constitution is strong and free from much irritability. But the most important truth to be attended to is the decision of many experienced surgeons, that the corrosive sublimate, though a powerful medicine, has not so much efficacy in accomplishing a radical cure of syphilitic diseases, as several other more simple and mild preparations of mercury. Hence it is seldom exhibited by surgeons of the present time for the cure of primary venereal symptoms, except when particular circumstances are in the way of other more approved methods. The convenience and secrecy with which a solution of the corrosive sublimate may be taken, and the circumstance of a small phial of it being in some instances sufficient for the cure, may, perhaps, be reasons why it has been more extensively administered, than its comparative efficacy appears to justify.

The submurias hydrargyri, or calomel, is far less active than the oxymurias, or corrosive sublimate, and though not now very much employed in this country for the cure of unequivocal syphilitic complaints, it is, like every other preparation of mercury, anti-venereal, and was at one time commonly given. Whenever it is exhibited at present, it is almost always in the form of pills, containing from one to three grains. When the dose is larger, purging is generally excited, and little specific effect on the disease is the consequence. Hence, when calomel is prescribed with a view of producing a salivation, opium must generally be conjoined with it. Calomel has also been mixed with ointment, so as to form a dressing for venereal sores, or admit of being introduced into the system by being rubbed upon the skin. Attempts have likewise been made to cure syphilis by frictions with calomel on the gums, and inside of the lips and cheeks. However, violent and dangerous ptyalism having, in this manner, been sometimes produced, without the disease being radically cured, the method has fallen into disrepute. In the article FUMIGATION, we have described a powder, made with calomel, for the purpose of being applied to the surface of the body in the form of a vapour, or a subtile powder raised by heat.

Sometimes,

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Sometimes, when patients cannot rub in mercurial ointment, or frictions alone have not sufficient effect, a grain of the hydrargyrus calcinatus, now called hydrargyri oxydum rubrum, is prescribed, and to prevent bad effects on the bowels, half a grain of opium is generally directed to be taken at the same time. The grey oxyd of mercury, formed by the trituration of quicksilver with fat, is the most common, safe, and effectual preparation for the cure of syphilitic complaints. A piece of this ointment, about as large as a nutmeg, is ordinarily rubbed into the surface of the body, for about half an hour before the fire. When there is a bubo in the groin, the leg and thigh, on the affected side, are generally preferred for the frictions; but when this is inconvenient, the ointment may be rubbed upon any other part of the body. Mercurial ointment, provided the fat is not rancid, which it is very apt to be, makes an eligible application to both primary and secondary venereal ulcers, when it is spread upon lint. The introduction of mercury into the constitution, by frictions with ointment, is one of the oldest and best methods. When the patient cannot rub in himself, the business may be done by an attendant, who must be provided with gloves, made of oil-skin, or pig's bladder, lest he salivate himself. The frictions are said to have the most effect when made along the inside of the limbs, where anatomy shews that the largest lymphatics are situated. It is always a prudent maxim to begin a course of mercury in a very gentle way, only small quantities of the ointment being at first ventured upon. Perhaps half a dram is enough to begin with. Nor need the frictions be made every day until the ability of the constitution to bear the medicine has been tried. Thus, the patient may commence with rubbing half a dram of the ointment on the inside of the leg. After letting one day intervene, he may make the second friction on the inside of the thigh. When another intervening day has elapsed, the third application of the ointment may be made to the hip and lower part of the abdomen. The fourth friction may be made on the arms, unless the patient should prefer beginning again on the leg. During such employment of the ointment, the patient, if convenient, should wash himself now and then in a warm bath, and have costiveness obviated by mild purgatives. The preceding method is generally commendable, because it removes all chance of too sudden and violent a salivation, as well as diminishes the peril, with which the administration of mercury is liable to be accompanied in particular constitutions. Though such is the most prudent plan to be followed in the generality of cases, it must still be remembered, that there are certain instances in which the affection of the system with mercury ought to be expedited, for the purpose of preventing the serious consequences, which might arise from the spreading of venereal ulceration in particular situations, as where a chancre threatens to destroy the whole glans, or an ulcer in the throat to eat away all the velum pendulum palati. In every case it is highly proper, that the patient should have some tenderness of the gums, and a copper taste in his mouth, as tests of his constitution being under the influence of mercury; but all violent salivations, attended with extreme soreness and sloughing of the mouth, and vast swelling of the face, are condemned as unnecessary, and in every respect blameable, by all the most judicious practitioners of the present time.

The grey oxyd of mercury, made by trituration of quicksilver with sugar or honey, composes the common pil. hydrarg. or blue pill, which, in ordinary cases, is the best mercurial medicine for internal use. It is given, either to assist the action of the ointment, or when the frictions cannot be executed. The common dose is ten grains every

night, opium being added when any griping or purging is excited.

Such are the preparations of mercury ordinarily used by British surgeons in the treatment of syphilis.

In addition to the foregoing directions, respecting the management of a mercurial course, there are many other circumstances to be observed. Every surgeon should be impressed with the importance of the patient keeping himself warm, and avoiding all exposure to damp and cold, during the employment of mercury. He should be recommended to keep to his room, and wear woollen stockings, and flannel drawers and waistcoat. Experience has proved, that exposure to the damp cold air sometimes determines the action of mercury violently either to the mouth, or the bowels, and materially lessens its effect upon the disease.

According to Mr. Hunter, when a course of mercury is about to be undertaken, we are to consider two things; first, the preparation and mode attended with the least trouble or inconvenience to the patient; and secondly, the preparation and mode of administering it, that most readily conveys the necessary quantity into the constitution. Mercury is carried into the constitution in the same way as other substances, either by being absorbed from the surface of the body, or that of the alimentary canal. It cannot, however, in all cases be taken into the constitution in both ways; for sometimes the absorbents of the skin will not readily receive it, at least no effect is produced, either on the disease, or constitution, from this mode of application. In this circumstance, mercury must be given by the mouth, although the plan may be very improper in other respects, and often inconvenient. On the other hand, the internal absorbents sometimes will not take up the medicine, or at least no effect is produced on the disease, or the constitution.

In such cases, all the different preparations of the medicine should be tried; for sometimes one succeeds when another will not. In some cases, mercury seems to have no effect, either applied outwardly, or taken into the stomach. Many surfaces seem to absorb mercury better than others; such are probably all internal surfaces and sores. Thirty grains of calomel, rubbed in on the skin, have not more effect than three or four taken by the mouth. Dressing small ulcers with red precipitate sometimes causes a salivation. Hunter on the Venereal Disease, p. 335, 336.

Besides the practicableness of getting the medicine into the constitution in either way, it is proper to consider the easiest for the patient, each mode having its convenience and inconvenience, depending on the nature of the parts to which it is applied, or on certain situations of life at the time. Hence, it should be given in the way most suitable to such circumstances.

In many, the bowels can hardly bear mercury at all, and it should then be given in the mildest form possible, conjoined with such medicines as will lessen, or correct its violent local effects, although not its specific ones on the constitution.

When mercury can be thrown into the constitution with propriety by the external method, it is preferable to the internal plan, because the skin is not nearly so essential to life as the stomach, and, therefore, is capable in itself of bearing much more than the stomach. The constitution is also less injured. Many courses of mercury would kill the patient, if the medicine were only given internally, because it proves hurtful to the stomach and intestines, when given in any form, or joined with the greatest correctors. Every one, however, has not opportunities of rubbing in mercury,

and is therefore obliged, if possible, to take it by the mouth. Hunter, p. 338.

Mercury has two effects, one as a stimulus on the constitution and particular parts; the other as a specific on a diseased action of the whole body, or of parts. The latter action can only be computed by the disease disappearing.

In giving mercury in the venereal disease, the first attention should be to the quantity, and its visible effects in a given time, which, when brought to a proper pitch, are only to be kept up, and the decline of the disease to be watched; for by this we judge of the invisible, or specific effects of the medicine, and know what variation in the quantity may be necessary. The visible effects of mercury affect either the whole constitution, or some parts capable of secretion. In the first, it produces universal irritability, making it more susceptible of all impressions. It quickens the pulse, increases its hardness, and occasions a kind of temporary fever. In some constitutions it operates like a poison. In some it produces a kind of hectic fever, that is, a small quick pulse, loss of appetite, restlessness, want of sleep, and a fallow complexion, with a number of consequent symptoms; but such effects commonly diminish on the patient becoming a little accustomed to the medicine. Mercury often produces pains like those of rheumatism, and nodes of a scrofulous nature. Hunter, p. 339, 340.

The quantity of mercury to be thrown into the constitution, for the cure of any venereal complaint, must be proportioned to the violence of the disease. However, we are to be guided by two circumstances, namely, the time in which any given quantity is to be thrown in, and the effects it has on some parts of the body, as the salivary glands, skin, or intestines. For mercury may be thrown into the same constitution in very different quantities, so as to produce the same ultimate effect; but the two very different quantities must also be in different times; for instance, one ounce of mercurial ointment, used in two days, will have more effect upon the constitution, than two ounces used in ten. The effects of one ounce, used in two days, on the constitution and diseased parts, are considerable. A small quantity, used quickly, will have equal effects, to those of a large one employed slowly; but if these effects are principally local, that is, upon the glands of the mouth, the constitution at large not being equally stimulated, the effect upon the diseased parts must be less, which may be known by the local disease not giving way in proportion to the effects of mercury on some particular part. If it is given in very small quantities, and increased gradually, so as to tend insensibly on the constitution, a vast quantity at a time may at length be thrown in, without any visible effect at all. Hunter, p. 341.

These circumstances being known, mercury becomes a much more efficacious, manageable, and safe medicine, than it was formerly thought to be; but, unluckily, its visible effects upon the mouth and the intestines are sometimes much more violent, than its general effect upon the constitution at large. These parts must therefore not be stimulated so quickly, as to hinder the necessary quantity of mercury from being used.

The constitution, or parts, are more susceptible of mercury at first than afterwards. If the mouth is made sore, and allowed to recover, a much greater quantity may be thrown in a second time, before the same soreness is produced. However, anomalous cases occur, in which, from unknown causes, mercury cannot at one time be made to

produce any visible effects; but afterwards, the mouth and intestines are all at once affected. Hunter, p. 342.

Mercury occasionally attacks the bowels, and causes violent purging, even of blood. This effect is remedied by intermitting the use of the medicine, and exhibiting opium. At other times, it is suddenly determined to the mouth, and produces inflammation, ulceration, and an excessive flow of saliva. To obtain relief in this circumstance, purgatives, nitre, sulphur, gum-arabic, lime-water, camphor, bark, kali sulphuratum, blisters, &c. have been advised. Mr. Pearson, however, does not seem to place much confidence in the efficacy of such means, and the mercury being discontinued for a time, he recommends the patient to be freely exposed to a dry cold air, with the occasional use of cathartics, Peruvian bark, and mineral acids, and the assiduous application of astringent gargles. "The most material objection, (says Mr. Pearson,) which I foresee against the method of treatment I have recommended, is the hazard, to which the patient will be exposed, of having the saliva suddenly checked, and of suffering some other disease in consequence of it.

"That the hasty suppression of a ptyalism may be followed by serious inconveniences, has been proved by Dr. Sylvester, (Med. Obs. and Inq. vol. iii.) who published three cases of persons who had been under his own care; two of whom were afflicted with violent pains; and the third scarcely retained any food in her stomach for the space of three months. I have seen not only pains, but even general convulsions, produced from the same cause. But this singular kind of metastasis of the mercurial irritation does not appear to me to owe its appearance to simple exposure to cold and dry air; because I have known it occur in different forms, where patients continued to breathe a warm atmosphere, but used a bath, the water of which was not sufficiently heated. Cold liquids, taken in large quantity into the stomach, or exposure of the body to cold and moisture, will also prove extremely injurious to those who are fully under the influence of mercury; whereas breathing a cool air, while the body is properly covered with apparel, has certainly no tendency to produce any distressing or dangerous consequences.

"If, however, a suppression of the ptyalism should be occasioned by any act of indiscretion, the remedy is easy and certain; it consists only in the quick introduction of mercury into the body, so as to produce a soreness of the gums, with the occasional use of a hot bath." Pearson on the Effect of Various Articles in the Cure of Lues Venerea, edit. 2. p. 163, 164.

Mercury, when it falls on the mouth, produces, in many constitutions, violent inflammation, which sometimes terminates in mortification. In these habits great caution is necessary. The ordinary operation of mercury does not permanently injure the constitution; but, occasionally, the impairment is very material; mercury may even produce local disease, and retard the cure of chancres, buboes, and certain effects of the lues venerea, after the poison has been destroyed. Hunter, p. 342.

When an immoderate and violent salivation is suddenly produced, the means in repute for lessening this accident are, bathing the feet in warm water, clysters, cathartics, and blisters. The application of pounded ice to the jaw, and washing the mouth and throat with cold acidulated gargles, are, perhaps, measures as serviceable as any that can be adopted.

In the article ERETHISMUS, we have described a dangerous state of the system, sometimes occasioned by the use of mercury, and producing death in the most sudden and unexpected

pected manner. This is a subject urgently requiring the attention of the practitioner; but as we have treated of it elsewhere, we shall here be content with referring to the above-mentioned part of the present publication.

Mercury occasionally gives rise to a most severe and extensive rash all over the body, attended with alarming indisposition. This complaint is noticed in the article ERYTHEMA, and is one with which every surgeon should be well acquainted.

The precise manner in which mercury acts in checking and curing syphilitic diseases, has been the subject of various conjectures. Some writers fancy that it must operate by neutralizing the virus, just as an alkali destroys an acid. Others, seeing that mercury only exerted an anti-venereal quality, when combined with oxygen, have endeavoured to account for the action of this mineral, by the quantity of oxygen which it conveys with it into the system. Against the first of these suppositions it is argued, that mercury cannot act by neutralizing the virus, since its effect would then always correspond with the quantity introduced into the system. This experience contradicts, and the Hunterian doctrines lead us to conclude, that the virus does not long remain in the constitution, after contaminating the parts, and communicating to them the disposition which is afterwards to come into action. Against the second opinion it may be observed, that though mercury has no effect in its simple state, yet those mercurial preparations which have the most power over syphilis, are such as are combined with the smallest quantity of oxygen. Besides, there are other substances which contain infinitely more oxygen than mercurial medicines, and yet have not gained the celebrity and confidence which surgeons place in mercury, as an antidote for syphilis. There can be no doubt, however, that the nitric and nitrous acids, the oxygenated muriatic acid, and the oxygenated muriate of potassa, substances which largely abound in oxygen, are in a certain degree anti-syphilitic, though they cannot be depended upon so much as mercury. With respect to the *modus operandi* of mercury, it was Mr. Hunter's belief, that this mineral produced in the constitution an irritation which counteracted the venereal and entirely destroyed it. *Treatise on Ven. Disease*, p. 365.

The indiserete and immoderate employment of mercury sometimes gives rise to diseases, which are very liable to be mistaken for continuations of the syphilitic affection, for which that remedy was at first prescribed. Mr. Hunter himself confesses that these cases puzzle considerably, it being difficult to say when the venereal action is absolutely destroyed. He observes, that such complaints are most common in the throat; for while a mercurial course is going on, and the ulcer on the tonsils healing, or even healed, these parts will sometimes swell, and excoriations occur and spread over the whole palatum molle. Mr. Hunter believed that such excoriations, as well as other appearances of disease coming on during the use of mercury, were seldom or never venereal. Hence he recommended mercury to be continued no longer than was sufficient to overcome the original syphilitic disease. In these cases, he thought that bark was often of service, and that it might be usefully given, either with the mercury, or after the mercurial course was over.

Frequently venereal abscesses will not heal up, though they have become considerably better; for while the syphilitic actions remained in the part, mercury disposed that part to heal; but under the mercurial course, the constitution and part had acquired another disposition, proceeding (to use Mr. Hunter's language) from a venereal and mercurial

irritation, affecting a particular habit of body, or part, at the time which new disposition differs from the venereal, mercurial, and natural, being a fourth disposition arising out of all the three. Mercury, when continued under such circumstances, acts as a poison, and makes the local disease grow worse and spread. Some of the fores, formed in this way, not only resist all means of cure, but often inflame, ulcerate, and produce hard callous bases, so as to put on a cancerous appearance. New diseases may arise from mercury alone, as swelling of the tonsils, unattended with any syphilitic diseases, thickening of the peritonsillar, and cedema, and firmness of the parts over the bones. These complaints, arising under a course of mercury, are too often regarded as venereal, and that mineral pushed to the utmost extent. If mercury has already been given sufficiently to cure the original disease, it ought to be now mixed and left off, and not continued for these incidental affection, which will be rendered worse by it. If, after the cure of such maladies, the venereal disease should begin to come into action again, mercury must be given a second time. Mr. Hunter suspected that the disorders of the tonsils and peritonsium, above alluded to, originated from scrofula, and he entertained a favourable opinion of bark and sea-bathing for their relief. P. 369—371. The terrible forms of disease, which we every day see syphilitic complaints converted into by rash local and mercurial treatment, are really deplorable. The worst phagedenic buboes, and destructive sloughing chancres, and other ulcers, are often more owing to the wrong continuance and immoderate exhibition of mercury, and bad local treatment, than any original fault in the habit.

From mercury, we proceed to notice a few of the other principal remedies which have obtained repute for their anti-syphilitic virtues.

Guaiaicum is the medicine with which the natives of the West Indies are said to have cured syphilitic affections before these diseases made their appearance in Europe. Many writers of the 16th century contended that guaiaicum was a true specific for the venereal disease; and the celebrated Boerhaave, in the 18th, maintained the same opinion. We learn from Mr. Pearson that he was first entrusted with the care of the Lock hospital in 1781. Mr. Bromfield and Mr. Williams were in the habit of reposing great confidence in the efficacy of a decoction of guaiaicum wood. This was administered to such patients as had already employed the usual quantity of mercury; but who complained of nocturnal pains, or had gummata, nodes, oses, and such other effects of the venereal virus connected with secondary symptoms, as did yield to a course of mercurial frictions. The diet consisted of raisins and hard biscuit; from two to four pints of the decoction were taken every day; the hot-bath was used twice a week; and a dose of antimonial wine and laudanum, or of Dover's powder, was commonly taken every evening. Constant confinement to bed was not deemed necessary; neither was exposure to the vapour of burning spirit, with a view of exciting perspiration, often practised, as only a moist state of the skin was desired. This treatment was sometimes of singular advantage to those whose health had sustained injury from the disease, long confinement, and mercury. The strength increased; bad ulcers healed; exfoliations were completed; and these anomalous symptoms, which would have been exasperated by mercury, soon yielded to guaiaicum.

Besides such cases, in which the good effects of guaiaicum made it to be regarded as a specific for lues venerea, the medicine was also formerly exhibited by some practitioners on the first attack of the venereal disease. The disorder, being

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thus benefited, a radical cure was considered to be accomplished; and though frequent relapses followed, yet as these partly yielded to the same remedy, its reputation was still kept up. Many diseases, also, which got well, were probably not really venereal cases. Mr. Pearson seems to allow, that, in syphilitic affections, it may, indeed, operate like a true antidote, suspending, for a time, the progress of certain venereal symptoms, and removing other appearances altogether; but he observes, that experience has evinced that the unsubdued virus yet remains active in the constitution.

Mr. Pearson has found guaiacum of little use in pains of the bones, except when it proved sudorific; but that it was then inferior to antimony or volatile alkali. When the constitution has been impaired by mercury and long confinement, a thickened state of the ligaments, or periosteum, or foul ulcers, still remaining, Mr. Pearson says, these effects will often subside during the exhibition of the decoction. He says, it will often suspend, for a short time, the progress of certain secondary symptoms of the lues venerea; for instance, ulcers of the tonsils, venereal eruptions, and even nodes. Mr. Pearson, however, never knew one instance in which guaiacum eradicated the virus; and he contends, that its being conjoined with mercury, neither increases the virtue of this mineral, lessens its bad effects, nor diminishes the necessity of giving a certain quantity of it. Mr. Pearson remarks, that he has seen guaiacum produce good effects in many patients having cutaneous diseases, the ozæna, and serofulous affections of the membranes and ligaments. See Pearson on the Effects of various Articles in the Cure of Lues Venerea, edit. 2. 1807.

Mezereon was recommended by Dr. A. Ruffel for a particular class of venereal symptoms, in the following terms: "The disease, for which I principally recommend the decoction of the mezereon root as a cure, is the venereal node that proceeds from a thickening of the membrane of the bones. In a thickening of the periosteum, from other causes, I have seen very good effects from it: and it is frequently of service in the removal of those nocturnal pains with which venereal patients are afflicted; though, in this last case, excepting with regard to the pain that is occasioned by the node, I own I have not found its effects so certain, as I at first thought I had reason to believe. I do not find it of service in the cure of any other symptom of the venereal disease." (Med. Obs. and Inq. vol. iii. p. 194. 195.) Mr. Pearson, however, asserts, unequivocally, that mezereon has not the power of curing the venereal disease in any one stage, or under any one form, and if the decoction should ever reduce a venereal node, yet there will be a necessity for taking mercury in as large quantity, and for as long a time as if no mezereon had been exhibited. Cullen found this medicine of use in some cutaneous affections, but excepting an instance or two of lepra, Mr. Pearson has very seldom found it possessed of medicinal virtue, either in syphilis, or the sequelæ of that disease, serofula, or cutaneous affections. The root of sarsaparilla was brought into Europe about 1530. It was at first reputed to possess singular efficacy in venereal cases; but afterwards lost all its fame. Sarsaparilla was again brought into notice by Dr. W. Hunter, who advised Dr. Chapman to make trial of it in a bad case of phagedenic bubo; and the benefit obtained in this instance led Dr. Hunter to extend the recommendation of the medicine. Sir William Fordyce stated, that sarsaparilla would quickly relieve venereal head-achs and nocturnal pains, and, if persisted in, cure them; that, in emaciated or consumptive habits, from a venereal cause, it was the greatest restorer of appetite, flesh, colour, and strength, which he knew of; that

when mercurial frictions had been previously employed, it would generally complete the cure of disease of the throat, nose, palate, or spongy bones; and that it would promote the cure of blotches and ulcers, sometimes accomplish it, even without mercury; though, in this circumstance, there was danger of a relapse. Sir W. Fordyce said, sarsaparilla was of little use in chimeres; but when these, or buboes, would not heal, after the employment of mercury, it would often cure, and always do good. He allows, however, that in all venereal cases "sarsaparilla is not to be trusted to, unless preceded by, or combined with, the use of mercury;" and he thought sarsaparilla would probably always cure what resisted mercury. Medical Obs. and Inq. vol. i.

The celebrated Cullen considered sarsaparilla as possessing no virtues of any kind; for (says he) "tried in every shape I have never found it an effectual medicine in syphilis, or any other disease." Mat. Med. vol. ii.

Mr. Brownfield declares, that he never saw a single instance in which sarsaparilla cured the venereal disease without the aid of mercury, either given before, or in conjunction with it. (Pract. Obs. on the Use of Corrosive Sublimate, &c. p. 78.) Mr. Pearson also "contends, that sarsaparilla has not the power of curing any one form of the lues venerea;" but he allows that it may suspend for a time the ravages of that contagion, the disease returning if no mercury should have been used. This gentleman admits, also, that sarsaparilla will alleviate symptoms derived from the venereal virus. He maintains, that the exhibition of sarsaparilla does not diminish the necessity for giving less mercury. Nocturnal pains in the limbs, painful enlargements of the elbow and knee, membranous nodes, cutaneous ulcerations, and certain other symptoms, resembling venereal ones, are often experienced after a full course of mercury. Such complaints, Mr. Pearson allows, are greatly benefited by sarsaparilla, and exasperated by mercury; and he observes, that it is from these complaints having been mistaken for venereal ones, that the idea has arisen, that sarsaparilla has cured syphilis when mercury had failed. Mercury, and the venereal poison, may jointly produce, in certain constitutions, symptoms which are not strictly venereal, and are sometimes more dreadful than the simple effects of syphilis. Some of the worst of these appearances are capable of being cured by sarsaparilla, while the venereal virus still remains in the system. When this latter disease has been eradicated by mercury, sarsaparilla will also cure the sequelæ of a course of the other medicine. Pearson on the Effects of various Articles in the Cure of Lues Venerea, 1807.

China-root once obtained the character of being a certain specific for syphilitic complaints. Its reputation rose very high, in consequence of its having been reported to have cured the emperor Charles V. At present its medicinal virtues are estimated very low indeed; and it seems to have now lost all its advocates. It was first used in practice about the year 1535.

Cinchona, or the Peruvian bark, has no specific virtue in syphilitic cases, but, according to Mr. Pearson, if it has been alleged upon plausible grounds, that guaiacum possesses medicinal efficacy in venereal pains; sarsaparilla, where there are phagedenic ulcers; and mezereon, in cases where there are membranous nodes; so bark has a claim to praise for its salutary agency in incipient buboes, in ulcers of the tonsils, and in gangrenous ulcers from a venereal cause. This gentleman has seen venereal buboes reduced, though not cured, by it; syphilitic ulcers in the throat healed by it, though the disease recurred; and sudden mortifications of the penis from chancre terminate in a cure of the distemper, with the exhibition of bark, unassisted by mercury. In these last cases,

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Mr. Pearson conjectures, that, as the extinction of the venereal poison could not be ascribed to the specific virtues of the bark, the absorption of the virus must have been anticipated and prevented by the death of the part. This gentleman acknowledges, however, that there are gangrenous chancres met with, where, after the detachment of the sloughs, the specific disease in the part continues, and the ulcer spreads, so that mercury is indispensable.

Opium has been said to be a specific in venereal cases; and in the first volume of the Medical Communications, some facts were published in support of this opinion. But in the years 1784 and 1785, Mr. Pearson made several experiments on the virtues of opium in lues venerea, at the Lock hospital. These are related in the second volume of the preceding work. The result was very unfavourable to the character of opium as an anti-venereal. In a later work, the same gentleman observes that he has been long accustomed to administer opium with great freedom, during the mercurial course; and the experience of more than twenty years has taught him, that when this medicine is combined with mercury, the proper efficacy of the latter is not in any measure increased; that it would not be safe to rely upon a smaller quantity of the specific mineral, nor to shorten the mercurial course at all more, than where no opium has been employed. (On Lues Ven., p. 68, 69.) Though opium may possess no anti-syphilitic virtue, it is unquestionably useful on other principles, in many venereal cases. It often prevents mercury from disordering the stomach and bowels; and it will frequently lessen the irritability and restlessness produced by the introduction of mercury into the constitution. But, regarded as a specific for syphilitic affections, we may conclude with Mr. Hunter, that it has no effect, till mercury has done its best, or its worst. This latter surgeon owns that opium has certainly considerable effects in many diseases, both in such as are consequent to the venereal disease, and in others arising from different causes. It had long been a favourite medicine with him, not only as relieving pain, but as capable of altering diseased actions. In all cases attended with irritability, he says, a decoction of poppy heads, made into a poultice, is an excellent application. He tells us, he had even seen two doubtful syphilitic cases cured by the internal exhibition of opium: but on his trying this plan in an unequivocal case of venereal blotches and sore throat, so far was opium from producing the desired effect, that, after a perseverance of three weeks, the sores were rather worse. Treatise on Venereal Disease, p. 373.

Dr. Storck has related some cases, in which cicuta, or hemlock, is stated to have cured syphilis, when other remedies had failed. (Lib. ii. De Cicuta.) At present it seems to have lost its character, as possessing any specific virtue over the venereal disease. It is not, however, a medicine without its uses. According to Mr. Pearson, the extract and the powder of hemlock may be sometimes advantageously given in spreading irritable sores; whether they are connected with the active state of the venereal virus, or they remain after the completion of the mercurial course. Cicuta sometimes does good, when opium will not; and, therefore, Mr. Pearson thinks it may have other virtues than those depending upon its anodyne qualities. P. 75.

For remarks on the anti-venereal effects of *sassafras*, *juni-perus*, *bardana*, *saponaria*, *dulcamara*, *juglans*, *lobelia syphilitica*, *astragalus exscapus*, *ammonia præparata*, *barytes muriata*, &c. we must refer to Mr. Pearson's publication.

A decoction of the green rind of the walnut seems worthy

of more attention than several other articles. The last author says he has employed it, during many years, where pains in the limbs and indurations of the membranes have remained, after the venereal disease has been cured by mercury, and seldom without manifest advantage. P. 81.

The decoction of the woods and the Lisbon diet drink are famous prescriptions in syphilitic cases. Where the disease is doubtful, or mercury disagrees, or is done with, such remedies may certainly be often taken with benefit.

No. 1.

R. *Sarsaparillæ concisæ*.
Ligni sassafras.
Ligni fantali rubri.
Ligni guaiaci officinalis, sing. unc. iij.
Radicis mezerei
Seminum coriandri sing. unc. ss.
Aquæ distillatæ, lib. x.

These are to be boiled till only half the fluid remains. The dose is a quart, or more, in the day.

No. 2.

R. *Sarsaparillæ concisæ*.
Ligni fantali rubri.
Ligni fantali citrini sing. unc. iij.
Radicis glycyrrhizæ.
Radicis mezerei sing. 3j.
Ligni rhodi.
Ligni guaiaci officinalis.
Ligni sassafras sing. unc. ss.
Antimonii unc. j.
Aquæ distillatæ, lib. v.

These ingredients are to be macerated for twenty-four hours, and afterwards boiled till the fluid is reduced to half its original quantity. From one to four pints are given daily.

Besides the preceding, Mr. Hunter has also noticed the following formula in his Treatise on the Venereal Disease.

No. 3.

R. *Sarsaparillæ concisæ*.
Radicis chinæ, sing. unc. j.
Necum juglandis cortice hecaturum, N^o xx.
Antimonii unc. ij.
Lapidis pumicis pulverizati unc. j.
Aquæ distillatæ, lib. x.

The powdered antimony and pumice stone are to be tied in separate pieces of rag, and boiled along with the other ingredients.

This last decoction is reckoned to be the genuine Lisbon diet drink, whose qualities have been the subject of so much encomium. Pharm. Chirurg.

The muriatic and sulphuric acids have been exhibited in venereal cases with some advantage, as they are capable of improving the appearance of syphilitic ulcers, and restraining for a time the progress of the disease.

But the nitrous and nitric acids have gained the greatest repute for their anti-venereal qualities. These acids have been tried by Dr. Rollo, Mr. Crunkthank, Dr. Beddoes, Mr. Blair, and many others, as substitutes for quicksilver, in the cure of lues venerea. The practice began with Mr. Scott, a surgeon in Bengal, who is said to have derived the idea from Girtanner, who suggested that the efficacy of the various preparations of quicksilver might arise from the oxygen which they contained.

A multitude of cases have been brought forward in favour of nitric acid, as an anti-syphilitic; but there are also some others adduced, which seem very decidedly to controvert its claims.

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claims to that character. It should be carefully remembered, that it is the *nitric* acid, not the *nitrous*, which seems to deserve a further trial in syphilitic cases.

The common way of giving the nitric acid, at first, is to mix ʒj with a pint of distilled water, the mixture being sweetened with simple syrup. This quantity is to be drunk, at different times, in the course of twenty-four hours, through a small glass tube, which is used to keep the teeth from being injured. If no inconvenience is felt, the dose of the acid may be increased to ʒiſs, ʒij, and even, in certain cases, to ʒiij.

The acid is said to increase the appetite, and secretion of urine; to cause more or less thirst, a white tongue, fizy blood, and an increase in the actions of the whole system, but nothing like mercurial salivation is produced. It does not agree, however, equally well with all constitutions.

The nitric acid is beneficial both in the *primary* and *secondary* symptoms of the venereal disease; more so, however, in the former. But, in the latter, even mercury itself frequently fails, and proves hurtful, so that the nitric acid suffers no disparagement from this fact. A change is said to be produced on the disease, by the acid, in six or eight days, and a cure very often in little more than a fortnight.

The oxygenated muriate of potash, which contains an immense quantity of oxygen, is said by Mr. Cruikshank to be more efficacious than the nitric acid, in relieving venereal symptoms.

Richerand informs us, that experiments, confirming the superior efficacy of mercury, in the cure of syphilis, were made for the space of a year, in the hospital of the *Ecole de Médecine* at Paris, before a committee of gentlemen expressly appointed for the purpose. It is stated, that some patients derived only temporary relief from the oxygenated fat and nitric lemonade; that a very few got quite well; and that others, after appearing to be entirely rid of the disease, suffered such relapses as evinced the superiority of the ordinary method. *Nosographie Chir. tom. i. p. 352. edit. 2.*

It appears to us, that there is one very important circumstance made out by the trials of various medicines in the treatment of the venereal disease. According to the Hunterian opinions, we are to suppose that it is the invariable character of the distemper to proceed regularly from bad to worse, unless checked by the specific remedy, mercury. This doctrine is taught in some of the present schools, and seems to be adopted by Dr. Adams in his work on morbid poisons. Were this idea a matter of fact, it would be of material consequence in practice; for, in many difficult and ambiguous cases, we might often form a just decision, by observing whether the complaints recede at all, without the aid of mercury: since, if they do so, they cannot in reality be syphilitic. This assertion, however, is by no means established; and from the observations published by Pearson, and other writers, on the effects of different remedies on the disease, we are to conclude that it is erroneous. The remarks, which we have quoted above, tend to shew that, even under the mere administration of bark, venereal buboes and syphilitic ulcers in the throat may sometimes be healed. The testimony of Mr. Pearson also confirms, that the muriatic and sulphuric acids will improve venereal sores, and restrain for a time the progress of the disease. The committee at the *Ecole de Médecine*, we find, announce that some few cures were effected by oxygenated lard and nitric lemonade. These statements, joined with the large body of respectable evidence from several other quarters already

specified, cannot fail to induce a suspicion, that many medicines, besides mercury, have a certain degree of power in resisting the ravages of the venereal disease; and that even syphilitic buboes and ulcers will sometimes recede, look better, and heal, without mercury. We do not wish to insinuate, that these things are decisively established; the diagnosis of true venereal complaints being often so difficult, that men of great judgment and experience are liable to mistakes.

Observations on the Treatment of particular Symptoms.

Treatment of Chancres.—Before the virus has been taken up by the absorbents, a chancre is strictly a local affection, quite unattended with any contamination of other parts. In this state, there can be no doubt that there is a possibility of accomplishing a cure by destroying with caustic the sore, and adjacent part affected with the venereal action. Such an endeavour must be the more likely to succeed, when it is made while a chancre is small, and in an incipient state. The *argentum nitratum* is commonly employed for this purpose: but perhaps it might be preferable to use the *kali purum* and quicklime, which operate with more effect and quickness. Unfortunately, the period at which the absorption of the virus begins is so uncertain, that the foregoing method is scarcely ever deserving of such implicit reliance, that mercury need not be employed at all. Small pustules and ulcerated points on the penis are frequently destroyed with caustic, and a lasting cure is effected without mercury. Possibly some of these cases may not be venereal; and when the practitioner infers that he has succeeded in preventing the absorption of the virus, he may be deceived. In other instances, the endeavour to supersede all occasion for mercury, by extirpating a chancre with caustic, is only attended with a temporary appearance of success; ulcerations of the tonsils, and other symptoms, denoting a general affection of the constitution, coming on soon after the healing of the sore. Hence it is generally deemed prudent, not to be content with the attempt at extirpation with caustic, but to exhibit, at the same time, for a few weeks, the *pil-hydrargyri*. The mercury may sometimes, indeed, be given unnecessarily; but with its exhibition, and the caustic, the patient has a double chance of security against the extension of the disease to his constitution.

We shall first consider the topical application to chancres.

Mercurial ointments have been commonly used as dressings to chancres; but Mr. Hunter was of opinion, that if the mercury were joined with watery substances, instead of oily ones, the application, by mixing with the matter, would be continued longer to the sore, and would prove more effectual. This, he observes, is one advantage, which poultices have over common dressings. He has often used mercury rubbed down with some conserve instead of ointment, and it answered extremely well. Calomel used in the same way, and also the other preparations of mercury mixed with mucilage, or honey, answer the same purpose. Such dressings, according to Mr. Hunter, will effect a cure in cases which are truly venereal, and free from other morbid tendencies.

Some chancres are indolent, and require a little warm balsam or red precipitate to be joined with the mercurial dressing. Mr. Hunter says, that calomel mixed with salve is more active than common mercurial ointment, and is attended with better effects, when the case requires stimulants.

Solutions of blue vitriol, verdigris, calomel, &c. have been recommended. But Mr. Hunter very judiciously observes,

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serves, that, as all these applications are only of service in remedying any peculiar disposition of the parts, as they have no specific power over the venereal poison, and as such dispositions are innumerable, it is almost impossible to say what applications will be effectual in every instance. Some kinds of dressings will answer in one state of the fore; some in another. The parts affected are often found extremely irritable, in which circumstance the mercury should be mixed with opium or preparations of lead.

Mr. Hunter was an advocate for changing the dressings very often, because the matter separates them from the fore, so as to diminish their effects. He states, that changing the applications thrice a day, will not be found too often, particularly when they are in the form of an ointment.

When the venereal nature of a chancre is removed, the fore frequently becomes stationary, in which case Mr. Hunter observes, that new dispositions have been acquired, and the quantity of disease in the part has been increased. When chancres are only stationary, Mr. Hunter says, they may often be cured, by touching them slightly with the lunar caustic. No cicatrization, in this case, seems possible, till the contaminated surface, or the new flesh, which grows on that surface, has either been destroyed or altered. It is often surprising, how quickly the fores heal up, after being touched with the application.

At the same time that topical applications are made to chancres, mercury must be internally exhibited, both with a view of curing these ulcers, and preventing a lues venerea. Mr. Hunter believed, that the venereal disposition of the chancre would hardly ever withstand both local and internal mercurials.

When local applications cannot easily be made to chancres, as in cases of phymosis, there is a still greater necessity for giving mercury internally, by which means, the cure may in the end be effected.

Mercury should always be given internally in every case of chancre, let it be ever so slight, and even when the fore has been destroyed on its very first appearance. The remedy should always be exhibited the whole time of the cure, and continued some time after the chancre has healed; for, says Mr. Hunter, as there are, perhaps, few chancres without absorption of the matter, it becomes absolutely necessary to give mercury to act internally, in order to hinder the venereal disposition from forming. How much mercury should be thrown into the constitution in the cure of a chancre, with a view of keeping the system from being affected, cannot easily be determined, as there is no disease actually formed, by which we can be guided. Mr. Hunter states, that the quantity must in general be proportioned to the size, number, and duration of the chancres; or, in other words, proportioned to the opportunity, which there has been given for absorption.

The mercury, which is exhibited to act internally, may be conveyed into the system, either by the skin, or stomach, according to circumstances, and it should be so taken, as to produce a slight affection of the mouth.

Mr. Hunter next remarks, that when the fore has put on an healthy look, when the hard basis has become soft, and the ulcer has skinned over in a favourable manner, it may be regarded as cured.

The same distinguished writer notices, however, that in very large chancres, it may not always be necessary to continue the application of mercury, either for external or internal action, till the fore is healed, for the venereal action is just as soon destroyed in a large chancre, as it is in a small one, since every part of the fore is equally affected by the medicine, and, of course, cured with equal expedition.

But, in regard to cicatrization, circumstances are different, because a large fore is longer than a small one, in becoming covered with skin. Hence Mr. Hunter very justly explains, that a large chancre may be deprived of its venereal action long before it has healed; while, on the other hand, a small one may heal before the syphilitic affection has been destroyed. In the latter case, this gentleman represents it as most prudent, both on account of the chancre and constitution, to continue the employment of mercury a little while after the fore has healed.

Mr. Hunter, in the valuable work which he has left on the present subject, takes notice of sloughs, which occur in the tonsils, from the effect of mercury on the throat, and are apt to be mistaken for venereal complaints. He also mentions, that sometimes, when the original chancre has been doing well, and been nearly healed, he has seen new fores break out on the prepuce, near the fist, and assume all the appearance of chancres.

When, in the treatment of chancres, a bubo arises, while the constitution is loaded with a sufficient quantity of mercury to cure such fores, which medicine has also been rubbed into the lower extremity, on the same side as the bubo, Mr. Hunter suspected, that the swelling in the groin is not venereal, but is produced by the mercury. In these cases, he always preferred conveying mercury into the system in some other manner.

With respect to the treatment of chancres in women, since it is difficult to keep dressings on the parts Mr. Hunter advises the fores to be frequently washed with some mercurial solution, and speaks of one made with corrosive sublimate, as perhaps being the best, since it will act as a specific, and stimulant also, when this is requisite. When the chancres, however, are irritable, they are to be treated in the same manner, as similar complaints in men. When the fores extend into the vagina, this passage must be kept from becoming constricted, or closed, by the introduction of lint.

Sometimes, after a chancre and all venereal disease are cured, the prepuce continues thickened and elongated, so that the glans cannot be uncovered. Perhaps, the case is often without remedy. Mr. Hunter, however, very properly recommends trying every possible means, and he informs us, that the steam of warm water, hemlock fomentations, and cinnamon fumigations, are frequently of singular service.

When the thickening and enlargement of the prepuce cannot be removed by applications, all the portion, anterior to the glans penis, may be cut away. See PHYMOSIS.

Mr. Hunter has very ably explained, that chancres, both in men and women, often acquire, during the treatment, new dispositions, which are of various kinds, some retarding the cure, and leaving the parts in an indolent thickened state, after the cure is accomplished. In other instances, a new disposition arises, which utterly prevents the parts from healing, and often produces a much worse disease, than that from which it originated. Such new dispositions may lead to the growth of tumours. They are more frequent in men than women, and generally occur only when the inflammation has been violent from some peculiarity of the parts, or constitution. They have sometimes been considered as cancerous.

Among the diseases in question, Mr. Hunter notices those continued, and often increased inflammations, suppurations, and ulcerations, which become diffused through the whole prepuce, and also along the common skin of the penis, which become of a purple hue, attended with such a general thickening of the cellular membrane, as makes the whole organ

organ appear considerably enlarged. The same writer observes, that the ulceration on the inside of the prepuce will sometimes increase, and run between the skin and the body of the penis, and eat holes through in different places, till the whole is reduced to a number of ragged fores. The glans often shares the same fate, till more or less of it is gone. Frequently, the urethra in this situation is wholly destroyed by ulceration, and the urine is discharged some way farther back. The ulceration, if unchecked, at length destroys all the parts. In this acute case, prompt relief is demanded; but often the proper mode of treatment cannot be at once determined, owing to our ignorance, in respect to the exact nature of the peculiar cause of the disease. Mr. Hunter states, that the decoction of sarsaparilla is often of service, when given in large quantities, and that he has known the German diet-drink effect a cure, after every other remedy had failed.

Mr. Hunter also states, that the extract of hemlock is sometimes of service, and that he has known sea-bathing effect a perfect cure.

Sometimes, when such fores are healing, it becomes necessary to keep the orifice of the urethra from closing, by the introduction of a bougie.

Sometimes, after a chancre has healed, the cicatrix breaks out again, and puts on the appearances of the preceding sore. Occasionally, similar diseases break out in different places from that of the cicatrix. Mr. Hunter represents, that they differ from a chancre in generally not spreading so fast, nor so far; in not being so painful, nor so much inflamed; in not having such hard bases, as venereal sores have; and in not producing buboes. This writer was of opinion, that they were not venereal. They are very apt to recur.

Mr. Hunter does not specify any particular mode of cure for all these cases; but he mentions one instance, which seemed to be cured by giving forty drops of the lixivium saponarium, every evening and morning, in a basin of broth; and he adverts to another case, which was permanently cured by sea-bathing.

In some instances, after a chancre has healed, the parts, as Mr. Hunter remarks, do not ulcerate; but appear to become thickened and indurated. Both the glans and prepuce seem to swell, so as to form on the end of the penis a tumour, or excrescence, shaped very much like a cauliflower, and, when cut into, shewing radii, running from its base, or origin, towards the external surface. It is extremely indolent. It is not always a consequence of the venereal disease; for Mr. Hunter has seen it arise spontaneously.

No medicine seems to be at all likely to cure the disease: the only successful means is to amputate a considerable part of the penis, and then to keep a proper catheter introduced into the urethra.

Warts.—Chancres often induce a disposition to the formation of warts on the penis. We have in a former column stated our belief, that they are not venereal, though sometimes curable by mercury. Hunter seems to think them not syphilitic, and we never have seen any which could not be cured without mercury, and this without the continuance of the original disease in any other form.

These substances are excrescences from the body, they are not to be considered as truly a part of the animal, not being endowed with the common, or natural animal powers. Many trifling circumstances make them decay. An inflammation of the found parts round the wart, or stimuli applied to its surface, will often make it die. Electricity will also

induce an action in such excrescences, which they are not able to support; an inflammation is excited round them, and they drop off.

From this account, we must perceive, according to Mr. Hunter, that the knife and escharotics are not always necessary, although these modes will act more quickly than any other, especially when the neck of the wart is small. When such is the form of the excrescence, perhaps a pair of scissors is the best instrument; but, says the above distinguished writer, when cutting instruments of any kind are horrible to the patient, a silk thread, tied round the neck of the wart, will do very well. However, whichever plan is adopted, it is in general necessary to touch with caustic the base of the little tumour, after this has separated.

Mr. Hunter remarks, that escharotics act upon warts in two different ways, *viz.* by deadening a part, and stimulating the remainder, so that, by the application of escharotic after escharotic, the whole excrescence decays moderately fast; and it is seldom necessary to destroy them down to the very root, which is often thrown off. This, however, is not always the case, and the wart grows again, in which circumstance, it is proper to let the caustic destroy even the root itself.

The kali purum cum calce vivâ, lunar caustic, and blue vitriol, are all proper applications. But one of the best stimulants is the *argus aris* and powder of fava-leaves, mixed together.

Treatment of Buboes.—When a bubo is certainly a venereal one, and only in an inflamed state, an attempt is to be made to resolve the swelling. The propriety of the attempt, however, depends on the progress which the disease has made. If the bubo be very large, and suppuration appears to be near at hand, resolution is not likely to be effected. When suppuration has already taken place, Mr. Hunter much doubted the probability of any success attending the endeavour, which now might possibly only retard the suppuration, and protract the cure.

The resolution of these inflammations, says Mr. Hunter, depends principally on mercury, and almost absolutely on the quantity which can be made to pass through them. When suppuration has taken place, the cure also depends on the same circumstances.

The quantity of mercury, which can be made to pass through a bubo, is represented by Mr. Hunter as depending principally on the quantity of external surface for absorption beyond the bubo.

The mercury is to be applied to such surfaces as allow the remedy, when absorbed, to pass through the diseased gland. In this manner, the disease in the groin is subdued, and the constitution is less liable to be contaminated.

However, Mr. Hunter accurately notices, that the situation of many buboes is such, as not to have much surface for absorption beyond them; for instance, the buboes on the body of the penis arising from chancres on the glands, or prepuce.

When the bubo is in the groin, Mr. Hunter recommends surgeons to pay attention to whether the swelling is in the upper part of the thigh and groin, or on the lower part of the belly, before Poupart's ligament, or near the pubes. When the buboes are situated on the body of the penis, the absorbents leading directly from the seat of absorption are themselves diseased. When the bubo is in the groin, and at the upper part of the thigh, we may conclude that the lymphatics, both from the penis and thigh, run to the affected gland. When the bubo is high up, or on the lower part of the belly, before Poupart's ligament, probably the absorbents,

absorbents, which arise from about the groin, lower part of the belly and pubes, pass through the bubo. When the bubo is far forward, the absorbents of the penis and skin about the pubes pass through the swelling. Mr. Hunter contends, that the knowledge of these circumstances is very necessary, in order to apply mercury in the most advantageous situations.

The utility of rubbing the mercury into surfaces, the absorbents of which lead through the bubo, must be obvious, when it is considered, that the medicine cannot pass to the common circulation without going through the diseased parts; that it must promote the cure, as it passes through them; and that it also prevents the matter, which has already passed, and is still continuing to pass into the constitution, from acting there. Thus the bubo is cured, and the constitution, at the same time, preserved.

Mercury alone, however, is not always capable of effecting the cure of buboes.

When the inflammation rises very high, bleeding, purging, and fomenting, are generally recommended. When the inflammation was erysipelatous, Mr. Hunter had a high opinion of bark; and when it was serofulous, he used to recommend hemlock, and poultices made with sea-water.

The same eminent writer also takes notice of the fact of emetics sometimes occasioning the absorption of buboes, even after they contain matter.

1. *Resolution of the Inflammation of the Absorbents on the Penis.*—Though there is not surface enough beyond the bubo, for rubbing-in a sufficient quantity of mercury, to prevent the effects of absorption, Mr. Hunter still advises this surface to be kept constantly covered with mercurial ointment. In consequence of the surface in question being so small, more mercury must also be conveyed into the system by the mouth, or frictions on some other part. Mr. Hunter observes, that this is necessary, both in order to prevent a lues venerea, and to cure the parts themselves. The quantity of mercury must be regulated by the appearances of the original complaint, and the readiness with which the disease gives way. The same method, he adds, is to be followed in women, and the ointment should be kept continually applied to the inside and outside of the labia.

2. *Resolution of Buboes in the Groin.*—The inflammation of the absorbent glands is to be treated on the same principle as that of the vessels. In the first case, however, we are able to make a larger quantity of mercury pass through the diseased parts. When the bubo is in the groin, the mercurial ointment is to be rubbed on the thigh. This surface, as Mr. Hunter remarks, will in general absorb as much mercury as will be sufficient to resolve the bubo, and preserve the constitution from being contaminated; but when resolution does not readily take place, the same author advises us to increase the surface of friction, by rubbing the ointment upon the leg.

When the bubo is on the lower part of the belly, the ointment should be rubbed also on the penis, scrotum, and belly. The same plan should be followed when the bubo is still more forward.

Mr. Hunter states, that when the bubo gives way, the mercurial frictions must be continued, till it has entirely subsided, and, perhaps, longer, on account of the chancre, which may not yield so soon as the bubo. After the bubo has supplicated, Mr. Hunter is doubtful, whether rubbing-in mercury is useful, or not.

3. *Resolution of Buboes in Women.*—When the swellings are situated between the labia and thigh, Mr. Hunter recommends the mercurial ointment to be rubbed-in all about the anus and buttock, from which parts the absorbents probably

run through the seat of the disease. When the buboes are in the round ligaments, the surface for absorption will not be large enough, and more mercury must be internally given, or rubbed into other surfaces.

When the bubo is in one of the inguinal glands, the same plan is to be adopted as in the same case in men.

4. *Buboes in unusual Situations.*—When buboes form in the arm, or arm-pit, in consequence of the absorption of venereal matter from wounds on the hands, or fingers, mercurial ointment should be rubbed on the arm and forearm. Mr. Hunter adds, however, that this surface may not be sufficient, so that it may be proper to convey more mercury into the system in other ways. He states, that he has seen a true venereal chancre on the middle of the lower lip, attended with a bubo, on each side of the neck, under the lower jaw, close to the maxillary gland. The swellings were resolved by applying mercurial ointment to them, and the chin and lower lip.

5. *Quantity of Mercury necessary for the Resolution of a Bubo.*—Mr. Hunter observes, that the quantity of mercury necessary for the resolution of a bubo, must be proportioned to the obstinacy of the complaint; but that care must be taken not to extend the employment of the medicine so far as to produce certain effects on the constitution. When the bubo is in a situation which admits of a large quantity of mercury being rubbed in, so as to pass through the swelling, and when the complaint readily yields to the use of half a dram of mercurial ointment every night, the mouth not becoming sore, or at most only tender, the above author thinks it sufficient to pursue this course, till the gland is reduced to its natural size. In this manner, the constitution will probably be safe, provided the chancre, which may have caused the bubo, heals at the same time. When the mouth is not affected in six or eight days, and the gland does not readily resolve, then two scruples, or a dram, may be applied every night; and, continues Mr. Hunter, if there should still be no amendment, even more must be rubbed in. In short (says he) if the reduction is obstinate, the mercury must be pushed as far as can be done without a salivation.

When there is a bubo on each side, so much mercury cannot be made to pass through each, as the constitution in general will not bear this method. However, Mr. Hunter sanctions the plan of minding the forecets of the mouth with in this kind of case; though, he adds, that it is better to let the buboes proceed to suppuration, than to load the system with too much mercury.

When the situation of buboes will not allow an adequate quantity of absorbed mercury to pass through them, the frictions must be continued in order to affect the constitution; but, according to Mr. Hunter, more mercury in this case will be requisite, than when the remedy can be made to pass directly through the diseased gland.

Many buboes remain swifter, without either coming to resolution, or suppuration; and, notwithstanding every attempt to promote these changes, the glands become hard and scirrhous. Mr. Hunter conceived, that cases of this sort are either serofulous at first, or become so as soon as the venereal disposition is removed. He advises the use of hemlock, sea-water poultices, and sea-bathing.

6. *Treatment of Buboes which suppurate.*—The suppuration of buboes frequently cannot be prevented by any known means. They are then to be treated, in some respects, like any other abscess. Before opening buboes, Mr. Hunter conceived it was advantageous to let the skin become as thin as possible, as a large opening would then become unnecessary, and no measures would be requisite for keeping the skin from closing, before the bottom of the sore had healed.

Mr. Hunter thinks it doubtful, whether the application of mercury should be continued through the whole suppuration. He was inclined to continue it; but in a smaller quantity.

There has been much dispute, whether a bubo should be opened, or allowed to burst of itself, and whether the opening should be made with a cutting instrument, or caustic. On this subject, Mr. Hunter remarks, that there is no peculiarity in a venereal abscess to make one practice more eligible than another. The surgeon, he says, should in some degree be guided by the patient. Some patients are afraid of caustics; others, of cutting instruments. But when the surgeon has the choice, Mr. Hunter expresses a preference to opening the bubo with a lancet, in which method no skin is lost. But, he observes, that when a bubo is very large, and there will be a great deal of loose skin, after the discharge of the matter, he thinks that caustic may, perhaps, be better, as it will destroy some of the redundant skin, and occasion less inflammation than what is caused by an incision. The *kali purum*, with the *calx viva*, is the caustic commonly employed.

After the bubo has been opened, surgeons usually poultice it as long as the discharge and inflammation are considerable, and then they employ dressings, which must be of such a quality, as numerous undescribable circumstances may indicate. The use of mercury, in the mean while, is to be continued, both to make the bubo heal, and prevent the bad effects which might otherwise arise from the matter continually absorbed. The mercury should also be so rubbed in, as to pass, if possible, through the diseased groin.

The mercurial course is to be pursued till the sore is no longer venereal. But, in general, since this point is difficult to ascertain, the mercury must be given till the part has healed, and even somewhat longer, when the bubo has healed very quickly; for the constitution is afterwards very apt to become contaminated.

However, mercury is not to be continued thus long in all cases; for, as Mr. Hunter explains, buboes often assume, besides the venereal, other dispositions, which mercury cannot cure; but will even exasperate.

Consequences of Buboes.—Sometimes the sores, when they are losing, or entirely deprived of the venereal disposition, become changed into ulcers of another kind, and, most probably, of various kinds. How far it is a disease arising from a venereal taint, and the effects of a mercurial course jointly, says Mr. Hunter, is not certain. This writer suspected, however, that the nature of the part, or constitution, had a principal share in the malady.

Mr. Hunter observes, that such diseases make the cure of the venereal affection much more uncertain, because, when the sore becomes stationary, or the mercury begins to disagree, we are ready to suspect that the virus is gone; but this is not always the case. Perhaps the action of the venereal poison is only suspended, and will commence again as soon as the other disease ceases.

In these cases, Mr. Hunter recommends attacking the predominant disease; but he allows there is difficulty in ascertaining its nature, and finding out whether it is venereal, or not.

The same author also acquaints us, that he has seen some buboes exceedingly painful and tender to almost every thing that touched them, and the more mild the dressings were, the more painful the parts became.

In some instances, the skin only seems to become diseased. The ulceration spreads to the surrounding integuments, while a new skin forms in the centre, and keeps pace with the ulceration, so that an irregular sore, which Mr. Hunter

compares with a worm-eaten groove, is formed all round. It appears only to have the power of contaminating the parts which have not yet been affected; and those which have readily healed.

When buboes become stationary, and seem little inclined to spread, attended with a sinus or two, hemlock, joined with bark, is, according to Mr. Hunter, the medicine most frequently serviceable. It is best to use it both externally and internally. The same author also speaks favourably of *sarsaparilla*, sea-bathing, and sea-water poultices. He states, that at the Lock Hospital, gold-refiners' water has been found a useful application; that, in some cases, drinking large quantities of orange-juice, and in others taking mezezon, have been found serviceable.

Treatment of secondary Symptoms.—Before treating of this subject, it may be as well to recapitulate a few of the leading points in Mr. Hunter's doctrine.

1. Syphilitic matter, after being absorbed into the system, circulates with the blood, and is thrown out by the common emunctories; but in its progress it may contaminate other parts of the body, and give them a disposition to disease.

2. When this disposition is given, the diseased action does not follow till a certain time, which varies according to the constitution and other circumstances; but never happens while the constitution is under a mercurial irritation.

3. When the disposition has taken place, the action may be suspended by mercury; but the disposition will remain, and the action shew itself at some period after the mercurial irritation has ceased.

4. When the action has begun in an order of parts it may be cured, and will not return in the part, or that order of parts from the same stock of infection.

5. But the diseased action may take place in another order of parts, if that other order has been contaminated; and, in this order, it must be treated as in the former.

6. When the diseased action has taken place and been cured in the part first infected, in the throat and fauces, the skin, and the bones or periosteum, the subject may be said to be free from the disease, as far as our knowledge has hitherto traced it.

7. The usual time of the skin or fauces taking on the diseased action is, on a medium, six weeks after the mercurial irritation that cured the first symptoms has subsided; and in the bones about twice that time.

8. Whatever doubtful appearances may arise on the skin, throat, or bones, during the mercurial irritation, under which chancres, or buboes are giving way, they are certainly not venereal: and even if such secondary symptoms appear after that mercurial irritation has ceased, but earlier than the period specified in the preceding proposition, they are to be regarded with doubt.

9. If no secondary symptoms appear for three months after the mercurial irritation has ceased, and the constitution has not in the mean time been occupied by any other disease, we have for the most part no reason to apprehend any thing in the skin or throat from that stock of infection.

Lastly, there are uncommon instances, in which the secondary symptoms occur sooner or later than the periods above stated. See Hunter's Treatise, and Adams on Morbid Poisons, p. 159, 160.

The treatment of secondary symptoms consists almost entirely of the judicious employment of mercury. Frictions with the ointment are generally the most preferable; but sometimes the pill hydrarg. oxydi rubri, the solution of the oxymercurate, or the administration of mercury by fumigation (see FUMIGATION), may be proper and advantageous. The continuance of the mercurial course must always be suspended,

suspended, when the effects produced are attended with too much violence or disorder. Opium may be given to lessen and check the diarrhœa, which sometimes arises from mercury, and both weakens the patient and diminishes the specific action of that mineral on the distemper. Sometimes other medicines will be useful, either given after the mercury is done with, while it is omitted for a time, or even in conjunction with it. This may be said of bark, cicuta, opium, farsaparilla, and the diet-drinks already specified. Whatever doubts may prevail respecting the antivenereal qualities of nitric acid, none remain with regard to its utility in meliorating the state of many complaints, which may exist after the syphilitic action has been entirely subdued by a previous exhibition of mercury. But in our general observations we have already been so full in our directions for the management of a mercurial course, and in our account of the effects of other medicines in cases of syphilis, that it would be the most superfluous prolixity to enlarge on this subject.

There is one question, however, that presents itself as deserving consideration, namely, how long a mercurial course ought to be continued? We find that it was one of Mr. Hunter's opinions, that when venereal matter is absorbed, it may produce in parts a disposition to the disease, or, in other words, a state of contamination, which, though it might have been hindered by the timely effects of mercury, and may now be kept from going into action as long as the system is under the influence of mercury, yet cannot be cured, but must some time or another proceed to action, or a state of palpable disease. In this condition alone it is curable. We observe, however, that Mr. Hunter, in his practice, is not altogether regulated by this principle; for in his directions for the cure of a chancre, he recommends mercury to be followed up some time after the sore is cured, which medicine being supposed not to be capable of curing the disposition that may be formed, (and if formed at all, must have formed ere this,) the method, according to reason, can be of no service. We cannot pretend to deliver an opinion whether the practice is positively right or the theory wrong. One thing or the other must be the case. But it is our duty to state that the generality of surgeons think it prudent to go on with mercury a certain time after ordinary chancres are healed. But in the treatment of secondary symptoms we believe the perseverance in mercury, after all palpable syphilitic mischief is removed, is utterly wrong and unnecessary. In other respects, the mercurial course for the relief of secondary symptoms is to be conducted exactly in the same manner as in cases of chancre or bubo, and according to the directions given in our general observations. Should the secondary symptoms in the throat, skin, mouth, or nose, have taken place and been cured by mercury, we may assure the patient that whatever appearances may now present themselves in these parts, the complaints cannot be really syphilitic. Therefore the continuance of mercury is not indicated. But though we may venture to predict that the disease will not recur in this first order of parts, we cannot promise as much with respect to the second order, viz. the bones, periosteum, and tendons. Whether these have contracted the disposition, or, in other words, are contaminated or not, can never be known *à priori*. If they have contracted the disposition, this cannot be cured by mercury, but will, some time or other, take on the syphilitic action, or, in other terms, fall into a state of obvious and palpable disease. It is only in this last condition that mercury can exert its beneficial power in effecting a permanent cure. Were this medicine given under the idea of preventing syphilitic mischief, it might indeed delay the coming on of the complaints, but after the disposition has been formed, they must sooner or later follow. Mercury was supposed by

Hunter to be sometimes capable of preventing the disposition from being formed at all, if exhibited in an early stage of a chancre, before the virus has been absorbed. But as much absorption, and the consequent disposition for the disease in certain parts take place at an early period of the case, all perseverance in mercury for the prevention of any more secondary symptoms is, according to the Hunterian tenets, altogether fruitless. If the soft parts or first order have been cured, we cannot consider our patient safe, respecting the bones, periosteum, and tendons, or second order, till a medium of at least six weeks after the last mercurial irritation has ceased. Of this the patient should always be warned. The affections of this second order of parts generally consist of nodes and pains. But it is not every swelling or pain in a suspected bone that is really venereal. Mercury itself will sometimes bring on painful affections and enlargements of the bones. Even when nodes are syphilitic, it often happens that no continuance nor quantity of mercury will totally remove the swelling. Such medicine is only to be continued till we have reason to infer all syphilitic action in the part is subdued. Whatever degree of thickening or enlargement may now remain is only of a common nature, does not demand mercury, and frequently admits of being materially lessened, or even entirely removed, by blisters, if care is taken to keep up a discharge from the excoriated surface with the savine cerate.

Some other cases, connected with the subject of lues venerea, will be considered in the articles PHIMOSIS and PARAPHIMOSIS. See also GLEET, GONORRHOEA, &c.

LUESIA, in *Geography*, a town of Spain, in the province of Aragon; 20 miles S.W. of Jaca.

LUFF, a sea-term, the same with *loof*.

LUFFA, in *Botany*, the Arabic name of an herb of the Cucumber family, *Momordica Luffa*, Linn. Sp. Pl. 1433. Vessing. Ægypt. 48. t. 50, 51. Cavanilles, in his *Icones*, v. 1. 7. t. 9, 10, has applied it generically to a plant called by him *Luffa fetida*, a native of the East Indies, with which he thinks it probable that the above *Momordica* may agree in generic characters. Willdenow has adopted this *Luffa*, in his Sp. Pl. v. 4. 383. How far the difference in its stamens, whose anthers are all separate, and which are accompanied by five abortive filaments, may serve to keep it distinct, we very much doubt. As to the fruit, it appears nearly to agree with *Momordica Operculata*.

LUG, in *Agriculture*, a long measure of land, the same with pole or perch, sixteen feet and a half. In Gloucestershire, it however signifies a land-measure, of six yards, or a rod, pole, or perch of six yards. It is a measure by which ditching and other similar operations are performed in that district. This term is likewise applied to the stick by which the work is measured. It is sometimes called *log*.

LUG-a-Leaf, a name used in some parts of England for the *rhomboides* of Rondeletius, and the *rhombus non aculeatus squamifolius* of Willughby.

We have it on our own shores; and the Cornish people, who frequently catch it, call it the *lug-a-leaf*. See PLEURONECTES *Plateffa*.

LUG-sail, in *Sea Language*, is a square sail, hoisted occasionally on the mast of a boat or small vessel, upon a yard which hangs nearly at a right angle with the mast. These are chiefly used in the *barca longas*, navigated by the Spaniards in the Mediterranean.

LUGA, in *Geography*, a town of Russia, in the government of Petersburg, on a river of the same name; 80 miles S. of Petersburg. N. lat. 58° 25'. E. long. 29° 30'.

LUGANO, or LAURA, a territory of Italy, ceded to the Swiss cantons in 1513; it is environed by the districts of

Mendris Lugarus, Bellinzona, and the duchy of Milan; it is fertile and populous, about eight leagues long and five broad, lying in N. lat. 46°, and is divided into quarters, containing 16 market towns and villages, and 53,000 inhabitants. This territory produces pasture, corn, fruit, and silk; olives are in great abundance. It is now ceded to Italy.—Alfo, the capital of the fore-mentioned bailiwick or district, which is a small, tolerably built, trading town, delightfully situated round the curve of a bay, and backed by a succession of hills, rising in gentle swells to a considerable height; in front a bold mountain clothed with forest projects into the lake, of which a noble branch extends to its right and left. To that spot boats of various sizes are continually passing and repassing, its base being perforated with *cuniculi*, or caverns, to which the inhabitants send their meat, and all sorts of provision, where it is kept untainted for seven or eight days, and the wine preserved with delicious coolness. The heats are moderated by the surrounding hills, and the cool breezes from the lake. It is no less sheltered from the Alpine blaits, which, chilled by the neighbouring snows, would otherwise destroy the temperature of this equal climate. Olive, almond, and all the southern fruits ripen here to perfection. Lugano is the emporium of the greater part of the merchandize which passes from Italy over the St. Gothard, or the Bernardin. At the end of autumn, the Swiss mountaineers bring down numerous herds of cattle for sale, and return with less bulky commodities. The town contains about 8000 inhabitants; most of the houses are built of tuff-stone; the residence of the capitano, or governor, is a low building; and on the walls are the arms of the twelve regent cantons. On an eminence above the town stands the principal church, remarkable only for the beautiful carvings in stone round the doors and rose-window, and for the delicious prospect from its towers. In the cloister of the Recollists is a capital picture attributed to Luvino; their church is handsome, and the screen is ornamented with the paintings of the Passion by the same master. The palace of the Marquis de Riva contains a few good pictures; 16 miles N.W. of Como. N. lat. 45° 50'. E. long. 8° 53'. Cox's Switzerland, vol. iii.

LUGANO, *Lake of*, a lake adjoining to the town above described, about 25 miles in length, and from two to four in breadth; its form is irregular, and bending into continued sinuities. From Porto, a small village, situated at its southern extremity, an arm of the lake bends northward, and discharges itself into the Lago Maggiore, by means of the river Trifa. It is scarcely possible, says Mr. Cox, to imagine a more perfect or greater variety of beauties than this noble piece of water affords. The vast overhanging woods, the bold precipices, the transparency of the water, unite to form a scenery in the highest degree luxuriant. This lake is about 190 feet perpendicular higher than the lake of Como and Lago Maggiore. The two last mentioned lakes are of the same level, and about 240 feet higher than the city of Milan. Cox. See LAKE.

LUGAR BEN, a town of Prussia, in Natangen; 36 miles S.E. of Koigsberg.

LUG R-NUEVO, a town of Spain, in Valencia, on the coast; eight miles S. of Alicante.

LUGDE, or LUBE, a town of Westphalia, in the bishopric of Paderborn, on the Emmer; 24 miles N.N.E. of Paderborn. N. lat. 51° 55'. E. long. 9° 18'.

LUGDUNUM, in *Ancient Geography*. See LYONS.

LUGDUNUM Batavorum. See LEYDEN.

LUGGS, the English name for a peculiar species of insect, found in great plenty on the shores of Cornwall. It is of the nature of the *scelopendra*, and is called by Mr. Ray *vermis*

scelopendroides. It grows to twelve inches long, and has instead of legs nineteen pair of stiff bristles, all which stand toward the head part of the creature. The tail is at least five inches long when full grown, and has no mark of them. Its body is rounded, and much resembles the body of the common earthworm, and is of a flesh-colour, or pale red. It has no forelegs.

LUGMON, in *Natural History*, a name given by the people of the Philippine islands to a species of turtle, the female of which has a tuft of red feathers, of a pale blood colour, on her breast, which have greatly the appearance of a wound, so much that any body would really be deceived.

LUGNAQUILLA, in *Geography*, mountains of Ireland, in the county of Wicklow.

LUGNY, a town of France, in the department of the Seine and Loire, and chief place of a canton, in the district of Mâcon; 10 miles N. of Mâcon. The place contains 1133, and the canton 12,776 inhabitants, on a territory of 17½ kilometres, in 19 communes.

LUGO, JOHN DE, in *Biography*, a learned Spanish Jesuit and cardinal, was born at Madrid in 1583. He gave early proofs of his attachment to the introductory parts of learning, and was sent to study the law at Salamanca, where he entered the society of Jesuits, thereby following the example of his brother, though contrary entirely to the wish of his father. Upon the death of the father, the two sons divided a very large estate that had fallen to them among the Jesuits of Seville and Salamanca. He became professor of philosophy at Medina del Campo, then professor of divinity at Valladolid, and afterwards he filled the divinity chair at Rome. In 1643 he was raised to the dignity of cardinal by pope Urban VIII. without his knowledge, and he died at the age of seventy-seven, in the year 1660. He was the author of seven folio volumes, chiefly in theology and morals, of which a few tracts only have any degree of merit, such as "De Virtute et Sacramento Penitentiae," and "De Justitia et Jure." He is, however, particularly celebrated as being the person who brought the virtues of bark into notice, which he introduced into France in the year 1650, and which, under the name of "Cardinal Lugo's powder," he administered gratis to the poor, but obliged the rich to purchase with its weight in gold. Bayle.

LUGO, *Lucus Augusti*, in *Geography*, a very ancient town of Spain, in the province of Galicia, which, in the time of the Romans, was the centre of one of those jurisdictions that were named "Conventus." At present it is the see of a bishop, suffragan to St. Jago, and worth 155*l.* sterling. It is situated on an eminence near the banks of the Minho, 13 leagues from its source. Here several councils have been held; and among others, one in 564 to regulate the limits of the bishoprics of Galicia and Portugal. It is at most three miles in circumference: and the streets are tolerably handsome and well paved. It has 12 squares, three fountains, and five gates. The walls are ancient, but in good repair. The city contains a cathedral, several churches and convents, the bishop's palace, a college, a hospital, and an asylum. The civil administration is composed of an alcalde major, a regidor, and several district alcaldes. The cathedral is a very ancient building of Gothic architecture, with a modern portal. Lugo is supposed to contain more than 4600 inhabitants. They work up wools in this town, but not enough to send any out of the country. In its territory is a number of thermal springs, temperate and boiling. Wheat, barley, rye, and maize, are produced in the environs; and many large flocks of sheep are to be seen. The Minho supplies trout, salmon, and lampries. Lugo is distant from St. Jago 13 leagues. N. lat. 43° 21'. W. long. 7° 32'.—Alfo, a town

town of Italy, in the Veronese; eight miles N. of Verona.—Also, a town of Italy, in the Paduan; 10 miles E. of Padua.—Also, a town of Italy, in the department of the Lower Po; 15 miles S. of Ferrara.

LUGOS, a town of Hungary; 37 miles S.W. of Colofvar.—Also, a town of Hungary, in the bannat of Temesvar, on the Temes; 23 miles E. of Temesvar.

LUGUBRE, *Fr.* in *Musie*, a term which implies gloomy, melancholy, dejected.

LUHÄNGO, in *Geography*, a town of Sweden, in the province of Tavastland; 60 miles N.N.E. of Tavastland.

LÜHEA, in *Botany*, so named by Willdenow, in compliment, as we presume, to F. K. Freyherr von der Lühe, who published at Vienna, in 1797, a German hymn to Flora. His poetry ought to be very fine, as we hope it is, to merit so magnificent a plant.—Willd. Sp. Pl. v. 4. 1434.—Ciafs and order, *Polyadelphia Polyandria*. Nat. Ord. *Columniferae*, Linn. *Malvaceae*, Juss.

Gen. Ch. Cal. Perianth inferior, double; the outer of nine equal, linear leaves, channelled at the back; inner in five deep, lanceolate segments, internally smooth, naked, and coloured. Cor. Petals five, longer than the calyx, broad, roundish, wavy, crenate, veiny. Nectaries five, stalked, pencil-shaped, hairy. Stam. Filaments numerous, hairy, united into five sets at their base; anthers incumbent, roundish, smooth. Pist. Germen roundish, or conical, with five angles, hairy; style columnar, thick, shorter than the stamens, smooth upwards; stigma orbicular, broad, depressed, with several radiant furrows. Peric. Capsule of five cells. Seeds winged.

Eff. Ch. Calyx double; the outer of nine leaves; inner in five deep segments. Petals five. Nectaries five, pencil-shaped. Style one. Capsule of five cells. Seeds winged.

1. *L. speciosa*. Willd. Nov. Act. Soc. Nat. Scrut. Berol. v. 3. 410. t. 5.—Native of lofty mountains in the Caraccas, from whence we have a specimen, gathered by Dr. J. Marter, to whom, though we do not meet with his name, the Vienna gardens are indebted for many of the finest plants published by Jacquin. From him we learn what is mentioned above respecting the capsule and seeds, about which Professor Willdenow had no information. We have had no opportunity of consulting his original account in the memoirs of the Berlin Society, which is here cited on his own authority in his *Species Plantarum*.

This, the only known species, is a tree, 20 or 30 feet high, with alternate, round, brown branches, downy when young. Leaves alternate, on short, thick, downy stalks, roundish-oblong, pointed, slightly heart-shaped and a little unequal at the base, three or four inches long, unequally and sharply serrated; smooth and naked above; white with dense stellated down, furnished with three prominent ribs, and numerous transverse parallel veins, beneath. Flowers white, large and handsome, not many together, in downy, terminal, simple clusters. The calyx and partial stalks are clothed with dense pubescence, of a rusty hue in the dried specimen.—This plant is closely allied in habit and fruit to the *Pterospermum* of Schreber and Willdenow (*Pentapetes suberifolia* and *acerifolia* of Linnaeus); the differences in their flowers however seem essential, especially as the calyx of *Pterospermum* is simple.

LU-YNY, in *Geography*, a town of Russian Poland; 24 miles W. S.W. of Owruca.

LUICHEN, a city of China, in Quang-tong, situated in a fertile and pleasant country, near the sea. N. lat. 28° 58'. E. long. 110° 8'.

LUIDA, in *Botany*, Adanson v. 2. 492, was so called by that writer after Mr. Edward Lwy, the correspondent of Ray, who is mentioned in his *Synopsis* as the discoverer of several mosses and other plants in Wales. The supposed genus however will neither immortalize him, nor its whimsical author, being made up of various species of *Hypnum*, *Bryum*, *Splachnum*, &c. characterized by having some leaves triangular and some orbicular! Mr. Lwy disappears, by what Ray says of him, in the preface to the second edition of his *Synopsis* and elsewhere, to deserve more permanent commemoration.

LUIGI Rossi, in *Biography*, one of the earliest and most voluminous composers of cantatas in the seventeenth century. He is celebrated in 1640 by Pietro della Valle, in his letter to Guidiccioni, for his grave canonette, particularly that which begins "Or che la notte del silenzio amica."

Many of his cantatas are preserved in all the collections which include the music of the last century, particularly in the Brit. Mus. Bibl. Harl. 1265 and 1273, and in Dr. Aldrich's Collection, Christ church, Oxon.

His cantata, "La Fortuna," in the Museum collection, No. 1265, is of an immeasurable length. The recitative, however, with formal closes, has pleasing expression in it, that still live. No *da capo*, or sign of reference, appears in his cantata, and he writes twice or three times over the same air; a trouble which these expedients would have spared. He seems to have started several flimsy divisions, which afterwards became common; and, indeed, it appears from his cantatas, that as soon as secular music had divested itself of the pedantry of perpetual canons, fugues, and multiplied parts, another vice crept into the art, by the frequent and excessive use of divisions. Luigi, in songs for a single voice, has some of this kind as long as those in modern bravura airs.

In the Magliabecchi library at Florence, we found a scene of oratorio called "Giuseppe Figlio di Giacobbe, opera spirituale fatta in musica da Aloigi de Rossi, Napolitano, in Roma." And under the name of *Rossi* many of his compositions may be found in the museum.

Luigi, in his motets that are preserved in the Christ-church collection, appears to have been as able to write a *cappella*, in many parts with learning, as with elegance in few.

LUIGNA, in *Geography*, a town of Spain, in Asturias; 20 miles N.W. of Oviedo.

LUI-LUNG-TA. See SECHO.

LUING, or LONG ISLAND, one of the smaller western islands of Scotland, between Scarba and Kerrera.

LUINI, BONERRO, of Brescia, in *Biography*, an opera singer in soprano, who had been in Russia and other foreign countries, and acquired great wealth, but dissipated great part of it by play. Yet, after losing ten thousand pounds in one night of the money which he had gained *en sa vie*, he was still said, in Italy, to be very rich.

LUIS, ST, in *Geography*, a town of South America, in the government of Buenos Ayres, and province of Cordova; 170 miles S.W. of Cordova. S. lat. 32° 15'. W. long. 67° 12'.—Also, a town of South America, in the province of Meyes; 72 miles N.W. of Trinidad.—Also, a mission of Spanish monks in New Albion; 15 miles N.E. of Punta el Eleros.—Also, a town of New Navarre; 50 miles S. of Cala Grande.

LUIS de la Paz, ST, a town of Mexico, in the province of Mechoacan; 100 miles N. of Mechoacan. N. lat. 21° 50'. W. long. 102° 15'.

LUIS de Maranon, ST. See ST. FELIPE.

LUIS de Potosi, St., a city of Mexico, in the province of Guasteca, pleasantly situated, and environed with rich gold mines. The town is handsome and well built, considerable in size, and populous. The streets are straight and neat, the churches magnificent; and the inhabitants, who are chiefly Indians, possessing all the conveniences and comforts of life; 190 miles N.N.W. of Mexico. N. lat. 22° 25'. W. long. 103° 6'.

LUIS de Zacatecas, a town of Mexico, capital of the province of Zacatecas, the see of a bishop, and residence of a governor; 240 miles N.N.W. of Mexico. N. lat. 22° 50'. W. long. 103° 46'.

LUI-SHIN, in *Mythology*, the Jupiter of the Chinese, or spirit that presides over thunder. The figure of it has the wings, beak, and talons of an eagle. In his right hand he holds a mallet, to strike the kettle-drums with which he is surrounded, whose noise is intended to convey the idea of thunder; while his left is filled with a volume of undulating lines, very much resembling those in the hands of some of the Grecian Jupiters, and evidently meant to convey the same idea, *viz.* that of the thunder-bolts, and lightning.

LOUISIANA, in *Geography*, a district of Spain, in Andalusia, three leagues from Ecija, settled in 1791 by a colony of Germans, who built houses in an uniform plan, allotting to each house a portion of land, which constituted a village; but the houses are already beginning to fall into ruin.

LUISINUS, Louis, in *Biography*, a physician, was born at Udina, in the state of Venice, where he obtained considerable reputation about the middle of the sixteenth century, and was not less distinguished by his acquisitions in literature, than by his medical skill. He was author of the following works: "Aphorismi Hippocratis hexametro carmine conscripti," Venice, 1552; "De compefendis animi affectibus per moralem philosophiam et medendi artem, Tractatus in tres Libros divisus," Basle, 1562; "Aphrodisiacus, sive de Lue Venerea, in duos Tomos bipartitus, continens omnia quæcumque hæcenus de hac re sunt ab omnibus Medicis conscripta," Venice, 1566, folio. The first volume contained an account of the printed treatises on the lues up to that year; the second, published the year following, comprehended principally the manuscript works on the subject, which had not then been committed to the press. Eloy Dict. Hist. de la Médecine.

LUISNANSBERG, in *Geography*, a town of Sweden, in Westmanland; 48 miles N.W. of Stroemsholm.

LUJULA, in *Botany*, &c. See *OXALIS Acetosella*.

LUK, in *Geography*, a town of Bohemia, in the circle of Saatz; 6 miles E. of Carlsbad.

LUKAU, a town of Moravia, in the circle of Znaim; eight miles W.N.W. of Znaim.

LUKAWETZ, a town of Bohemia, in the circle of Czaflau; 28 miles S.W. of Czaflau.

LUKE, St., in *Sacred Biography*, one of the evangelists, and the writer of the gospel bearing his name, and also of the book of the Acts of the Apostles. Concerning his profession and country, previously to his conversion to Christianity, there is a difference of opinion among both ancient and modern authors. The first mention of him in the books of the New Testament occurs in his own history. (Acts, xvi. 10, 11.) When the apostle Paul was again, a second time, in Greece, it appears, from Acts, xx. 1-6, that St. Luke was with him; and that he accompanied Paul from Greece through Macedonia to Philippi, and went with him from thence to Troas. It further appears from the sequel of the history in the Acts, that he accompanied the apostle to Jerusalem, and remained with him there. When the

apostle was sent a prisoner from Cæsarea to Rome, Luke was in the same ship with him, and staid with him at Rome during the whole interval of his two years' imprisonment in that city. Of this fact we have also collateral evidence from the epistles of St. Paul written at this time. (2 Tim. iv. 11. Philem. v. 24.) And if Luke the beloved physician, mentioned Col. iv. 14, he the evangelist, this passage affords additional proof of his being then with the apostle. Some have also supposed that he is the person mentioned 2 Cor. viii. 18, as "the brother, whose praise is in the gospel throughout all the churches." Dr. Lardner, with his usual industry and accuracy, has collected the testimonies of various ancient writers concerning the evangelist Luke; and from these he deduces several inferences that serve to settle his profession and country, and to correct the mistakes of other authors. The notion which some have entertained, that he was a painter, is without foundation, as it is not countenanced by ancient writers. The learned Grotius and J. Wettstein have suggested, that he was a Syrian and a slave, either at Rome, or in Greece; and that having obtained his freedom, he returned to his native place, Antioch; where he became a Jewish proselyte, and then a Christian. This opinion is also rejected by our author; who observes, that the account given of this evangelist by Eusebius, and by Jerom after him, that he was a Syrian, and a native of Antioch, is not supported by the authority of Irenæus, Clement of Alexandria, Tertullian, or Origen, nor indeed by any other writer before Eusebius. Cave and Mill have intimated, that Luke was converted by Paul at Antioch; but it is alleged, on the other hand, that if Luke had been a Gentile, converted by Paul, he would have been always uncircumcised, and unfit to be the companion of Paul. For the apostle would not have allowed the Greeks or Gentiles of Antioch, or any other place, to submit to that rite. Besides, no hints occur in the Acts, or in the epistle of St. Paul, that Luke was his convert. It has been doubted by several learned men, whether the evangelist Luke was a physician. Dr. Lardner allows, that the distinguishing character of "beloved physician" (Col. iv. 14.) has occasioned a difficulty, which, however, he thinks, is not insuperable; and he conceives it probable, that Luke the evangelist was by profession a physician. That St. Luke was a Jew by birth, or at least by religion, our author argues from his being a constant companion of Paul in many places, particularly at Jerusalem. If he had been an uncircumcised Gentile, some exceptions would have been made to him, which we do not find from St. Paul's epistles, or the Acts, to have been the case; and besides, he follows the Jewish computations of times, such as the passover, the pentecost, and the fast. (See Acts, xii. 3. xx. 6. 16. xxvii. 9.) In this opinion, that St. Luke was a Jew, many learned and judicious moderns, as Mr. L. Bafnage and J. A. Fabricius, concur; and Dr. Lardner thinks, that it ought not to be questioned. Moreover, he was probably an early Jewish believer, soon after Christ's ascension, if not a hearer of Christ, and one of the 70 disciples. The most ancient writers speak of Luke as a disciple of the apostles. Some have reckoned him one of the Seventy, others have thought him to be Lucius, mentioned by St. Paul in the epistle to the Romans, and others have supposed, that he was one of the two disciples that met Jesus in the way to Emmaus. If Lucius be the evangelist Luke, which is an opinion adopted by several learned writers, we may conclude, that he was a Jew, and related to the apostle. We may know his character, and, in part, his history, from Acts, xi. 19-21, and xiii. 1-4. He was an early Jewish believer after Christ's ascension,

ascension, and together with others was very serviceable in preaching the gospel, at an early period, to Jews and Gentiles out of Judea. And if the other disciple, who accompanied Cleopas in the way to Emmaus, be Luke the evangelist, he was a disciple and eye-witness of Jesus Christ; though we do not allow him to be one of the 70. It appears further, that St. Luke was for a considerable time a constant companion of St. Paul; and that he was also acquainted with other apostles. It is probable, that St. Luke died a natural death; because none of the most ancient writers, such as Clement of Alexandria, Irenæus, Origen, Eusebius, and Jerom, say any thing of his martyrdom. Gaudentius, bishop of Brescia, about the year 387, observes, that in his time it was generally said, that Luke and Andrew finished their course at Patræ in Achaia, but without adding that it was by martyrdom: and if St. Luke be called a martyr, the appellation may be understood in a general sense, as equivalent to confessor, or a great sufferer for the gospel. Cave says (Hilt. Lit. p. 25.) that Luke lived a single life, and died in the 84th year of his age, about the year of Christ 70, but of what death is uncertain. Philostorgius informs us, that in the reign of the emperor Constantius, the reliques of St. Luke were translated from Achaia to Constantinople; and therefore it must have been a general persuasion in those times, that St. Luke had died, and had been buried in Achaia, which Gregory Nazianzen says, was the province assigned to St. Luke. Lardner.

LUKE's Gospel, St., in *Biblical History*, the gospel written by the evangelist Luke. That the gospel and the Acts were written by St. Luke, is a fact that is confirmed by the testimony of the most unexceptionable of ancient writers. To this purpose we may observe, that this gospel is often cited by Justin Martyr, who lived A.D. 140, and by the martyrs of Lyons, A.D. 177. Irenæus, A.D. 178, says expressly, that Luke, the companion of Paul, put down in a book the gospel preached by him. Clement of Alexandria, A.D. 194, has borne ample testimony to this gospel, as well as the Acts. Tertullian, A.D. 200, asserts against Marcion the genuineness and integrity of the copies of St. Luke's gospel, owned by himself and Christians in general, and for this he appeals to divers apostolical churches. Luke's digest, says this ancient father, is often ascribed to Paul; it being easy to take that for the master's which the disciples published. Origen, A.D. 230, mentions the gospels according to the order in which they are now generally received; and "the third," he says, "is that according to Luke, the gospel commended by Paul, published for the sake of the Gentile converts." Eusebius of Cæsarea, A.D. 315, speaking of St. Paul's fellow-labourers, says, "and Luke, who was of Antioch, and by profession a physician, for the most part a companion of Paul, who had likewise a more than slight acquaintance with the rest of the apostles, has left us in two books, divinely inspired, evidence of the art of healing souls, which he had learned from them. One of these is the gospel, which he professed to have written, as they delivered it to him, 'who from the beginning were eye-witnesses and ministers of the word,' with all whom he says likewise, he has been perfectly acquainted from the very first. The other is the Acts of the Apostles, which he composed now, 'not from what he had received by the report of others, but from what he had seen with his own eyes.'" In the Synopsis, ascribed to Athanasius, but supposed to be written about the end of the fifth century, it is said, "that the gospel of Luke was dictated by the apostle Paul, and written and published by the blessed apostle and physician Luke." But it is needless in this place to cite a greater number of authorities.

As to the time in which this gospel was written, it may be settled without much difficulty. The Acts of the apostles were published A.D. 63 or 64, and not long after the gospel, as is generally allowed. Accordingly Dr. Mill supposes, those books to have been two parts of one and the same volume, and to have been published in the year of Christ 64. The gospel itself bears internal characters of the time in which it was written. As to the place where it was written, learned writers have differed. Jerom says, that Luke, the third evangelist, published his gospel in the countries of Achaia and Beotia. Gregory Nazianzen also says, that Luke wrote for the Greeks, or in Achaia. Grotius says, that about the time when Paul left Rome, Luke departed to Achaia, and there wrote his books, which we have. Cave thought that they were written at Rome, and before the termination of Paul's captivity. But it is said by Mill, Grabe, and Wetstein, that Luke published his gospel at Alexandria in Egypt. Dr. Lardner has particularly examined these different opinions; and he concludes, that "upon the whole, there appears not any good reason to say, that St. Luke wrote his gospel at Alexandria, or that he preached at all in Egypt. It is more probable, that when he left Paul, he went into Greece, and there composed, or finished, and published his gospel, and the Acts of the apostles." Origen was of opinion that this gospel was written for gentile converts; Jerom says, that of all the evangelists Luke was best skilled in the Greek language, and that he wrote his gospel more especially for gentiles, but Chrysostom maintains that he wrote for all in general. Luke himself, at the beginning of his gospel, assigns the reason of his writing, declaring, that whereas many others had rashly undertaken to give a relation of the matters which he most surely believed, he thought himself obliged, in order the better to divert us from the uncertain relations of others, to deliver in his gospel a certain account of those things, which he was well assured of from his intimate acquaintance and familiarity with Paul, and his conversation with the other apostles. So says Eusebius.

St. Luke has inscribed his two books, his gospel, and the Acts to Theophilus, by whom some understand any good Christian in general, others a particular person. Augustin, Chrysostom, and many others, have understood Theophilus to be a real person. Cave supposed him to be a nobleman of Antioch; but it seems more probable, that if St. Luke published his books in Greece, as we have already stated, Theophilus, to whom they are addressed, was a man of the same country. It is of greater importance to ascertain, who are designated by the many mentioned by the evangelist, who before him had attempted to write histories of Jesus Christ. Epiphanius supposes, that St. Luke here refers to Cerinthus, Merinthus, and others of that description. Origen and Jerom say, that many attempted to write gospels, as Basilides, Apelles, and others; and they mention several such, not received by the church; such as the gospel of Thomas and Mathias, the gospel of the Egyptians and of the Twelve. Theophylact seems to imagine, that the evangelist referred to the two later gospels now named. Grabe, while he allows that St. Luke did not refer to the gospels of Basilides or Thomas, or some others mentioned by Origen, for they were not published till after St. Luke's death, thinks, that St. Luke might refer to the gospels according to the Egyptians, and according to the twelve, and some others. But against this opinion it might be urged, that the gospel according to the Egyptians was not composed before the second century. Dr. Mill is of opinion, that of the many narrations to which St. Luke refers, the two principal were the gospels according to the Hebrews,

Hebrews, and according to the Egyptians. About the year 58, or somewhat sooner, says Mill, were composed, by some of the faithful, evangelical narrations, or short histories of Christ. The writers were not our evangelists Matthew and Mark; but some of the first Christians, who, before Luke, and also before Matthew and Mark, wrote histories of the things done by Christ, and received from apostolical tradition, not with a bad or heretical design, but with the same design with our evangelists; but their histories, as we may infer from St. Luke's account, were inaccurate and imperfect, and they contained some things not certain, or well attested, and possibly some mistakes. Dr. Lardner, who upon the whole approves the preceding statement, cannot allow the gospel according to the twelve, or according to the Hebrews, to have been one of the memoirs or narrations; to which St. Luke refers; for these were short histories, whereas that was a full gospel, supposed to have been either St. Matthew's original Hebrew gospel with additions, or his original Greek gospel, translated into Hebrew with additions. Moreover, the gospel according to the Egyptians could not have been one of these memoirs, because it was an heretical gospel, probably composed in the second century by some Encratites, who were enemies of marriage. Whatever the memoirs or narrations were, none of them now remain, nor even so much as any fragments, nor quotations of them occurring in any Christian writings now extant. Marcion, a heretic who lived in the first half of the second century, rejected all the gospels, except that of St. Luke, and this he mutilated and altered, and interpolated in a great variety of places. He would not allow it to be called the gospel of St. Luke, erasing the name of that evangelist from the beginning of his copy. Some of his followers considered it as written partly by Christ himself, and partly by the apostle Paul. Marcion retrenched the first and second chapters entirely, and begun his gospel at the first verse of the third chapter, and even read this in a manner different from our copies, viz. In the 15th year of Tiberius Cæsar, God descended into Capernaum, a city of Galilee. Some late Christian writers have concurred in Marcion's retrenchment; but without sufficient authority. Lardner.

St. Luke, says a modern writer, is pure, copious, and flowing in his language, and has a wonderful and entertaining variety of select circumstances in his narration of our Saviour's divine actions. He acquaints us with numerous passages of the evangelical history, not related by any other evangelist: both in this gospel and Apostolical Acts, he is accurate and neat, clear and flowing, with a natural and easy grace; his style is admirably accommodated to the design of history; it had a very considerable resemblance to that of his great master St. Paul; and, like him, he had a learned and liberal education, and appears to have been very conversant with the best classics; for many of his words and expressions are exactly parallel to theirs. Blackwall's Sacred Classics.

LUKE'S DAY, *St.*, is a festival observed on the 18th of October.

LUKE'S HOSPITAL, *St.* See HOSPITAL.

LUKE'S KEYS, in *Geography*, two small islands near the coast of Honduras. N. lat. 15° 50'. W. long. 86° 35'.

LUKIN, a town of Poland, in Volhynia; 56 miles N. of Zytomiers.

LUKINJA, a town of Samogitia; 24 miles N. of Miedniki.

LUKOIENOV, a town of Russia, in the government of Niznei-Novgorod; 80 miles S. of Niznei-Novgorod. N. lat. 54° 58'. E. long. 54° 20'.

LUKOMLA, a town of Russia, in the government of Polotsk; 60 miles S.S.E. of Polotsk.

LUKOW, a town of Poland, in the palatinate of Lublin; 40 miles N. of Lublin.

LUKOWA, a town of Poland, in the palatinate of Belez; 44 miles W.S.W. of Belez.

LUKOWO, a town of Lithuania, in the palatinate of Brzeze; 80 miles E. of Pultk.

LULANIS, in *Botany*, a name given by some of the ancient Greeks to a plant, used very frequently for a yellow colour in dyeing, and by the ladies for tinging their hair yellow, the favourite colour of those times. Neophytus explaining this word, says, that it signified the same with isatis, glastum, or woad; and several others have been of that opinion, though very absurdly, since the glastum or woad dies a blue colour, not a yellow; and by no means answers the description of the lulanis, which is the same with the lutum, or lutea herba of the Romans, and with the genifella tinctoria, or dyers'-weed of these times.

LULEA, or LULA, in *Geography*, a sea-port of Sweden, in West Bothnia, on the N. side of the river Lulea, at the N.W. extremity of the gulf of Bothnia, with a good harbour; 68 miles W. of Tornea. N. lat. 65° 38'. E. long. 22° 4'.

LULES, LOS, a town of South America, in the province of Tucuman; 50 miles N. of St. Miguel de Tucuman.

LULLI, JOHN BAPTIST DE, in *Biography*, secretary to Louis XIV., and superintendant of his music, was born at Florence in 1633, having a miller for his fire. A Cordelier gave him his first lessons in music upon the guitar, though he afterwards applied to the violin. He was only thirteen when the Chevalier de Guise, being on his travels in Italy, proposed to his parents to take him into France, and engage Mademoiselle de Guise, his sister, to take him among the officers of her kitchen.

This princess having accidentally heard him play on the violin, had him taught, and he became in a short time an excellent performer.

Louis XIV. being desirous to hear him, was so pleased with his performance, that in 1652, he appointed him inspector-general of his violins, and soon after created a new band, which was called *les petits violons*. These new musicians formed by Lulli soon became the first in Europe, which is not saying much for them, as such was the ignorance of the generality of instrumental performers at this time, that they could execute nothing which they did not know by heart.

The genius, therefore, of Lulli was obliged to contract itself to the abilities of his orchestra, and it is supposed that he would have written as well as his successors, if he had lived a hundred years later.

Before the establishment of the opera in France, the king every year gave to his court magnificent spectacles called *ballets*, in which there was a great number of symphonies, mixed with recitatives. Lulli first began by only composing the music to the dances in these ballets; but the king became so fond of his compositions, that he would hear no other.

In 1672, Perrin, to whom the patent for an opera was first granted, resigned it to Lulli, whose genius began to expand, and he may be regarded as the creator of this kind of music, which (according to M. Laborde) has not been so much improved (in France, he should have said) as some imagine, and in many particulars has, perhaps, lost more than it has gained.

It is true, that he was assisted by the immortal Quinault,

of whom he had the penetration to discover the genius, and the dexterity to secure the assistance by a deed, in which the poet engaged to supply him every year with a new drama, for 4000 livres, about 200*l*.

Quinault sketched many plans, and carried them to the king for his approbation: after which Lulli pointed out to him the places where the dances were to be introduced, and let him hear the airs. The scenes were examined, by his majesty's command, in the Académie des Belles Lettres. Thus by their united opinions, all the dramas of Quinault were regulated, which remain the best that were produced in France during the 17th century, and will probably continue the best, if new set, for many ages yet to come. The enemies of Quinault, jealous of his glory and talents, contrived to bring about a quarrel between the poet and musician. Lulli had recourse to La Fontaine, who, at his request, produced the opera of "Daphne," but as soon as Lulli had heard it read, he did not conceal from the author, that he thought his talents did not extend to writing operas. La Fontaine, piqued at having laboured in vain, to revenge himself on Lulli, for his coarse rejection of his drama, wrote his comedy, or rather satire, of "The Florentine," but as he had a good heart, he soon subdued his wrath, and they were sincerely reconciled.

The king, more and more pleased with his music, conferred on him the title and emoluments of secretary to his majesty, and heaped upon him many other favours for his family.

The king having been extremely ill in 1686, Lulli composed a Te Deum on his recovery, which was executed in the church of the Feuillans, Rue Saint Honoré, the eighth of January 1687. In enthusiastically regulating the time with his cane, he struck his foot so violently, that, probably from a bad habit of body, a mortification came on. He was at first advised to have the toe taken off which was wounded by the cane, then the foot, and then the leg. But some quacks having promised to cure him without amputation, Messrs. de Vendôme, who had a sincere regard for him, offered to the quacks 2000 piñoles if they cured him, and lodged them in the hands of a banker. But all their efforts were useless, and it was announced to him that he must prepare for death. His confessor refused to give him absolution, but upon condition that he would burn the opera of Achilles and Polixene, which he had been preparing for the stage. He consented, and the composition was committed to the flames.

Some days after, fancying himself a little better as the gangrene encreased, one of the young princes of Vendôme came to see him; "What! Baptist, (says he,) hast thou been so foolish as to burn such good music?"—"Hush! hush! my lord, (whispers Lulli,) I have got a copy of it." However, it is asserted, that he manifested in his last moments a sincere repentance, and testified the highest sense of religion. He died at Paris on the 22d of March 1687, in the 54th year of his age. He was buried in the church of Les petits Pères, in La Place des Victoires, where a fine monument was erected to his memory, and where may have been read, before the revolution, the following epitaph by Santeuil:

"Perfida mors, i. linica audax, temeraria et excors,
Crudelique, et cœca probris te absolvimus illis,
Non de te querimur, tua sint hæc munia magna.
Sed quando per te populi Regisque voluptas,
Non ante auditis rapuit qui cantibus orbem
LULLIUS eripitur, querimur modo, furdus fustli."

Lulli was a fortunate man to arrive in a country where music had been so little cultivated, that he never had any

rival, nor was there throughout the whole kingdom of France an individual who had the courage to doubt of his infallibility in his art. He was fortunate in so magnificient a patron, and still more fortunate in a Lyric poet, who could interest an audience by all the powers of poetry, by the contexture of his fables, and variety and force of his characters.

Lulli was rough, rude, and coarse in his manners, but without malice. His greatest frailties were the love of wine and money. There were found in his coffer 630,000 livres in gold, an exorbitant sum for the time in which he lived. He had the art of making himself at once beloved and feared by the performers of his music, which is doubtless the most essential talent for governing such eccentric and mutinous subjects; but however difficult it may be to keep them in order and in good humour, true merit, exact justice, and a steady conduct always succeed.

Lulli married the only daughter of Michel Lambert, the celebrated musician, and the best singing-master of his time. By this marriage he had three sons and three daughters, to all of whom he left an ample provision, and friend in power, who conferred on them places, pensions, and kindred.

LULLY, RAYMOND, a philosopher and chemist of great note in the dark ages, was born in the island of Majorca in 1236, of an illustrious family of that name at Barcelona. From the works that bear his name, it is supposed that he was ardently attached to the study of the sciences, of philosophy, theology, chemistry, and medicine; but there is great doubt as to the genuineness of many of those works, which were probably written by his pupils, or even by persons who lived considerably posterior to his time. In his youth he bore arms, and led the life of a man of pleasure. It is related of him that he fell in love with a young damsel, named Eleonora, who obstinately rejected his addresses; and at length, when he was one day strongly pressing his suit, and demanding the reason of her refusal, she exposed her breast consumed with a cancerous ulcer. This spectacle is said to have inspired him with a resolution of seeking a remedy for her disease, and to have been the motive which led him to the chemical studies, for which he became celebrated, as well as to a journey into Africa, for the purpose of consulting the works of Geber. But others affirm that the sight had such an effect upon him, that he plunged into religious retirement, and devoted the rest of his days to pious purposes. It appears certain that he undertook a course of travels into Africa and the East, with the view of converting the Mahometans to the Christian faith, where he incurred greath hardships and dangers, and whence he was permitted to depart only upon condition of not returning. He was still, however, so much inflamed with zeal for this object, that he entered the Franciscan order, and again visited Africa. When he was again found there, he was thrown into prison, and after suffering much torture, was released through the intercession of some Genoese merchants, who took him on board their ship; but he died on the passage when just in sight of his native land, in 1315. Others assert that he was stoned to death while preaching to the infidels in Africa, on the 26th of March of that year.

From this narrative, which represents Lully in the light of a fanatic missionary, we should not expect that scientific character which has caused his name to be preserved to modern times. It seems, however, that he had travelled in England, France, and Germany; and he calls himself a disciple of Roger Bacon, whom he had probably seen in his journey. As a chemist, indeed, he appears in an extraordinary light; for although he is believed to have been a

first who mentioned the philosopher's stone, and though that was the leading object of his researches, together with the fancied *panacea*, or universal remedy; yet he maintained that chemistry was only to be acquired, and these objects to be obtained by a series of experiments; and that the art was not to be taught by words. Boerhaave says of the chemical works extant in Lully's name, that he has perused most of them, and finds them beyond all expectation excellent; so that he has been tempted to doubt whether they could be the work of that age. "So full," says he, "are they of the experiments and observations which occur in later writers, that either they must be supposititious, or the ancient chemists must have been acquainted with many things which pass for modern discoveries."

Lully has also been celebrated as a scholastic metaphysician. He introduced into the schools a "new transcendent art," which was distinguished by his name, and by means of which a person might hold a disputation for a whole day, upon any subject whatever, without understanding any thing of the matter. This invention suited the genius of the age. It consisted in collecting a number of general terms, common to all the sciences, of which an alphabetical table was to be provided. Subjects and predicates taken from these were to be respectively inscribed in angular spaces upon circular papers. The essences, qualities, affections, and relations of things being thus mechanically brought together, the circular papers of subjects were fixed in a frame, and those of predicates were to be placed upon them as to move freely, and in their revolutions to produce various combinations of subjects and predicates, whence would arise definitions, axioms, and propositions, varying infinitely. This contrivance, worthy of Laputa, was greatly admired in its time, and its author acquired the title of *the most enlightened despot*.

The following are the titles of those of his works which relate to chemistry: "De Secretis Naturæ, seu de Quinta Essentia, Libellus," first printed in 1518, 4to. and frequently republished; "Apertorium de veri Lapidis compositione," 1546; "Testamentum duobus Libris universam Artem Chemicam complectens. Item ejusdem Compendium animæ transmutationis Artis metallorum," 1566; "Liber Mercuriorum;" "De Arte brevis;" "Secreta Secretorum;" "Codicillus, seu Vade Mecum, in quo fontes Alchymicæ Artis et Philosophicæ reconditoris uberrimè traduntur." Many manuscript essays of Lully are preserved in the library at Leyden, and upwards of a hundred, it is said, which have never been published, in that of Venice. A complete edition of all the writings attributed to this author was published at Mayence in 1714, including treatises on theology, morals, medicine, chemistry, physics, law, &c. Gen. Biog. Eloy Dict. Hist.

LULLY'S ART. See ART, and the preceding article.

LULOLA, in *Geography*, a strong town in Angola, situated on an island about 100 miles from the mouth of the Cuanza, fortified by the Portuguese.

LULWORTH, EAST, a parish in the hundred of Wimborne, in Blandford division of Dorsetshire, England, is situated six miles from Wareham, and 116 from London, and contains 74 houses and 364 inhabitants. The chief object worthy of notice here is Lulworth castle, the seat of — Weld, esq. It is situated in the south-east corner of an extensive park, which occupies a circuit of nearly four miles and a half, and has been lately surrounded by an excellent stone wall, upwards of eight feet high. The present edifice, which was built on or near the site of a castle mentioned so far back as the year 1146, was commenced in 1588, and finished in 1609, except the internal decorations,

which were not completed till after the year 1641, when the ancestor of the late owner purchased the estate. The castle is an exact cube of eighty feet, with a round tower at each corner thirty feet in diameter, and rising sixteen feet above the walls, which, as well as the towers, are embattled. The hall and dining-room are spacious, and the rooms in general eighteen feet high. The principal front is on the east, and is faced with Chalkmark stone, decorated with statuary. In the year 1789, during their majesties' residence at Weymouth, Mr. Weld had several royal visits, the particulars of which are recorded in two inscriptions over the entrance to the castle. Mr. Weld has lately erected an elegant little chapel for the convenience of his family; this structure is of a circular form, increased by four sections of a circle, so as to form a cross, and finished with a dome and lantern. The parish church of St. Andrew (which was an ancient and curious fabric) has been recently rebuilt at the expense of Mr. Weld.

United with the foregoing parish, and about a mile distant towards the sea, is that of West Lulworth, which contains 73 houses and 312 inhabitants. At a small distance is Lulworth Cove, a sort of natural basin, into which the sea flows through a wide gap in the cliff, sufficient for the entrance of vessels of 70 or 80 tons burthen. About a mile from the cove is the Arched Rock, which projects from the land into the sea, having an opening near 20 feet high in the middle, formed like an arch, through which the prospect of the sea has a peculiar effect. Beauties of England and Wales, vol. iv.

LUMACHELLE MARBLE. See MARBLE.

LUMAMPA, in *Geography*, a town of South America, in the province of Tucuman; 90 miles S. of St. Yago del Estero.

LUMBAGO, in *Medicine*, signifies a pain in the loins (*lumbi*), especially from rheumatism, affecting the ligaments of the spine, or the muscles of the back. See RHEUMATISM.

The only diseases which are liable to be mistaken for *lumbago* in general, are painful affections of the kidneys, which, it is well known, are seated within the lumbar region on each side of the spine; especially inflammation of these glands, or the formation of calculi in them, or the passage of these concretions through the ureters towards the bladder. The symptoms, attendant upon these disorders of the kidneys, will be found described in their proper places. (See NEURALGIA, NEPHRITIS, and GRAVEL.) We may observe here, that, in *lumbago*, the pain does not follow the course of the ureters, it is not accompanied with retraction of the testicle in men, it is not increased by external pressure, it is often little felt, except in the erect posture, and there is no vomiting, nor any change in the quantity or quality of the urine; the contrary of all which is observed in inflammatory and calculous affections of the kidneys.

The internal remedies, commonly administered for the cure of other forms of rheumatism, are also beneficial in the *lumbago*; such as opiates, with antimonials and other sudorifics, taken at bed-time, and followed by laxatives in the morning, or combined with laxatives, especially the submuriate of mercury, preparations of sulphur, or salts. Much relief, however, is afforded by the application of local stimulants to the lumbar region externally. Liniments of camphor, turpentine, and similar substances, have been found from the experiments of Dr. Hume, Dr. Ferriar, and others, among the most efficacious of these applications. Dr. Ferriar affirms, that he has found a solution of camphor in sulphuric ether relieve the pains of diseased joints, after all other

applications had failed; and he relates several cases in which a liniment, resembling that proposed by Dr. Home, proved an effectual cure for lumbago. He used two drams of camphor, an ounce of balsum, and half an ounce of black soap, anattig the oil of turpentine, ammonia, and seed of cymum, prescribed by Dr. Home. The effect of this application, he says, is commonly the removal of the pain within three days, often in a much shorter time. See Ferriar. Med. Hist. and Reflect. vol. i. p. 188. Home, Clin. Exper. p. 261, § xiv.

LUMBALIS, in *Anatomy*, an epithet applied to some parts placed about the loins. The lumbar arteries are branches of the aorta, and the lumbar veins terminate in the inferior vena cava. (See ARTERY and VEIN.) The lumbar nerves are five pairs proceeding from the medulla spinalis. (See NERVE.) The lumbar muscles are the *psoæ*; which see. For an account of the lumbar vertebrae, see SPINE. The lumbar region of the abdomen is the lateral and posterior part of the umbilical region, the part, in short, which constitutes the loins in common language. See ABDOMEN.

LUMBAR, in *Geography*, a town of Spain, in Navarre; 15 miles N. of Sangüeta.

LUMBAR Abscess, in *Surgery*. See *Psoas Abscess*.

LUMBERTON, in *Geography*, a post-town of America, in North Carolina, and capital of Robeson county, on Drowning creek; 32 miles S. of Fayetteville; it has a court-house, and about 36 dwelling-houses.

LUMBI, in *Anatomy*. See *LOINS*.

LUMBO, in *Geography*, a town of Benguela; 120 miles E. N. E. of Benguela. S. lat. $11^{\circ} 45'$.

LUMBORUM QUADRATUS, in *Anatomy*, *ileo-costien* of Dumas, a muscle situated towards the side and lower part of the vertebral column, and extending from the crista of the os innominatum, and the ileo-lumbar ligament, to the lower edge of the last false rib, and to the transverse processes of the four first vertebrae of the loins. It has the form of an elongated square, but is rather broader below than above. Its anterior surface is covered above by the diaphragm, then by the anterior lamina of the aponeurosis of the transversus abdominis, and towards the inside by the psoas. It corresponds to the kidney and to the colon. Its posterior surface is covered by the middle aponeurosis of the transversus, which separates it from the common mass of the sacro-lumbalis and longissimus dorsi. The outer edge is inclined a little from above downwards, and from within outwards, and corresponds to the angle formed by the separation of the anterior posterior laminae of the aponeurosis of the transversus abdominis. The inner margin is attached to the points of the transverse processes of the four first lumbar vertebrae by as many flattened pieces. The lower edge is attached to the middle of the posterior part of the crista ili, for an extent of about two inches; it is also fixed to the ileo-lumbar ligament. The upper edge is inserted in the lower margin of the last false rib, for a more or less considerable extent in different subjects; in some it occupies nearly the whole length, in others only the inner third part.

It is fixed to the crista of the os innominatum by aponeuroses, which ascend to a considerable height on the anterior surface and the outer edge. These fibres, which proceed from below upwards, are crossed below by others, which arise from the transverse process of the last lumbar vertebra. The fleshy fibres ascend rather obliquely from without inwards, and the internal are the shortest; they terminate at the transverse processes of the lumbar vertebrae by tendinous fibres. The external and longer ones end at the lower edge of the last false rib by short aponeuroses. Sometimes an-

other muscular stratum arise from the front of the transverse processes of the third and fourth lumbar vertebra, pass obliquely outwards, and is blended with the rest of the muscle.

The quadratus lumborum inclines the loins towards its own side; when these are fixed, it may raise the pelvis on that side, and lower it on the opposite. By drawing downwards the last false rib, it may be concerned in respiration.

LUMBRE, in *Geography*, a town of France, in the department of the Straits of Calvès, and chief place of a canton, in the district of St. Omer. The place contains 502, and the canton 13,655 inhabitants, on a territory of 262½ kilometres, in 36 communes.

LUMBRERAS, a town of Spain, in Leon; 22 miles N. N. W. of Ciudad Rodrigo.

LUMBRICALES, in *Anatomy*, certain small muscles of the fingers and toes, connected with the flexor tendons of those organs. See FLEXOR.

LUMBRICOIDES. See ASCARIS.

LUMBRICUS, EARTH-WORM, in *Natural History*, a genus of the vermes-intestina class and order. Body round, annulate, with generally an elevated fleshy belt near the head, mostly rough, with minute concealed prickles placed longitudinally, and furnished with a lateral aperture. There are sixteen species contained in this genus, of which four are natives of this country.

Species.

* **TERRESTRIS**; Common earth-worm, sometimes named dew-worm. Body red, with eight rows of prickles. There is another variety exactly like this, only half the size. The body contains about one hundred and forty rings, each of which has four pair of prickles, not visible to the naked eye, but discoverable to the touch: when expanded, it is convex on each side; but when contracted, it is flattish beneath, with a red canal down the body; the belt is wrinkled and porous; mouth placed beneath the proboscis. It inhabits decayed wood and common soil, which, by perforating, it renders fit to receive the rain; it devours the cotyledons of plants, and wanders about by night; it is the food of moles, hedge hogs, and various birds.

This worm has neither bones, brains, eyes, nor feet. It has a number of breathing holes situated along the back, and near each ring. The heart is placed near the head, and may be observed to beat with a very distinct motion. The small rings are furnished with a set of muscles, that enable it to act in a sort of spiral direction; and by this means it is capable, in the most complete manner, of creeping on the earth, or penetrating into its substance. These muscles enable the worm to contract or dilate its body with great force. The rings are each armed with small stiff sharp prickles, which the animal is able to open out or close upon its body; and from beneath the skin there is secreted a slimy matter, which, by lubricating the body, greatly facilitates its passage through the earth.

This worm has been confounded with the *ASCARIS Lumbricoides*, or round worm of the human intestines; which see. The difference between the two may be briefly pointed out in this place.

The common earth-worm has its extremities much blunter than those of the intestinal; its mouth consists of a small longitudinal fissure, situated on the under surface of a small rounded head, there being no appearance of the three vesicles which are found in the ascaris. On the under-surface of the earth-worm there is a large semi-lunar fold of skin, into which the head retreats: but this is wanting in the ascaris. The anus of the earth-worm opens at the very ex-

cremity of the tail, and not, as in the ascaris, at a considerable distance from it. The ascaris wants the transverse rugae, which are so strongly marked in the earth-worm, as well as the broad yellowish band by which the body of the latter is surrounded.

The internal structure of the two worms is also extremely different. In the earth-worm there is a complete and large stomach, consisting of two cavities; and the intestinal canal in the latter is larger, and more formed into sacculi than in the ascaris. The parts subservient to generation in these worms are very different: in the ascaris there is a distinction of sex, but the common earth-worm is hermaphrodite.

Dew-worms, though a small, and frequently regarded as a despicable link in the chain of nature, would, if lost, be greatly missed by those who are apt to consider them as a nuisance. For, independently of their affording a large supply of food to birds, &c. already noticed, they are of great use in promoting vegetation, by boring, perforating, and loosening the soil, and rendering it pervious to rain and the fibres of plants, by drawing straws and stalks of leaves and twigs into it; and, most of all, by throwing up such numbers of lumps called worm-casts, which act as a fine manure for grain and grass.

* **MARINUS.** Lug. Back with two rows of bristly tubercles; body pale red, round, and annulate, with greater or less rings; the first prominent, with two opposite tufts of short bristles on each, the lower part smooth. It is found on the shores of England, and other parts of the European coast, where it buries itself in the sand to a great depth, leaving a little rising with an aperture on the surface. It is used as a bait for fishes.

VERMICULARIS. Body white, with two rows of prickles. It inhabits the wet and decayed trunks of trees, and among moist leaves, moving very expeditiously in moist places, but twisting itself up in dry ones. Its body is polished and glabrous.

VARIEGATUS. Rufous spotted, with six rows of prickles. It inhabits wet plantations, and is the most beautiful of the whole genus. The body red, very finely tessellate with brown, having a sanguineous line running down the whole body. It easily breaks in pieces, and as easily reproduces what has been lost by accident or otherwise.

TUBIFEX. Body reddish, with two rows of prickles; the body is pellucid, very simple, thin, and truncate at the tip, with a dark intestine. It is found at the bottom of rivulets, where it forms a perpendicular tube of earth for its habitation.

LINEATUS. Body white, with a longitudinal red line. Found very abundantly on the shores of the Baltic, among sea-weed. It is pellucid, with rather a short body, having a yellow artery on the back, and a bifid vein towards the head.

CILIATUS. Body rufous, and ciliate between the rings; the body is glabrous, with about forty segments; the intersections are armed with four tufts of short bristles.

TUBICOLA. White, with a red dorsal spot on each of the segments. This species is found in the bays of Norway that have a clayey bottom, in a round membranaceous tube, covered with mud, and about an inch longer than itself. It has twenty-five segments in the body, of which the intersections are armed with two bristles on each side; the intestine is black, and running down the whole body.

ECHINURUS. Body covered with rows of granulations; the hind-part obtusely truncate, and surrounded with a double crown of bristles. It inhabits the sandy bottom of the shores of Belgium; is most observable in winter, and is the chief food of cod-fish. Body whitish-grey, with fulvous

viscera, about the size of a person's middle finger; tongue fleshy, thickish, and boat-shaped.

* **THALASSEMA.** Body striate, dirty red, with shining red spots, beneath grey; mouth surrounded with a funnel-like tube, which is wrinkled within, and plaited at the margin; the body is glabrous, mucous, thicker at one end, and somewhat pointed at the other; the mouth is placed above, with a saffron funnel. Inhabits the shores of Cornwall.

EDULIS. Body whitish-flesh-colour, subclavate behind, dilated and papillose before; mouth terminal, and surrounded with a villous rim or wrinkle. There are two hundred and seventy-eight rings between the villous part and the hinder end, separated by an annular stria; the hind-part bulbous, with a double papilla; the fore-part beset with numerous flesh-coloured ones disposed in transverse rows.

* **OXYURUS.** Body whitish-livid, very sharp at the hind extremity, and obtuse before, with a round, retractile, and exsertile proboscis. This species is found on the Suller coast, is about an inch and a half long, and annulate with very fine striae; snout truncate, and very fine, granulate, with a pore at the base scarcely visible.

FRAGILIS. Body red, with lateral divided warts, and fasciculate bristles. The body of this species resembles the terrestris, with above five hundred smooth and very brittle rings; the head is conic, with an approximate wrinkled mouth. It inhabits the muddy bottom of the bays of Norway.

ARMIGER. Body red, with double lanceolate lamellæ on the belly, and none on the fore-part; is about two inches long, and consisting of about two hundred rings. Found in the islands of Norway.

CIRRATUS. Body armed with very long cirri. Inhabits the Norway seas.

SABELLARI. Body jointed, and truncate at one end; the intersections of the joints thick, and armed with two prickles. It resembles the tubicola, and is found in the Norwegian seas.

LUMELLA, in the *Glass-trade*, the round hole in the floor of the tower of the leer, which is directly over the working surface, and by which the flame is let into the tower.

LUMELLO, in *Geography*, a town of Italy, in the department of the Gogna. This place lately gave name to a district in the duchy of Milan, called "Lumalline," on the Gogna; once the residence of the kings of Lombardy, now a village; 26 miles S.W. of Milan. N. lat. 48 57'. E. long. 8 47'.

LUMHAGAN, an island in the straits of Malacca, near the coast of Salengora, 12 miles long, and 5 broad; separated from the continent by a narrow channel, called the "Straits of Lumhagan." N. lat. 2 54'. E. long. 101 24'.

LUMJOCKI, a town of Sweden, in East Bothnia; 12 miles S.W. of Ulea.

LUMINOSA SEMITA. See SEMITA.

LUMINOUS COLUMN, and *Fire.* See the substantives.

LUMINOUS Emanations, have been observed from human bodies, as also from those of brutes. The light arising from currying a horse, or from rubbing a cat's back, are known to most. Instances of a like kind have been known on combing a woman's head. Bartholin gives us an account, which he entitles "mulier splendens," of a lady in Italy, whose body would shine, whenever slightly touched with a piece of linen. These effluvia of animal bodies have many properties in common with those produced in glass; such as their being lucid, their snapping, and their not being excited

cited without some degree of friction; and are undoubtedly electrical, as a cat's back has been found strongly electrical when stroked. See **ELECTRICITY** and **LIGHT**.

Human bodies not only appear luminous, but even the exhalations from them adhering to their clothing will cause it to shine likewise.

LUMINOUSNESS of the Sea. See **LIGHT** and **SEA**.

LUMIO, in *Geography*, a town in the island of Corsica; 5 miles N.E. of Calva.

LUMME, in *Ornithology*. See **COLYMBUS Trile**.

LUMO, in *Geography*, a town of the island of Cuba; 45 miles S.S.W. of Havannah.

LUMP-FISH, in *Ichthyology*. See **CYCLOPTERUS Lumpus**.

LUMP of Fish, in the *Mange*. See **BOUILLON**.

LUMPARAN, in *Geography*, an island of Sweden, east of Aland, between the Baltic and the gulf of Bothnia. N. lat. 60° 7'. E. long. 20° 3'.

LUMPEN, in *Ichthyology*, the name of a fish, common in the markets at Antwerp, of a long and round body, growing gradually slenderer to the tail. Its colour is a greenish-yellow, with black broad lines on the back, placed transversely; and it has a little redness at the end of its tail.

The lumpen is a species of the blenni, distinguished by Artedi by the name of the *blennius*, with fins like cirri under its neck, and transverse streaks on the back. The cirri are biid.

LUNPOKOLSKOL, *Niznei*, in *Geography*, a town of Russia, in the government of Tobolsk, on the Oby. N. lat. 61°. E. long. 76° 54'.

LUNPOKOLSKOL, *Torchnei*, a town of Russia, in the government of Tobolsk. N. lat. 60° 54'. E. long. 78° 22'.

LUNPS, in *Rural Economy*, a term made use of to signify barn-floor bricks, in some places.

LUNA, in *Astronomy*. See **MOON**.

LUNA, in *Ancient Geography*, *Lunegiano*, a town situated on the Maera, which had a port in Liguria, called "Luna Portus," which, according to Strabo, was a very large and fine harbour, containing several others. The town was situated to the west of the mouth of the river Maera, and was afterwards called "Cariaram," both names alike signifying Luna, the moon, and referring to its form, which was that of a crescent. Lucan speaks of its aruspices; Servius and Martial of its cheese, marble, and wine. According to Strabo, it was destroyed by Nero; and some of its ruins are still visible in a place called Lunigona, and its small territory is named Lunegiano. M. Gebelin conjectures that the name Luna was derived from the Celtic *lun*, water.

LUNA, in *Geography*, a town of Spain, in Arragon; 22 miles W. of Huesca.—Also, a town of Lithuania, in the palatinate of Troki; 16 miles S.E. of Grodno.

LUNA CORNEA, in *Chemistry*, is the combination of marine acid with silver, or the white curdy precipitate of muriat of silver, which takes place, when the nitrat, acetat, or any other soluble salt of silver comes in contact with muriatic acid, either single or in any soluble combination. See **SILVER**.

To make this combination, the silver is first dissolved in nitrous acid; to this solution marine acid, or more usually common salt dissolved in water, is added. The mixture soon becomes turbid, and a copious precipitate is formed in it, which has always the appearance of curd. The solution of salt is added, till no more precipitate is formed. The precipitate, when separated from the liquor that swims over

it, is called luna cornea; because if this matter be exposed alone to fire, the acid carries off with it a portion of the silver, and the remaining matter melts, assuming the form of a horny substance.

The best method of reducing luna cornea, or of separating silver from marine acid, according to Margraaf, is to digest half an ounce of fine silver in aqua regia, to precipitate it by a sea-salt, and edulcorate the precipitate, which will then weigh five drams sixteen grains. For the reduction of this precipitate, mix it with an ounce and a half of dry volatile sal ammoniac, triturate them well together with a little water during a quarter of an hour; then add three ounces of mercury obtained from cinabar by means of quick-lime, and continue to triturate during some hours with a little more water. Thus an amalgam will be formed, which being washed from a white powder and dried, will weigh three ounces and half a dram. By distillation of this amalgam, a residuum of silver, four grains less than the original half ounce, will be obtained. By subliming the white powder, which weighs five drams, three grains of silver will be obtained; but if the amalgam and white powder be distilled together, the operation will fail, and the luna cornea be recomposed. (Berlin Mem. 1749.) M. Beaucourt says, that luna cornea may be reduced without loss by fusion with four times its weight of fixed alkali.

Luna cornea mixed with sea-salt and tartar rubbed on brass gives a silver-like appearance; and is the substance employed for the silvering of the dial-plates for clocks. A more substantial silvering may be given by the above mixture, if the piece of brass to be silvered be previously heated considerably, and cleaned with a scratch brush; and if the operation be repeated, till the silver seems to be sufficiently thick. The brass having a stronger disposition to unite with the marine acid than the silver has, separates this acid from the silver, which is then precipitated upon the surface of the brass plate. The luna cornea will also serve in examination of mineral waters, or of any other liquor, to dissolve if they contain marine acid in whatever base it be engaged, except metallic bases; for if these waters contain the smallest quantity of marine acid, a luna cornea will be precipitated by them from a solution of silver in nitrous acid, and this luna cornea is known by its acid-like appearance. Macquer, Chem. Dict. Engl. edit.

LUNA, *Crystals of*. See **CRYSTAL**.

LUNA, *Vitriol of*. See **VITRIOL**.

LUNA, in *Ichthyology*. See **ZEUS luna**.

LUNA Marina, a name by which Gefner has called a peculiar species of star-fish, called also the *sea-jun*. See **SOLEIL de Mer**.

LUNA Piscis, a name by which some have called the mola, which we usually call in English the *sun-fish*. See **TETRODON mola**.

LUNEE, *Lac*. See **LAC luna**.

LUNACHI, in *Geography*, a town of Chili: 42 miles E.N.E. of Valparaiso.

LUNAGUANA, a town of Peru, in the audience of Lima; 80 miles S.S.E. of Lima.

LUNAHOLM, a small island among the Shetlands. N. lat. 60° 44'. W. long. 1° 16'.

LUNALE BEZOARDICUM. See **BEZOARDICUM**.

LUNAN BAY, in *Geography*, a bay on the E. coast of Scotland, celebrated for its security against all but easterly winds; four miles S. of Montrose. N. lat. 56° 37'. W. long. 4° 27'.

LUNANESS, a cape on the E. coast of Shetland. N. lat. 60° 43'. W. long. 1° 17'.

LUNAR,

LUNAR, something relating to the moon.

LUNAR *Causitic*. See CAUSTIC.

LUNAR *Cycle*. See CYCLE.

LUNAR *Dial*. See DIAL.

LUNAR *Eclipse*. See ECLIPSE.

LUNAR *Horoscope*. See HOROSCOPE.

LUNAR *Month*. See MONTH.

LUNAR *Observations*, or *Lunar Method*, is the method of finding the longitude, by taking the distance between the moon and the sun, or a fixed star, which has been already explained under the article LONGITUDE; but the great importance of this problem induces us here to give a further and more minute explanation of its principles and operations, and of the different methods that have been devised for obtaining the solution.

This method of finding the longitude is the greatest modern improvement in navigation: the idea, however, is not modern, but it has not been applied with any success until within the last fifty years. M. de la Lande mentions certain astronomers who, above two hundred years ago, proposed this method, and contended for the honour of the discovery; but its present state of improved and universal practice he very justly ascribes to Dr Maskelyne. The discovery, indeed, seems to claim less honour than its subsequent improvements; it is one of those things which are obvious in theory, but difficult in practice. The most ancient method of finding the longitude was by the lunar eclipses; and that of finding it by the lunar distances is perfectly analogous: it is therefore highly probable that the method was thought of at a very early period, but the want of proper tables and apparatus prevented its being reduced to practice.

It may be observed, that, in the most practical methods of finding the longitude at sea by celestial observations, the moon is the chief guide or instrument; for the quickness of her motion renders her peculiarly well adapted for measuring small portions of correspondent time. Now, as she is seen in the same part of the heavens nearly at the same instant of absolute time, from all parts of the earth where she is visible, and as she is continually and sensibly changing her place, it is evident that if two correspondent observers were to note the precise moment of the respective times, when she is seen in any particular part of the heavens, *the difference between these times would shew the difference of longitude.*

In every method of finding the longitude by the moon, the first object is to be able to ascertain the part of the heavens where she is: this is easily seen at the time of her eclipses, or at the occultation of a fixed star; and these were naturally the first methods resorted to, but they occur too seldom for general use: the moon's place, however, may be marked with equal precision, by taking her distance from some fixed object, whose latitude and longitude are known; and stars in or near the zodiac are preferred, as the nearer such objects are to the moon's orbit, the greater will be her motion with respect to them: and though her motion is not uniform, yet, during the short space of time that she is near any star, she may be considered as moving uniformly.

It has been above observed, that if two persons under different meridians were to mark the moon's place, and also their relative times of observation, they might thence tell their difference of longitude; but they could not communicate their observations sufficiently soon for practical purposes; and even admitting the possibility of this, it were

necessary that the longitude of one place should be known, in order to determine that of the other. Now the Nautical Almanac is calculated to supply all these wants. This admirable work may be considered a perpetual observer, that communicates universally and instantaneously certain celestial appearances, as they take place at Greenwich Observatory. Here the distances are given between the moon and the sun, and certain remarkable stars in or near the zodiac, for every three hours; and any intermediate distance, or time, may be thence found by the rule of proportion with sufficient accuracy. If, therefore, under any meridian, a lunar distance be observed, *the difference between the time of observation and the time in the Almanac, when the same distance was to take place at Greenwich, will shew the longitude.* For example, if the observed distance between the sun and moon be 50° at eight o'clock, but by the Almanac the same distance of 50° will take place at Greenwich at six, it is evident that the difference between the observed and computed time is two hours, and therefore the longitude is 30° ; and it is also clear that the longitude is east, the time being most advanced at the place of observation.

A method so apparently simple must have been long since adopted; but two difficulties occurred: one the want of proper instruments, which want has been happily supplied by the invention and subsequent improvement of Hadley's quadrant; and the other, correct lunar tables; for the moon, though so near and so conspicuous to the earth, has always perplexed astronomers more than any other celestial body. The various inequalities of her motions were never properly understood, until sir Isaac Newton discovered the physical laws which govern them; and from his theory professor Mayer formed lunar tables, which have been found sufficiently correct for nautical practice, and from which those tables in the Nautical Almanac of the lunar distances had been calculated under the direction of Dr. Maskelyne for many years. In 1806 the French board of longitude published new lunar tables, calculated by Du Burgh, from the theory of La Place and the observations of Dr. Maskelyne; and from these tables the lunar distances in the Nautical Almanac of 1813 are computed, and in the Almanacs that follow.

The above two difficulties having been obviated, a third seems still to remain; and though this is in some measure removed by the application of the Nautical Almanac and Requisite Tables, yet the calculation is still more tedious than might be wished; nor is it possible to render it much shorter, as the problem necessarily comprehends solutions in two spherical triangles: this arises from the circumstance of the *observed distances* between the heavenly bodies not being the *true distances*; for the altitudes of those bodies are more or less affected both by refraction and parallax; and though these effects only operate in a vertical direction, yet that which changes the altitude of two bodies must also change their distance asunder. This is evident from the consideration, that the altitude of a celestial object is an arc of an azimuth circle intercepted between the object and the horizon; and as all azimuth circles incline gradually to each other from the horizon to the zenith, where they meet, it is plain that the more two bodies are apparently raised, the less will be their apparent distance asunder, and the contrary.

It is well known that the heavenly bodies are raised by refraction, and depressed by parallax; and that these effects are greatest in the horizon, and gradually diminish to the zenith, where they become nothing. Refraction depends upon altitude alone, but parallax depends upon both altitude and

LUNAR OBSERVATIONS.

and distance. All celestial objects, except the moon, are more affected by refraction than by parallax, and therefore appear above their true places; but the moon is always seen, excepting in the zenith, below her true place, being more affected by parallax than refraction, on account of her proximity to the earth.

These effects of parallax and refraction, though counteracting each other, seldom do it so equally as to render all correction unnecessary. Sometimes the *apparent* distance is nearly a whole degree more or less than the *true* distance; and the principal cause of so great a difference is the moon's parallax: for this body, which is the chief guide to the longitude, is also the great cause of error in the distances, and is therefore the principal object of correction.

In making a lunar observation, four persons are generally employed, one of whom takes the distance, two the altitudes, and the fourth notes the time. These things should be performed at the same instant; and if the observation be repeated several times, and a mean taken, the work is likely to be the more correct; and great care is here necessary, for an error in this part of the operation, particularly in taking the distance, will pervade the subsequent parts of the work, and will of course produce a wrong solution. The manner of adjusting the instruments, and of making the observations, is best taught by practice. Those who wish for written instructions on the subject are referred to the British Mariner's Guide by Dr. Maskelyne, to Dr. Mackay's book upon the longitude, or to professor Vince's Practical Astronomy.

Of correcting the Altitudes of the observed Objects.—When a lunar observation is made, the first object is to clear the altitudes from semidiameter, dip, refraction, and parallax.

The moon's parallax in altitude must be next calculated; by saying, *As radius is to the sine of her zenith distance, so is the sine of her horizontal parallax (as given in the Nautical Almanac) to the sine of her parallax in altitude.*

In correcting the moon's altitude, an allowance should be made for the augmentation of her semidiameter, which gradually takes place from the horizon to the zenith. This increase is given, in the IVth of the Requisite Tables, for every five degrees of altitude, which correction is to be added to her horizontal semidiameter given in the Nautical Almanac.

The augmentation of the moon's semidiameter is caused by her being nearer to the spectator in the zenith than in the horizon by a semidiameter of the earth—for the magnitude of a body is in the inverse ratio of its distance from the observer; and as the earth's semidiameter bears a very sensible proportion to the moon's distance, she is seen under the greatest angle in the zenith, which angle gradually diminishes to the horizon.

There are other corrections of the altitudes which may be necessary in cases of particular nicety, but which are seldom noticed at sea. These are—an allowance for the contraction of the vertical semidiameters of the sun and moon by refraction; a correction of the moon's parallax, supposing the earth an oblate spheroid; a correction for the refraction, according to the actual state of the atmosphere, as shewn by a thermometer and barometer, and not according to the mean astronomical refraction which is commonly used. These corrections, though perhaps necessary towards the perfection of this problem, being very small, and frequently counteracting each other, are generally considered of little consequence in nautical practice, where greater errors are unavoidable.

From the corrected Altitudes to find the true Distance.—It is easy to conceive, that by a lunar observation, the three sides

of a spheric triangle are measured in the heavens, which sides are the apparent co-altitudes of the observed bodies, and their apparent distance asunder.

The co-altitudes or zenith distances being corrected, the question is, to find the true distance between the observed bodies; but here there are only two things given, and therefore it cannot be performed until the angle at the zenith is known, which is determined from the three given sides of the triangle, by the rules of spheric trigonometry.

As the effects of parallax, refraction, &c. operate only in a vertical direction, it is evident that the corrections of the zenith distances or containing sides will not change the included angle at the zenith; and therefore three things are now known, namely, the corrected zenith distances and the included angle, whence the other side is determined by spherics, and this side is the true distance sought.

A General View of the different Methods of working the Lunar Observations.—Few problems have been ever more investigated or studied than that of clearing the lunar distance, and many ingenious methods have been devised for contracting the operation. These methods are founded on some of the following general principles.

The first general principle is spheric trigonometry, as before explained; the second is the doctrine of proportional errors, by which the effects that the errors in the altitudes produce on the distance are solved by fluxions, or by the *differential calculus*: and a third principle has been lately discovered, which is founded on the properties of a quadrangle inscribed in a circle, as explained and exemplified by the inventor, Dr. Andrew, in his Astronomical and Nautical Tables.

Various methods of working the lunar observations have been devised chiefly by Halley, Euler, Mayer, Maskelyne, Lyons, Witchell, Burrow, Borda, Wales, Mackay, Kelly, Gerrard, Andrew, and Mendoza. The methods of the two last authors appear the most concise, but all are sufficiently correct, and seamen generally prefer such as they have first learnt. It may indeed be observed, that operations which appear the most concise are not always the most expeditiously performed, as much depends on the number and variety of tables required, and the manner of applying them. No method has hitherto obtained an exclusive preference over the rest, nor does it appear possible to reduce the calculation to a conciseness to answer the general purposes or wishes of seamen; and hence, other modes have been devised, of obtaining approximate solutions by projection or graphic operation.

The first graphic method for clearing the distances was that by La Caille, called the *Chassis de reduction*, which has since been copied by La Lande, Mackay, and others. It is an orthographic projection, consisting of a great number of lines accurately drawn, and various scales for obtaining the different corrections.

Another graphic operation, of a different description, was executed by the late George Margetts, and published in 1790. It consists of seventy large plates, containing numerous lines drawn from the solutions of lunar distances in Dr. Shepherd's Tables. By Margetts' Longitude Tables the solution of a lunar observation may be obtained in about one-fourth of the time required by calculation; and the answer, though not perfectly accurate, is sufficiently correct for the general purposes of navigation.

An orthographic projection, founded on the fluxional analogies of spheric triangles, has been devised by Dr. Kelly, and published in his Introduction to Spherics and Nautical Astronomy, where an investigation of its principles is given (p. 195, edit. 2 and 3.) with a demonstration,

stration, shewing, that in all proper altitudes it will give the true distance within a few seconds. The simplicity of this projection is extremely curious, as giving an approximate solution of a complicated problem, by drawing four right lines only from the scale of chords, and it must therefore be very useful where great expedition is required.

LUNAR Rainbow. See RAINBOW.

LUNAR Year. consists of three hundred and fifty-four days, or twelve synodical months. See YEAR.

In the first ages, the year used by all nations was lunar; the variety of course being more frequent in this planet, and of consequence more conspicuous, and better known to men than those of any other. The Romans regulated their year, in part, by the moon, even till the time of Julius Cæsar; the Jews too had their lunar months. Some rabbins pretend, that the lunar month did not commence till the moment the moon began to appear; and that there was a law, which obliged the person who discovered her first, to go and inform the sanhedrim thereof. Upon which the president solemnly pronounced the month begun, and notice was given of it to the people by fires lighted on the tops of mountains. But this appears somewhat chimerical.

LUNARE Os, in *Anatomy*, one of the bones of the carpus. See EXTREMITIES.

LUNARIA, in *Botany*, elegantly so named by the older botanists and by all succeeding ones, from *luna*, the moon; on account of the silvery semi-transparent aspect, and broad orbicular shape, of its seed-vessels. Honefly or Sattin-flower. Linn. Gen. 337. Schreb. 440. Willd. Sp. Pl. v. 3. 476. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 1. v. 2. 385. Juss. 239. Tourn. t. 105. Lamarek Illustr. t. 561. Gærtner. t. 142, *rediviva*.—Class and order, *Tetradynamia Siliculosa*. Nat. Ord. *Siliquosæ*, Linn. *Crucifera*, Juss.

Gen. Ch. Cal. Perianth inferior, oblong, of four ovate-oblong, obtuse, cohering, deciduous leaves, of which two opposite ones are gibbous and pouched at the base. Cor. cruciform, of four equal, large, undivided, obtuse petals, as long as the calyx, each tapering down into a claw of the same length. Stam. Filaments fix, awl-shaped, about the length of the calyx, two of them rather shorter; anthers erect, or slightly spreading. Pist. Germen stalked, ovate-oblong, compressed; style short, permanent; stigma obtuse, undivided. Peric. Pouch elliptical, compressed quite flat, undivided, erect, very large, stalked, terminated by the style, of two cells and two valves; the partition flat, parallel and equal to the valves. Seeds several, projecting into the middle of the pouch, kidney-shaped, compressed, bordered, supported by long thread-shaped stalks, inserted into the lateral sutures.

Eff. Ch. Pouch undivided, elliptical, flat, stalked; valves equal and parallel to the dissepiment, flat. Calyx-leaves bagged at the base.

1. *L. rediviva*. Perennial Honefly. Linn. Sp. Pl. 911. (*L. græca perennis*; Bell. Eyst. vern. ord. 1. t. 21. f. 1. *Viola lunaris*, longioribus siliquis; Ger. em. 464. f. 2.)—Leaves doubly and sharply toothed. Pouches elliptic-lanceolate, acute at each end.—Native of Germany, Switzerland, and Greece. In our gardens it flowers in May or June, and is perennial, but by no means common. The stems are three or four feet high, erect, round, leafy. Leaves on long stalks, heart-shaped, pointed, nearly smooth, doubly, sharply and finely toothed; the lower ones opposite, the rest alternate. Flowers numerous, large, corymbose, fragrant, crimson. Pouch two inches long and not one broad, elliptical, making a sharp angle at each extremity, green or brownish.

2. *L. annua*. Annual Honefly. Linn. Sp. Pl. 911.

Mill. Illustr. t. 54. (*Viola lunaris*, five *Bolbonac*; Ger. em. 464. f. 1.)—Leaves simply and bluntly toothed. Pouch elliptical, somewhat orbicular, rounded at each end.—Native of Germany and Switzerland; very common in gardens, flowering in May and June. The root is annual or rather biennial, tapering. Stem solitary, branched. Leaves with much broader and less taper teeth than in the former, in a simple series only. Flowers copious, large, scentless, crimson. Pouch glaucous, scarcely more than an inch long, and nearly as broad, being almost orbicular, rounded at each end.

Linæus having founded his specific differences of these plants on the opposite or alternate situation of their leaves, in which respect they both vary, has led some to suppose they were both the same. Nothing however can be more distinct than the shape of their seed-vessels, to which we have added the different manner in which their leaves are toothed. They also permanently differ as to duration.

Willdenow charges Gærtner wrongfully with figuring the pouch of *L. rediviva* for *Ricotia*; the latter differs in not being elevated on a stalk above the base of the flower, which stalk in the said *Lunaria* is an inch long, or more. *Ricotia* is observed by Mr. R. Brown, as well as by Gærtner, to have, sometimes at least, two cells.

L. annua was discovered wild in Switzerland by M. Schleicher, though Haller seems not to have been aware of it.

LUNARIA, in *Gardening*, comprises plants of the herbaceous, annual, and perennial kinds, of which the species cultivated are, the perennial honefly (*L. rediviva*); the annual honefly, moor-wort, or satin-flower (*L. annua*); and the Egyptian honefly (*L. Egyptiaca*).

In the second sort the seed-vessels, when fully ripe, become transparent, and of a clear shining white, like satin; whence the name of satin flower.

Method of Culture.—These plants may be raised by sowing the seed in a shady border, or, which is better, in patches in the situations where they are to remain, in the autumn, keeping the plants afterwards properly thinned out and free from weeds. They may likewise be sown in the early spring; but the former is the better season, as the plants rise stronger. The last sort should have an open situation. When sown in beds, the perennial sort should be set out where they are to remain, in the following autumn after being sown.

These plants all afford ornament and variety in the borders and clumps of pleasure-grounds, in which the first sort should be placed more backward.

LUNARIA, in *Ichthyology*, a species of *Perca*; which see.

LUNARIA, in *Natural History*, is also used by some authors for the scelerites.

LUNARIS COCHLEA, the name of a genus of shells of the snail-kind, according to the classification of some writers, the distinguishing character of which is their having a perfectly round mouth. These are univalve, unbilobed shells, with a depressed clavicle, and a surface sometimes smooth, but more frequently striated, furrowed, lacinated, or covered with tubercles.

It is said, that Archimedes took the invention of the screw, so famous ever since his time, and still called after his name, from the form of this shell; and it is generally allowed, that architects have taken the hint of their winding flights of stairs from it. See TROCHUS, HELIX, &c. under CONCHOLOGY.

LUNAS, in *Geography*, a town of France, in the department of the Hérault, and chief place of a canton, in the district of Lodève. The place contains 1296, and the canton

canton 6122 inhabitants, on a territory of 292 $\frac{1}{2}$ kilometres, in 12 communes.

LUNATI, CARLO AMEROSIO, in *Biography*, of Milan, furnished *Il Gobbo della Regina*, who came to England in the reign of James II. Lunati was a most celebrated performer on the violin, and Geminiani's first master on that instrument.

LUNATIC, LUNATICUS, a person supposed to be affected, or governed by the moon. Hence, epileptics were anciently called lunatici, because the paroxysms of that disease seemed to be regulated by the changes of the moon. Thus Galen, (*De Diebus Criticis*, lib. iii.) says, the moon governs the periods of epileptic cases: and others referred the disease entirely to this planet. *Retæus de Diuturnis Morbis*, lib. i. cap. 4. See Mead's *Treatise concerning the Influence of the Sun and Moon upon the Human Bodies*, p. 38. 46, &c.

Mad people are still called lunatics, from an ancient but now almost exploded opinion, that they are much influenced by that planet. A much sounder philosophy hath taught us, that if there be any thing in it, it must be accounted for, not in the manner the ancients imagined, nor otherwise than what the moon has in common with other heavenly bodies, occasioning various alterations in the gravity of our atmosphere, and thereby affecting human bodies. However, there is considerable reason to doubt the fact; and it is certain that the moon has no perceivable influence on our most accurate barometers.

A lunatic, in the contemplation of the law, is properly a person who hath lucid intervals; sometimes enjoying his senses, and sometimes not. See NON-COMPOS.

The stat. 17 Edw. II. cap. 10. ordains, that the king is to provide that the lands of lunatics be safely kept, and they and their families maintained by the profits, and the residue shall be kept for their use, and be delivered to them when they come to their right mind; the king taking nothing to his own use; and if the parties die in such state, the residue shall go to their executors or administrators. A warrant is now issued by the king, under his royal sign manual, to the lord chancellor, or lord keeper, or lords commissioners for the custody of the great seal, to perform this office for him. All matters, therefore, touching lunatics, are within the peculiar jurisdiction of the court of chancery.

Lunatics are not legally accountable for any crimes they commit in this state. (1 Hawk. c. 1.) And also, if a man in his sound memory commits a capital offence, and before arraignment for it he becomes non-compos, he ought not to be arraigned for it; and if, after he has pleaded, the prisoner becomes mad, he shall not be tried: if, after he be tried and found guilty, he loses his senses before judgment, judgment shall not be pronounced: and if, after judgment, he becomes of non-sane memory, execution shall be stayed.

By the common law, if it be doubtful whether a criminal, who at his trial is in appearance a lunatic, be such in truth or not, it shall be tried by an inquest of office, to be returned by the sheriff; and if it be found by them, that the party only feigns himself mad, and he still refuse to answer, he shall be dealt with as if he had confessed the indictment. 1 Hawk. c. 1. §. 4.

By 39 and 40 Geo. III. c. 94.; in all cases, where it shall be given in evidence upon the trial of any person for treason, murder, or felony, that such person was insane at the time when the offence was committed, and such person shall be acquitted, the jury shall be required to find specially, whether they acquitted him on

account of insanity; and if they do so find, the court shall order such person to be kept in strict custody in such place, and in such manner as to them shall seem fit, until his majesty's pleasure shall be known; whereupon his majesty may give such order for the safe custody of such person during his pleasure in such place and manner as to his majesty shall seem fit.

When any person, who shall be indicted for any offence, and upon arraignment shall be found by the jury to be insane, so that he cannot be tried, or when upon the trial he shall be found to be insane, the court may record such finding, and order the party to be kept in strict custody until his majesty's pleasure shall be known; and if any person, charged with any offence, shall be brought before any court to be discharged for want of prosecution, and such person shall appear to be insane, the court may order a jury to be impanelled to try the sanity of such person; and if the jury find him to be insane, the court may order such person to be kept in strict custody, &c.; and in all cases of insanity his majesty may give such order, &c. as stated above.

And for the better prevention of crimes being committed by persons insane, if any person shall be discovered and apprehended under circumstances that denote a derangement of mind, and a purpose of committing some crime, for which if committed he would be liable to be indicted, any justice, before whom such person shall be brought, may, if he think fit, issue a warrant for committing such person as dangerous, and suspected to be insane, such cause of commitment being plainly expressed in the warrant; the person so committed shall not be bailed, except by two justices, one whereof shall be the justice who issued such warrant; or by the quarter sessions; or by one of the judges.

By 17 Geo. II. c. 5. it is enacted, that whereas there are sometimes persons, who by lunacy or otherwise are furiously mad, or are so far disordered in their senses, that they may be dangerous to be permitted to go abroad, it shall therefore be lawful for two or more justices, where such lunatic or mad person shall be found, by warrant directed to the constables, churchwardens, and overseers of the place, or some of them, to cause such person to be apprehended, and kept safely locked up in some secure place within the county or precinct, as such justices shall under their hands and seals direct and appoint, and (if such justices find it necessary) to be there chained, if the settlement of such person shall be within such county or precinct.

And if such settlement shall not be there, then such person shall be sent to his settlement by a vagrant pass (*mutatis mutandis*); and shall be locked up or chained by warrant of two justices of the county or precinct to which such person is so sent in manner aforesaid.

And the reasonable charges of removing, and of keeping, maintaining, and curing such persons, during such restraint (which shall be during such time only as such lunacy or madness shall continue) shall be satisfied and paid (such charges being first proved upon oath) by order of two justices, directing the churchwardens or overseers, where any goods, chattels, lands, or tenements of such person shall be, to seize and sell so much of the goods and chattels, or receive so much of the annual rents of the lands as is necessary to pay the same; and to account for what is so seized, sold, or received, to the next quarter sessions; but if such person hath not an estate to satisfy the same, over and above what shall be sufficient to maintain his family, then such charges shall be paid by the parish, town, or place to which such person belongs, by order of two justices, directed to the churchwardens or overseers for that purpose.

Provided, that any person aggrieved by any act of

such justices out of sessions may appeal to the next sessions, giving reasonable notice; whose order therein shall be final.

And nothing herein shall restrain or abridge the power of the king or lord chancellor; nor shall restrain or prevent any friend from taking them under their own care and protection.

But the above parts of the act relate to vagrant lunatics only, who are strolling up and down the country, and do not extend to persons, who are of rank and condition in the world, and whose relations can take care of them properly by applying to the court of chancery. 2 Atk. Rep. 52. See MADHOUSES.

When a person is legally found to be *non-compos*, (see NON-COMPOS,) the lord chancellor usually commits the care of his person, with a suitable allowance for his maintenance, to some friend, who is then called his *committee*, which see. However, to prevent sinister practices, the next heir is seldom permitted to be this committee of the person; because it is his interest that the party should die. But it hath been said, there lies not the same objection against his next of kin, provided he be not his heir; for it is his interest to preserve the lunatic's life, in order to increase the personal estate by savings, which her or his family may be hereafter entitled to enjoy. (2 P. Wms. 638.) The heir is generally made the manager, or committee of the estate, it being clearly his interest by good management to keep it in condition; accountable, however, to the court of chancery, and to the *non-compos* himself, if he recovers; or otherwise, to his administrators. In this care of idiots and lunatics, the civil law agrees with ours; by assigning them tutors to protect their persons, and curators to manage their estates. But in another instance the Roman law goes much beyond the English. For, if a man by notorious prodigality was in danger of wasting his estate, he was looked upon as *non-compos*, and committed to the care of curators or tutors by the praetor. And by the laws of Solon such prodigals were branded with perpetual infamy. But with us, when a man on an inquest of idiocy hath been returned an *unthrif*t and not an *idiot*, (which see,) no further proceedings have been had. Bro. Abr. tit. Idiot 4.

By 29 Geo. II. c. 31, a lunatic may surrender a lease in the court of chancery or exchequer, in order to renew the same. Also, by direction of the lord chancellor, he may accept a surrender of such lease, and execute a new one. 11 Geo. III. c. 20.

By 43 Geo. III. c. 75. whereas great injury frequently happens to persons found lunatic or of unsound mind, and incapable of managing their affairs, and the creditors of such persons are delayed in obtaining payment of their demands for want of sufficient power to apply the property of such persons in discharge of their debts and engagements, it is enacted that it shall be lawful for the lord chancellor, lord keeper, or lords commissioners for the custody of the great seal, to order the freehold and leasehold estates of such persons respectively to be sold, or charged by way of mortgage or otherwise, for raising such sum of money as shall be necessary for payment of the debts, and for performing the contracts or engagements of any such persons respectively, and [of] the costs and charges attending the same, and attending such sale or incumbrance respectively, and to direct the committee or committees of the estate of such persons respectively to execute in the name and on behalf of such persons conveyances of the estates to be sold or incumbered, and to procure such admittance to and make such surrenders of the copyhold estates of such persons found lunatic or of unsound mind, and to do all

such acts as shall be necessary to effectuate the same in such manner, as such chancellor, &c. shall direct; which conveyances shall be as good in law, as if the same had been executed by every such person when in his or her sound mind.

And in case of any surplus of money to be raised by any such sale as aforesaid, after answering the purposes aforesaid, the same shall be applied in the same manner as the estate sold would have been applied, if this act had not been made.

And whereas many such persons may be seized and possessed of freehold and copyhold lands, &c. either for the term of their natural lives or for some other estate, with power of granting leases and taking fines, reserving small rents on such leases for one, two, or three lives, in possession or reversion, or for some number of years determinable upon lives, or for terms of years absolutely; be it enacted, that in every such case every power of leasing such lands, &c. which is or shall be vested in such person, having a limited estate only, shall and may be executed by the committee or committees of the estate of such person, under the direction and order of the lord chancellor, lord keeper, or lords commissioners; and such lease or leases shall be as good in law, as if the same were executed by the said person in his or her sound mind.

And whereas persons so found lunatic or of unsound mind may be seized or possessed of, and entitled to freehold or copyhold estates, in fee or in tail, and an absolute interest in leasehold estates, and it may be for their benefit that leases or under leases should be made of such estates for terms of years, and especially to encourage the erection of buildings thereon, or repairing buildings actually being thereon, or otherwise improving the same; be it enacted, that it shall be lawful for the lord chancellor, &c. to order and direct a committee or committees of the estate of such lunatic to make such leases of the freehold, copyhold, or leasehold estates of such persons respectively, according to his or her interest therein, and to the nature of the tenures of such estates, for such term or terms of years, and subject to such rents and covenants, as the lord chancellor, &c. shall direct; and that every such lease shall be as good in the law, as if the same had been executed by such persons in his or her sound mind.

Every act to be done by such committee or committees by virtue of this act, and the order of the lord chancellor, &c. shall be as valid and binding against the said persons so found lunatic and of unsound mind respectively, and all persons claiming by, through, or under him or her respectively, as if the persons so found lunatic or of unsound mind respectively had been in his or her sound mind, and had personally done such act or acts respectively.

Provided nevertheless, that nothing herein shall extend to subject any part of the freehold, copyhold, or leasehold estates of any person found lunatic or of unsound mind, to the demands of his creditors, otherwise than as the same are now subject by due course of law; but only to authorise the lord chancellor, lord keeper, or lords commissioners for the custody of the great seal of the united kingdom and of Ireland respectively, being intrusted by virtue of the king's sign manual with the care and commitment of the custody of the persons, and estates of persons so found lunatic or of unsound mind, to make order in such cases as are hereinbefore mentioned, when the same shall be deemed for the benefit of such person so found lunatic or of unsound mind, and incapable of managing his or her affairs.

To make a will, it is not sufficient that the testator have memory to answer to familiar and usual questions, but

he ought to have a disposing memory, so as to be able to make a disposition of his estate, with understanding and reason.

For the marriage of lunatics, see *MARRIAGE*.

For lunatic asylums, see *MAD-HOUSES*.

LUNATION, the period, or space of time, between one new moon and another; also called *synodical month*. See *CYCLE* and *EPACT*.

LUNAWARA, in *Geography*, a town of Hindoostan, in Guzerat; 50 miles E. of Amedabad.

LUND, a town of Sweden, in West Gothland, on the Wenner lake; 36 miles N.N.E. of Uddevalla.

LUND, or *Lunden*, the most ancient town of Sweden, the capital of Scania, Schonen, or Skonen, of which a proverb is recorded, *viz.* that when our Saviour was born, Lund was in its glory. Lund contains scarcely more than 800 inhabitants, carries on but little trade, and is principally supported by the university established by Charles XI., and called, from the name of its founder, "Academia Carolina Gothorum." When Mr. Coxe visited Sweden, it had 21 professors and 300 students. The library contains 20,000 volumes. The botanical garden was not in a flourishing state, the number of plants not exceeding 1200. Linnæus was matriculated at this university. (See *LINNÆUS*.) At Lund was instituted, in 1776, a Royal Physiographical Society, which was incorporated by the king in 1778. The subjects treated of in its acts relate only to natural history, chemistry, and agriculture. Lund is an archbishopric. The cathedral is an ancient irregular building, raised at different intervals; 21 miles E. of Copenhagen. N. lat. 55° 44'. E. long. 13°.

LUNDA, a town of Sweden, in Sudermanland; 10 miles W. of Nyköping.

LUNDBY, a town of Norway, in the province of Agderhus, on the Glomme; 60 miles N.E. of Christiania.

LUNDE, a town of Norway, on a lake of the same name; 28 miles W.N.W. of Christianland.—Also, a town of Norway; 17 miles N.W. of Skeen.

LUNDEN, a town of the duchy of Holstein; 24 miles W. of Rendsborg.

LUNDO, a town of Sweden, in the government of Abo; 8 miles N.E. of Abo.

LUNDRESS, in our *Old Writers*, a sterling silver penny; which had its name from being coined only in London, and not at the country mints.

LUNDSAY, in *Geography*, a town of Pegu, on the W. side of the river Ava; 60 miles W.N.W. of Pegu. N. lat. 18° 30'. E. long. 95° 43'.

LUNDSJE, a town of Persia, in the province of Laristan, on the Persian gulf. N. lat. 26° 38'. E. long. 54° 36'.

LUNDSKORON, a town of Poland; 18 miles S. of Cracow.

LUNDY ISLAND, is situated in the mouth of the Bristol channel, nearly four leagues from the coast of Devonshire, England. It is rather more than three miles in length, and about one in breadth; contains about 2000 acres; and is environed by high and steep rocks, which render it inaccessible, except in one or two places. The only safe landing place is on the east side; where a small beach admits a secure approach, and is sheltered by a detached portion of rock, called the Isle of Rats, from the great number of those animals which burrow here. On landing, visitors are obliged to climb over various craggy masses, before they can reach the steep and winding tract that leads to the summit, which commands views of the English and Welsh coasts. About 400 acres only of this

island are in cultivation; of which 300 are arable, and the rest pasture: wheat is the chief produce. The elevated situation of the land, in some places 800 feet above the sea, and the violence of the N.E. winds, prevent any tree from growing, though a considerable expense has been incurred in planting. Rabbits and rock birds are numerous; and in the season, lobsters, crabs, and other fish may be obtained in abundance. About 400 head of sheep, and 80 of cattle, are fed here; but the former do not thrive. The inclosures are stone fences. Of the history of the island but little is known. Riddon relates that one Morisco, who had conspired to kill king Henry III., retired hither, and turning pirate, committed great depredations; on which the king arrested, and had him executed on an elevated part. About the middle of the last century, it was purchased of government by a nobleman, who entrusted it to the care of a person named Benson, a notorious smuggler, who carried on a considerable illicit traffic. The next proprietor of the island was sir John Borlase Warren, who, about the year 1781, sold it to John Cleveland, esq.; but it appears to have been recently re-purchased by government. The whole rent is but 70*l.* per annum; no taxes are paid; nor can it maintain any revenue officer, the duties in seven years scarcely amounting to five pounds. The number of houses is only seven; the inhabitants, in the year 1794, were but twenty-three. The population of the isle was probably greater at some distant period, as many human bones have been ploughed up; and Camden says, "the turrows show it to have been once cultivated." The chief antiquities are, the ruins of St. Anne's chapel, and what is termed Morisco's castle. The latter is near the south-east end, and was strongly fortified with large out-works and a ditch; a few old dismounted cannon occupy the battlement, beneath which is a curious cavern. In the reign of Charles I. lord Say and Seale held the castle for the king; and in the time of William and Mary, the French surprised it by a stratagem, plundered it, and kept possession for some time. Beauties of England and Wales, vol. iv.

LUNE, in *Fortification*. See *DEMI-LUNE* and *LUNETTE*.

LUNE, or *Lugne*, in *Geography*, a river of England, which rises in the county of York, and runs into the Irish sea, a few miles below Lancaster. N. lat. 53° 57'. W. long. 2° 49'.

LUNE, **LUNULA**, in *Geometry*, is the space included between the arcs of two unequal circles, forming a sort of crescent, or half-moon, the area of which may in many cases be as accurately determined as that of any rectilinear figure. The lune was the first curvilinear space of which the quadrature was ascertained, and this is said to have been first effected by Hippocrates of Chios, though others say it was discovered by Ctenopidas of Chios. However this may be, the former geometer has generally had the honour of the discovery attributed to him, and the figure still bears his name, being commonly denominated the lune of Hippocrates, the construction of which is as follows.

On the diameter of a semicircle (*Plate X. Geometry, fig. 2.*) describe a right-angled triangle, of which the angular point will necessarily fall in the circumference. Then on each of the sides *A D*, *D B*, describe a semicircle, and the two figures *A G F D*, *D H E B* will be lunes, and the area of them will be equal to the area of the right-angled triangle *A D B*. For circles, and consequently semicircles, being to each other as the squares of their diameters; and since $A B^2 = A D^2 + D B^2$; therefore the semicircle $A D B = A G D + D H B$; from these equal spaces taking away the common segments *A F D* and *D E B*, there remain the two lunes equal to the triangle *A D B*; and therefore, if the

two sides AD , DB , become equal, as in *fig. 3*, the two lunes are each equal to half that triangle, and consequently the quadrature of them is determined, being each equal to a given rectilinear figure; and this is what is properly called the lune of Hippocrates, and it was the only one of which he could determine the area, for though he, in all cases, had the measure of the space of both together, yet it was only in the case of equality that he could find the area of the single lune, though he could always determine a lune that should be equal to any given rectilinear space. For in *fig. 3*, the arc DEB is a quarter of a circle to the radius CB , and DHB is a semicircle. If, therefore, we construct the isosceles right-angled triangle BCA , (*fig. 3*.) equal to any given space, and on AB describe the semicircle BDA , and from C as a centre, and with CA as a radius, describe the quadrant BEA , we shall have the lune $BDEA$ equal to the given space as required. This, as we have observed above, was the first instance of the quadrature of a curvilinear space, that is, of its being shewn equal to a rectilinear figure; for, properly speaking, it is not absolutely a quadrature, as was that of Archimedes, when he demonstrated that every parabola was two-thirds of its circumscribing rectangle; Hippocrates arriving at his result only step by step, by subtracting equal quantities from equal spaces, and hence finally, as by chance, coming to a case in which a curvilinear area is equal to a rectilinear one.

This discovery of Hippocrates, it seems, inspired him with great confidence of being able to find the measure of the circle itself; and the reasoning which has been attributed to him on this subject, though very erroneous, is still extremely plausible. Hippocrates supposed a semicircle $ADEB$ (*fig. 4*.) in which he drew the three chords or radii AD , DE , EB , and on each of these chords he described a semicircle and a fourth, as F , equal to them. Then the four semicircles AGD , DEH , EIB , and F , being each equal to a quarter of the semicircle $ADEB$, they are therefore together equal to it, and taking away from each the small segments AGD , DHE , EIB , we shall have on one side the rectilinear figure $ADEB$, equal to the three lunes, together with the semicircle F . If, therefore, the area of the lunes be taken away from the rectilinear $ADEB$, there will remain the area of the semicircle F , equal to a given rectilinear space. This reasoning, however, though ingenious, is still very defective, in consequence of the lunes employed in this case being different from those of which Hippocrates had found the quadrature, for that, as we have seen, is bounded by a quadrant of one circle, and the half of another, whereas those in the above figure are bounded by a semicircle, and the sixth part of another circle, which is very different from the former, and the quadrature of it equally as difficult as that of the circle itself. All, therefore, that Hippocrates could draw from his investigation, was merely this, that if any geometer should be able to find the area of those lunes, the quadrature of the circle would necessarily follow, and as this problem was not at that time thought so difficult as it is now known to be, it is not improbable that considerable hopes of success were entertained after the discovery which this able geometer had made of the possibility of squaring what is indeed apparently a more complex figure than the circle. In fact the quadrature of the circle might be accomplished, if we only knew the ratio of the two lunes, described as in *fig. 2*; for then knowing the sum of the two, and their ratio, it is obvious that we should have the real area of each, and consequently, by taking AD equal to the radius BC , the area of the circle would follow, as we have shewn above.

But though Hippocrates and the ancient geometers were

unable to square any other lune, except that above-mentioned, yet the moderns have found several other cases in which the quadrature may be obtained, as also certain portions of them cut off by right lines, drawn in certain directions. In the lune of Hippocrates, the radii of the bounding circles are to each other in the ratio of two to one; but if the two circles are to each other as three to one, or as three to two, or as five to one, or five to three, they may also be squared, or may be constructed equal to given spaces, by means of the simple elements of geometry; but other ratios, as four to one, six to one, seven to one, &c. require the assistance of the higher geometry, being of a similar description of problems to those of trisecting an angle, doubling a cube, &c.; and can only be solved by the same means.

We shall take this opportunity of giving a summary of some of the most curious observations, added by modern geometers to the discovery of Hippocrates.

1. If from the centre F , (*fig. 5*.) there be drawn any straight line whatever FE , cutting off the portion of the lune $AEGA$, that portion will be quadrable, and equal to the rectilinear triangle AHE . For it may be readily demonstrated, that the segment AE will be equal to the semi-segment AGH .

2. From the point E , if EI be let fall perpendicularly on AC , and FI and EF be drawn, the same portion of the lune $AEGA$ will be equal to the triangle AFI . For it may be easily demonstrated, that the triangle AFI is equal to the triangle AHE .

3. The lune, therefore, may be divided in a given ratio, by a line drawn from the centre F ; nothing more being necessary than to divide the diameter AC in such a manner, that AI shall be to CI in that ratio; to raise EI perpendicular to AC , and to draw the line EF : then the two segments of the lune AGE and GEC will be in the ratio of AI to CI .

All these remarks were first made by M. Artus de Lionne, bishop of Gap, who published them in a work, entitled "Curvilinearum Amoenitas Contemplatio," 1654. 4to., and afterwards the following were added by other geometers.

4. If two circles, forming the lune of Hippocrates, be completed, the result will be another lune, which may be called the *conjugate* to the former, and in which mixtilinear spaces may be found, which may be squared as in the preceding cases.

From the point F , if there be drawn any radius FM , intersecting the two circles in R and M , we shall have the mixtilinear space $RAMR$ equal to the rectilinear triangle LAR ; which can be easily demonstrated; for it may be readily seen that the segment AR , of the small circle, is equal to the semi-segment LAM of the greater.

6. Hence, if the diameter MO touch the small circle in F , it follows that the mixtilinear space $ARFMA$ will be equal to the triangle ASF , right-angled at S , or to half the lune $AGCB A$. We might have added here various other properties relating to lunes and their segments, but our limits will not admit of it; we must therefore refer the curious reader to Ozanam's "Mathematical Recreations," where the subject is amply illustrated. See also the remarks of David Gregory, Cawwell, and Wallis, on the quadrature of the lunula, in Phil. Trans. N. 259, or vol. iv. p. 452, New Abridgment; and for "the dimensions of the solids generated by the conversion of the lunula of Hippocrates, and of its parts about several axes, with the surfaces generated by that conversion," see De Moivre's paper in the Philosophical Transactions, N. 205, or vol. iv. p. 565, New Abridgment.

LUNELLE-LA-VILLE, in *Geography*, a town of France, in the department of the Herault, and chief place of a canton, in the district of Montpellier. The place contains 4207, and the canton 9451 inhabitants, on a territory of 145 kilometres, in 11 communes. N. lat. $43^{\circ} 40'$. E. long. $4^{\circ} 13'$.

LUNEN, a town of Germany, in the county of Mark, at the conflux of the Zefick and Lippe; 20 miles S.S.W. of Munster. N. lat. $51^{\circ} 36'$. E. long. $7^{\circ} 37'$.

LUNENBURG, a town of Prussia, in the province of Natangen; 34 miles S.S.E. of Konigsberg.

LUNENBURG, or *Lunenburg*, a city of Westphalia, capital of a principality, situated on the Ilmenau, surrounded with moats and walls, fortified with towers, and containing three churches, about 1300 houses, and 9000 inhabitants. It has also three hospitals, in each of two of which is a church. The prince's palace and the guild-hall are in the market place. The anatomical theatre was built in 1713, and an academy for martial exercises was founded on the site of the convent of St. Michael, which was suppressed. The burghers consist of four orders, the patricians, the brewers, the merchants and tradesmen, and the artisans; and to these four classes some others might be added. Since the year 1639 the magistracy has been composed of one moiety of patricians, and of another of men of letters. The Salze, which is a distinct part of the town, enclosed by wall, has its own separate magistracy. This town consists of fifty-four small houses, sunk in the ground, in each of which are four large leaden pans, containing brine, which is left to exhale for the manufacture of salt; and the salt water is conveyed into them by a common pipe from the several springs. The salt-houses, being 54 in number, and containing 216 pans, which are daily boiled, and every salt-house being estimated at 40,000 rix-dollars, the capital of the whole Salze much exceeds two millions of rix-dollars. Of these salt-works a fifth belongs to the sovereign's due; and the town of Lunenburg pays annually to the treasury near 6000 rix-dollars. Of late the salt-trade has very much declined. The exports of the town are salt, lime furnished by two rocks in its vicinity, and beer. It likewise carries on a trade in wax, honey, wool, flax, linen, and frize. Goods are also brought here from all parts of Germany, and forwarded by the Ilmenau to Hamburg and to Lubek. Lunenburg is 36 miles distant S.E. from Hamburg. N. lat. $53^{\circ} 15'$. E. long. $10^{\circ} 36'$.

LUNENBURG, or **LUNENBURG-Zelle**, a principality of Westphalia, the soil of which is various; consisting of fruitful marsh-land that lies along the Elbe, the Aller, the Jetze, and some other small rivers, other parts, amounting to upwards of 5000 acres, that are sandy, and others that comprehend heath, turf-moors, and swamps. According to the diversity of its soil, it produces wheat, rye, barley, oats, pease, buckwheat, flax, hemp, hops, garden-stuff, oak, beech, fir, pine, birch, and alder. The wheat differs in quantity in different districts, some super-abounding, and the others being deficient; and some breed but few horned cattle and horses, whilst they abound in others. The heaths are covered with numerous flocks of a small kind of sheep, the wool of which is long and coarse. The culture of bees furnishes considerable quantities of honey and wax. The rivers supply plenty of good fish. The river Elbe, which traverses the E. and N. sides of this principality, serves to fertilize the adjacent marsh-lands, and to afford other advantages by its fisheries, navigation, and tolls. This principality contains three large towns, viz. Lunenburg, Velen, and Zelle, with eleven smaller, and thirteen large villages. Its principal manufactures are those of linen, cotton, cloth, ribbons, neckings,

and hats. The king of Great Britain derived from this principality a feat and voice in the college of the princes of the empire, and the circle of Lower Saxony. By the peace of Tilsit, it was annexed to the new kingdom of Westphalia.

LUNENBURG, a county of Virginia, adjoining Newaway, Brunswick, Mecklenburg, and Charlotte counties; about 30 miles long, and 20 broad. It contains 45,576 free inhabitants, and 5876 slaves.—Also, a township in Essex county, in Vermont, seated on Connecticut river, S.W. of Guildhall, and N.E. of Concord, and containing 393 inhabitants.—Also, a township of Worcester county, Massachusetts, on an elevated situation, 25 miles from the Great Monadnock mountain, in New Hampshire. It contains 14,000 acres of land, on which are 1243 inhabitants, and is more distinguished by its salubrity than by its wealth. The inhabitants have little intercourse or trade with their neighbours; but they carry on the mailing business to advantage.—Also, a town of New York, in Green county, now called "Esperanza," situated on the W. side of Hudson's river, opposite to the city of Hudson, and 30 miles S. of Albany. The soil of this thriving village, or town, is uneven, nor is the soil very good.—Also, a county of Nova Scotia, on Mahone bay, on the S. coast of the province, facing the Atlantic ocean. Its chief towns are New Dublin, Lunenburg, Chester, and Blandford. In Mahone bay, La Have, and Liverpool, several ships trade to England with timber and boards.—Also, a township in the above county, situated on Merliquoeth, or Merliquoeth bay, well settled by a number of industrious Germans. The lands are good, and well cultivated; 35 miles S.W. by S. from Halifax.

LUNENSE MARMOR, in the *Natural History of the Ancients*, the name of that species of white marble, now known among us by the name of the Carrara-marble, and distinguished from the statuary kind by its greater hardness and less splendour. It was ever greatly esteemed in building and ornamental works, and is so still. It is of a very close and fine texture, of a very pure white, and next in purity to the Parian marble. It has always been found in great quantities in Italy, and is so to this day. See *Carrara MARBLE*.

LUNES, or **LOWINGS**, in *Falconry*, leathes or longlashes to call in hawks.

LUNETTE, in *Fortification*, an enveloped counterguard, or elevation of earth, made beyond the second ditch, opposite to the places of arms; differing from the ravelins only in their situation.

Lunettes are usually made in ditches full of water, and serve to the same purpose as faussebrays, to dispute the passage of the ditch.

Lunettes are placed on both sides of the ravelin, as B, B. *Plate VIII. Fortification, fig. 8.* to increase the strength of a place: they are constructed by bisecting the faces of the ravelin with the perpendicular I.N., on which are set off 30 toises from the counterfearp of the ditch, for one of its faces; the other face P.N. is found by making the semigorge T.P. of 25 toises; the ditch before the lunette is 12 toises; the parapet three, and the rampart eight. There is sometimes another work made to cover the salient angle of the ravelin, such as A, called *bonnet*, whose faces are parallel to those of the ravelin, and when produced bisect those of the lunettes; the ditch before it being 10 toises. There are likewise some lunettes, whose faces are drawn perpendicular to those of the ravelin, within a third part from the salient angle, and their semigorges are only 20 toises. Mr. Muller recommends the face P.N. to be perpendicular to that of the bastion, which would then defend it in a direct manner; and if the semigorges of the bonnet A were only seven or eight toises,

toises, it would be less expensive, and its ditch and the covert-way before it would be better defended by the lunettes. *Elem. of Fortif.* p. 36.

LUNETTE, in the *Manege*, is a half horse-shoe, or such a shoe as wants the sponge, *i. e.* that part of the branch which runs towards the quarters of the foot.

LUNETTE is also the name of two small pieces of felt, made round and hollow, to clap upon the eyes of a vicious horse that is apt to bite, and strike with his fore feet, or that will not suffer his rider to mount him.

LUNEVILLE, in *Geography*, a town of France, and principal place of a district, in the department of the Meurthe, situated between the Vesouze and the Meurthe, in a marshy plain, which has been drained. An academy was instituted here by king Stanislaus, and furnished with a good library. The place contains 9797, and the two cantons 22,334 inhabitants, on a territory of 345 kilometres, in 37 communes; 13 miles E.S.E. of Nancy. N. lat. 48° 36'. E. long. 6° 34'.

LUNGKORCKE, a town of Prussia, in the palatinate of Culm; 10 miles N. of Stralsburg.

LUNGOBARDI, in *Ancient Geography*. See LOMBARDS.

LUNGON, in *Geography*, a small island on the W. side of the gulf of Bothnia. N. lat. 62° 40'. E. long. 17° 48'.

LUNGPOUR, a town of the country of Cachar; 15 miles E. of Cospour.

LUNGRO, a town of Naples, in Calabria Citra, chiefly inhabited by Greeks; 10 miles S.S.W. of Cassano.

LUNGRY, a town of Bengal; 36 miles S. of Calcutta. N. lat. 21° 58'. E. long. 87° 35'.

LUNGS, in *Anatomy* and *Physiology*, are organs of the body, situated in the chest, through which the blood passes on its course from the right to the left side of the heart, and in which it is changed from the venous to the arterial state, by means of exposure to the atmospheric air received into these organs in respiration.

The two lungs, (right and left,) are entirely alike in their composition; their size is considerable, and they consist of several different tissues, which render their structure complicated. These tissues are almost all vascular, which gives to the lungs their characteristic spongy and soft nature. They possess, besides the properties arising from their organization, only the insensible organic contractility, or tonic power. Perhaps the muscular fibres of the air-vessels may constitute an exception to this observation. In consequence of their vital properties being limited to this tonic power, they are not capable of any motion in themselves; and they therefore remain motionless, unless some exterior agency puts them in motion; yet, in their functions as respiratory organs, they exhibit a continual movement, an alternation of dilatation and contraction, by which the air is first received into their interior, and then expelled after a certain interval. If this be interrupted for a very short time, the blood is no longer changed, the circulation ceases, and death follows. The lungs then require some auxiliary means for the execution of the functions to which they are destined; these are furnished by the considerable organs of motion surrounding them, which at the same time compose a sufficiently firm defence to protect them against external injury. The ribs with their cartilages, the sternum, and the dorsal vertebrae, form the solid part of the cavity containing the lungs; the diaphragm and intercostal muscles the moveable parts: the cavity itself resulting from their union, is named the thorax. To the sides of this cavity we must refer the pheno-

mena of dilatation and contraction of the lungs, which are entirely passive, and follow the impulse received from this source. Thus the thorax constitutes an essential part of the respiratory apparatus.

But the thorax contains also the central organ of the circulation (the heart), and the large blood-vessels connected with it; thus the apparatus of this function is brought near to, and in a manner confounded at its origin with that of respiration. Yet they are distinct, by the disposition of the common cavity which contains them. For the heart occupies that part of the chest which is formed by the vertebral column behind, by the sternum in front, and by the aponeurotic centre of the diaphragm below; parts which are either immoveable, or capable only of a small degree of motion. The lungs, on the contrary, occupy the most moveable part of the chest; those formed by the ribs and intercostal muscles, and the muscular parts of the diaphragm.

The following account of the respiratory apparatus will include descriptions, 1st, of the chest, in which the lungs are contained; 2dly, of the motions which that part is capable of; 3dly, of the membranes lining the cavities; 4thly, of the lungs themselves; and 5thly, of their functions.

The chest or thorax is a conical cavity, slightly flattened in front, occupying the upper part of the trunk, and consequently having a much larger share of the skeleton below than above it. Yet, if we compare its position to that of the most important organs, we shall find the latter placed almost equally near the viscera contained in the thorax. The parts situated in the head, and those contained in the abdomen differ very little in their distance from the heart; while the latter organ is placed at very unequal distances from the upper and lower extremities. Hence the heart is the centre of the organs contained in the head and abdomen, while it exerts a much less active influence on the lower than on the upper limbs.

The chest is situated in front of the vertebral column; but the curvature of the ribs, which is very prominent behind, causes the cavity to pass a little beyond the spine in that direction, particularly towards the middle. The plane of the front of the chest is posterior to that of the front of the face; commonly it is nearly on a level with that of the abdomen; but the numerous variations of the latter cavity produce corresponding varieties in this respect.

A false idea would be formed of the chest by examining it when covered with soft parts, and articulated to the upper limbs. The numerous muscles surrounding it above, the shoulder, and particularly the clavicle, give to its upper part an extent in the transverse direction, which does not exist in the skeleton, where the chest represents a cone flattened in front and behind, with the basis downwards and the apex upwards. The longitudinal axis of this cone is oblique from above downwards, and behind forwards; but all its sides do not partake equally in this obliquity, which belongs only to the anterior and lateral parts: the posterior, formed by the spine, has no concern in it. Hence a vertical line, drawn from the middle of the space, included between the vertebral column and the ensiform cartilage, perpendicularly through the chest, would not pass out at the centre of the superior aperture, but would go in front of the clavicular extremity of the sternum. The diameters, whether antero-posterior or transverse, of the cone represented by the chest, are all larger in proportion as they are nearer the basis.

In its general capacity the chest holds a middle place between the head and the abdomen. Its depth, from above downwards, is much less in the natural state, than it appears in the skeleton. The diaphragm below forms a considerable arch

arch projecting into the chest, and very considerably lessening its extent in this direction. But this diminution affects the middle, which is occupied by the central tendon, much less than the sides. Again, the clavicles above very manifestly surmount the sternum, and contribute to make the chest appear higher than it really is. The breadth is much less at the upper part, than it appears to be on the first view, because the clavicle and the muscles enlarge the exterior forms without affecting the internal dimensions. The capacity constantly increases in proportion as we proceed downwards. Yet the habit of wearing clothes that are very tight about the waist, particularly stays, contracts that part, so that the chest is sometimes shaped like a barrel, narrow above and below, and broader in the middle. The concavity in the dorsal part of the spine makes the chest more capacious in its middle; yet this enlargement is not equal to the contraction produced by the anterior prominence of the bodies of the vertebrae. In fact, the antero-posterior diameters are all much less extensive along the middle line of the chest than on the sides; so that the sternum is separated from the spine by an interval much smaller than that which exists between the cartilages of the ribs and the hollows at the sides of the spine.

In the female the chest is proportionally broader, but shorter than in the male.

Any cause of distention affecting the abdomen, as pregnancy, ascites, large tumours, &c. strongly elevates the chest, presses the ribs together, and diminishes the perpendicular axis, while the transverse and antero-posterior diameters are rather increased, particularly below. There are malformations of the chest, particularly affecting the sternum and ribs, which diminish the breadth, while they leave the height nearly the same. Individuals predisposed to phthisis are remarkable for this transverse contraction of the cavity, which makes the prominence of the sternum very conspicuous in front. In other instances the chest is affected, in consequence of deformities of the spine: when this is curved, the ribs are brought very close together on one side, and are proportionally separated on the other, so that the two sides of the cavity are rendered very unequal. The chest, in such instances, is generally very prominent.

Description of the particular Bones of the Chest.—It is composed of a common, and of proper parts. The dorsal portion of the spine is the former (see *SPINE*); the sternum in front, and the ribs on each side, are the latter.

The *sternum* is a symmetrical bone, placed in the front and middle of the chest, flattened and elongated, broad above, contracted about the middle, then again becoming a little broader, and terminating at last below by a prominent point. It is divided into a cutaneous and a thoracic surface, a clavicular and an abdominal extremity, and lateral edges.

The cutaneous surface is anterior, covered by the skin, and more immediately by the aponeuroses of the *sterno-mastoidei* and great pectoral muscles: it is marked sometimes by lines dividing it into surfaces of unequal breadths, and corresponding to the original divisions of the bone. It is a little convex at the upper part, and then flattened. The attachment of the muscular fibres, and of the ligaments of the ribs, gives it a roughness. The thoracic surface is posterior, a little concave, smooth, and sometimes exhibits transverse lines similar to those already mentioned. It corresponds above to the *sterno-hyoidei* and *sterno-thyroidei*; then, for a short space, to the cellular tissue of the *mediastinum*, and afterwards to the *triangularis sterni*.

The clavicular extremity is the broadest and thickest part of the bone. Its middle consists of a broad concavity, al-

most entirely occupied by the inter-clavicular ligament: on each side of this is a large superficial excavation, concave from within outwards, and convex from before backwards, articulated to the clavicle, and surrounded by ligamentous insertions. The abdominal extremity is called also the ensiform or xiphoid cartilage or appendix. It is thin, flattened, broader above, and terminating in a narrower way below. Its figure varies greatly in different individuals: the lower end sometimes turns forwards, sometimes backwards; occasionally it is perforated. It generally is cartilaginous, in a greater or less degree, until the later periods of life. It affords insertion to the aponeuroses of the abdominal muscles; the recti cover it in front, and the diaphragm behind.

The margins of the sternum are thick, and exhibit seven articular cavities, to which the cartilages of the true ribs are articulated. These are oblong, and not very smooth. The first, which is superficial, and not clearly marked, is immediately below the concavity that lodges the clavicle. The succeeding ones are separated by slight concavities corresponding to the intercostal spaces, and become nearer and nearer to each other, in proportion as they are placed lower.

The substance of the bone is almost entirely cellular, and its surfaces are covered by a very thin compact stratum of bony texture: hence the sternum is very light in proportion to its size. It consists at first of eight or nine pieces, enclosed in a mass of cartilage: these are soon reduced to seven, and then to five; which number continues for a long time, the individual portions being still separated by cartilaginous strata. The first of these pieces is the largest, and is broader above than below, the two following are nearly square, and very short: the fourth is longer; the last includes the ensiform appendix already mentioned. This division no longer exists in the adult; the pieces are united in the following order. The second is consolidated with the third, and then the latter with the fourth: the other divisions generally continue through life; so that the sternum is ordinarily described as being composed of two bones and a cartilage. The first bone ends at the second rib, which is articulated between it and the second bone. The two pieces are united by a thin layer of cartilage, and their union is often consolidated by bone. The ensiform cartilage is connected in the same way to the end of the second bone; but after a certain age, it is generally more or less ossified.

The *ribs* are bones of irregular figure, placed in succession from above downwards, on each side of the chest, consisting generally, but not constantly, of twelve pairs, flattened and rather thin in front, rounded and thicker behind, and more or less arched. They differ in length, breadth, and direction. The length, which is inconsiderable in the first, is suddenly increased to a very considerable degree in the second; and this augmentation proceeds gradually as far as the eighth. From this they again decrease, so that the twelfth is about as long as the first. The first rib is the broadest; the succeeding ones become narrower, but in an almost insensible degree. Each individual rib is narrowest from its vertebral extremity to the angle: it grows broader in front of this part, and increases to its sternal end. The first rib forms nearly a right angle with the vertebral column; the following are more and more inclined outwards and downwards, so that their vertebral end is higher than their cartilaginous extremities. The first forms a small, but nearly regular semicircle; the succeeding ones form less perfect segments of circles, which increase successively as far as the eighth, and then decrease. All are more curved behind.

hind than in the front: and hence arises the deep excavation on each side of the chest, in the former direction, for lodging the lungs. They are all twisted on themselves, so that the two extremities cannot rest at the same time in an horizontal plane. The point of twisting is at the angle, consequently the first, which has no angle, does not exhibit this circumstance, which is the more sensible in proportion as the angle is more strongly marked. The ribs are distinguished into two classes: the seven superior ones, articulated to the sternum, are called *true*, or thoracic; the five inferior, joined to each other in front by their cartilages, which are not connected to the sternum, are named *false*, or abdominal. Each is divided into a vertebral and a cartilaginous extremity, and a body.

The vertebral extremity is posterior and articulated to the spine. It exhibits a rounded and contracted neck, of about an inch in length, resting on the transverse process of the corresponding vertebra. This neck is slightly expanded at its posterior end, to form the head of the rib, which exhibits a cartilaginous surface for articulation with the vertebral column. The surface is rounded in its outline, single in the first, eleventh, and twelfth ribs, which are each articulated to a single body of a vertebra, and divided by a rising line into two parts in the nine others, which are severally articulated to hollows formed between two vertebrae. Of these two portions the lower is the largest.

The cartilaginous extremity is elongated from above downwards, broad and concave in the ten first ribs, and narrower in the two last. It is most closely joined to the corresponding cartilages, so as to appear perfectly continuous with it.

The body of the rib may be considered under four different points of view; *viz.* the external and internal surfaces, the superior and inferior margins. 1. On the outside it is convex, and presents behind a tubercle, marking the termination of the neck, and divided into two portions: the inner of these is a smooth cartilaginous surface, nearly circular in its figure, articulated to the transverse process of the lower of the two dorsal vertebrae, between the bodies of which the head is articulated; the external is rough, and affords attachment to a strong ligament. This tubercle is confounded with the angle in the first rib, and is deficient in the two last. In front of this eminence is the angle, or part at which the rib, after being continued from the vertebral column obliquely downwards and outwards, turns forwards: instead of being angular, as its name implies, this bend is gentle and rounded. It has a prominent oblique line, not seen in the first and twelfth, but slight in the second and eleventh, and more strongly marked and distant from the tubercle, in proportion as the rib is lower down: it gives attachment to the sacro-lumbalis. Between this angle and the tuberosity there is a surface directed backwards, occupied by the longissimus dorsi, and becoming broader as we trace the ribs from above downwards. The rest of the rib, in front of the angle, forms a nearly smooth surface, directed upwards in the first, where we observe in it two superficial impressions made by the course of the subclavian artery and vein, separated by a surface, in which the scalenus is inserted, and inclined more and more outwards in the succeeding ribs, in proportion as they are lower. In the middle of the second there is a mark from the attachment of the serratus anticus, and on the others analogous impressions from various muscles of the chest and abdomen, as the obliquus externus, pectoralis minor, serratus anticus, serratus posticus, &c.

2. On the inside the surface is uniformly concave and smooth, covered by the pleura, directed downwards in the

first, a little inclined in the same direction in the second, but completely internal in the remainder.

3. Above, the body of the rib forms an obtuse margin, which is internal in the first, inclined upwards in the second, and directly superior in all the others. It affords attachment to the intercostal muscles, except in the first rib.

4. The inferior margin is sharp, particularly near the tubercle, and becomes more obtuse in front. Just within this is found the groove of the rib, which is deep at the back part of the bone, becomes gradually shallower, and is insensibly lost in the front. It lodges the intercostal nerves, but is hardly perceptible in the first and last ribs. This inferior margin affords attachment to the intercostal muscles.

These bones are thin in comparison to their length, and have consequently considerable elasticity, which is not observed in any other part of the skeleton. They are composed mostly of compact bone, with a little cellular structure in their centre: the latter is more abundant at the anterior and posterior extremities. They are developed at an early period in the fœtus, and are more perfect at the time of birth than any other bones, except those belonging to the organ of hearing. They are formed from a single point of ossification, excepting the head, which is not consolidated to the body till the formation of the skeleton is nearly complete.

Sometimes there are thirteen ribs: the thirteenth may be either above or below the ordinary series.

Articulations of the Chest—The chest, formed by bones of an arched figure, most of which rest on the sternum by one end, and by the other on the vertebrae, presents in front and behind articulations corresponding to these relations. The joints, separately considered, do not admit of much motion; but the pectoral cavity, taken altogether, enjoys an extensive power of movement.

The posterior Articulations of the Chest.—The ribs are united to the vertebrae; 1st, by the articular surfaces of their heads to the cavities in the bodies of the vertebrae, each of which cavities is formed in a single vertebra for the first, eleventh, and twelfth, in the two adjoining bones and their connecting fibro cartilage, for the other ribs; 2dly, by the articular surfaces of their tubercles to the transverse processes of the vertebrae, excepting the two last ribs, which have not this kind of articulation. The first has been called the costo-vertebral; the latter the costo-transverse articulation.

The costo-vertebral joints. In each of these the union is effected by means of an anterior and an inter-articular ligament, and two small synovial membranes. The anterior ligament is a broad, thin, flattened, and irregularly quadrilateral fibrous fasciculus, attached in front, above and below the articular surface of the head of the rib, diverging towards the spine, and fixed by its superior fibres to the body of the vertebra that forms the upper part of the corresponding cavity, by its inferior to that which forms the lower, and by the middle to the intermediate fibro-cartilage. The latter are in general less sensible than the two former, each of which forms a very distinct fasciculus. The disposition of this ligament is not exactly the same in the first, eleventh, and twelfth ribs, each of which is articulated to a single vertebra; yet the fibres extend a little on the neighbouring vertebrae. It is covered in front by the great sympathetic nerve, by the pleura, and on the right side by the vena azygos: it has a radiated figure, is short and strong, composed of longer superficial and shorter deep-seated fibres, and has small vascular intervals. It is applied over the joint, for which, in conjunction with the middle

middle costo-transverse ligaments, it may be considered as forming a kind of fibrous capsule.

The inter-articular ligament does not exist in the joints of the first, eleventh, and twelfth ribs. It is a more or less thick fibrous fasciculus, of a flattened figure, fixed on one side to the prominent angle of the head of the rib, and on the other to the corresponding depression of the cavity in which it is received. It separates the two synovial membranes from each other, and is continuous with the fibro-cartilage, as we may perceive by sawing the joint across, so as to divide it into a superior and an inferior half.

The synovial membranes are double in the joints that possess the ligament last described; but in the others there is only a single one, covering the whole extent of the corresponding articular surfaces, and reflected from the one to the other. Where there are two, each capsule belongs to its corresponding upper or lower half of the articulation, and is separated from the other by the inter-articular ligament. These membranes are not clearly marked, do not exhibit the usual polish on their surface, contain a remarkably small quantity of synovia, and occupy often a very small space on account of the great size of the inter-articular ligament. The latter is sometimes so thick, that it may almost be doubted, whether the joint possesses any synovial membrane; in other instances, however, these membranes are very distinct. Although the bones are held together almost as closely as at the anterior articulations between the cartilages and the sternum, the joint is not so frequently lost in the old subject. Yet anchylosis does sometimes occur; and this is a character distinguishing it from joints where the membrane is clearly marked, which may be anchylosed from accident or disease, but hardly ever undergoes this change in the natural progress of ossification.

The *costo-transverse* articulations are formed by a small synovial cavity, a posterior, a middle, and an inferior costo-transverse ligament. The latter does not belong to the tubercle and process which are contiguous: but extends from the process to the upper edge of the rib immediately below. The posterior ligament arises from the end of the process, passes nearly horizontally outwards, and is inserted into the rough eminence of the tubercle of the rib. Its fibres are parallel and close, form a very distinct fasciculus nearly quadrilateral in its figure, correspond behind to the muscles contained in the excavations on the sides of the spinous processes, and in front to the articulation. The middle ligament is a collection of irregular reddish fibres, rather cellular than strictly ligamentous, placed between the front of each transverse process, and the corresponding part of the rib. When we forcibly separate these parts, we distinguish the fibres which are torn by the separation: to see them entire we should saw through the process and rib in their connected state. The inferior ligament is a distinct nervous fasciculus, composed of numerous strong and parallel fibres. It arises from the root of the transverse process, passes obliquely to the upper edge of the rib immediately below, and is inserted near the vertebral extremity. The first and the last ribs do not possess it. It is covered in front by the intercostal vessels and nerves, behind by the *longissimus dorsi*: on the outside it is continuous, by means of a thin aponeurosis, with the intercostal muscle, and it completes on the inside a small cellular space traversed by the posterior branch of the nerves. Between this space and the vertebral column there is commonly a small fibrous fasciculus, arising from the basis of the process, and attached to the articular extremity of the rib below, where it is united to the upper part of the radiated ligament. The two cartilaginous surfaces, of the transverse

process and the tubercle of the rib, are covered by a small synovial membrane, which is looser, contains more synovia, and is always more distinct than that of the preceding joint. Hence it never becomes anchylosed by the mere progress of age.

Anterior Articulations of the Chest—These are not formed by the bony portions of the ribs, but by a series of cartilages terminating them: the seven superior of these are joined to the sternum, while the five inferior, connected to each other, have no other kind of connection. These cartilages must be described before we speak of the articulations. They are not uniform in their length, breadth, and direction. That of the first rib is very short; the succeeding ones increase in length as far as the last of the true ribs. The false ribs again become shorter and shorter, so that it is scarcely perceptible in the last. The first is the broadest, and they become narrower as they are placed lower down. The breadth of the two first is nearly uniform throughout; it diminishes in the others from the costal towards the opposite extremity. This diminution, however, is not regular in the sixth, seventh, and eighth, which are considerably increased in breadth, where they are joined to each other. The first cartilage is a little oblique from above downwards; so that the angle formed between it and the sternum is acute above and obtuse below; the second is nearly horizontal, and follows the same direction as the rib to which it belongs. The following cartilages of the true ribs are more oblique from below upwards, and more manifestly curved where they arise from the ribs in proportion as they are lower. At this curvature the ribs and their cartilages take opposite directions: the first descend from the spine, the others ascend to the sternum. This curvature is diminished a little in the first of the false ribs, where, however, it is still very considerable, and decreases successively to the last, in which the cartilage follows the direction of the bone.

The general figure of the cartilages corresponds to that of the bones to which they are connected. The surface of the body is rather unequal externally, or on the front, slightly convex in most, covered by the *pectoralis major* above, by the *obliquus externus* and *rectus* below. The first gives attachment to the costo-clavicular ligament. Behind or on the inside it is slightly concave, and corresponds in the first five or six to the pleura and triangularis dorsi, to the *transversus abdominis* in the succeeding ones. The upper edge is more or less concave, and the lower convex: they afford attachment to the intercostal muscles, and form a continuation of the intercostal spaces, which, as well as the muscles of the same name, become narrower in proportion as they are lower. Those between the sixth and seventh cartilages, and between the latter and the eighth, are interrupted by small articulations, formed by the contiguous cartilaginous surfaces.

Each cartilage has an external or costal and an internal extremity, which may be also called sternal in the seven first. The former consists of a small convex and unequal surface intimately united to the corresponding concavity in the extremity of the rib. The latter has in the true ribs a small articular surface of a convex figure, adapted to the hollow of the sternum, in which it is received. In the three first false ribs this extremity is elongated, situated immediately under the cartilage above it, and united to it; in the two last it is separated from the cartilage above by a marked interval.

In respect to their structure, the cartilages of the ribs have a great analogy to those of the larynx. Both are very dense and compact, exhibit, at first view, no marks of organization, although they possess really a peculiar structure,

ture, are difficultly reduced into gelatine by boiling, and are remarkable for their tendency to ossification. Even in subjects not much advanced in age, we frequently find a bony point in the centre of these cartilages: this is the commencement of ossification. Those of the first ribs undergo this change most readily: they are often completely bony, while the others still exhibit their natural texture. This ossification is always preceded by a yellowish tint, which succeeds to the white colour that characterizes the cartilages of the child. When they are converted into bone, they resemble the ribs in being compact externally and cellular on the inside. In the rib of an old person the cells of the rib and of its cartilage are continuous.

Articulations of the Cartilages of the true Ribs.—Each of these has a small surface at its internal extremity, received into a corresponding hollow of the edge of the sternum, covered by a thin layer of cartilage. The joint possesses an anterior and a posterior ligament, and a synovial membrane. The seventh rib is moreover united by a peculiar ligament to the ensiform cartilage. The anterior ligament is thin and broad, composed of radiated fibres arising from the extremity of the cartilage, diverging as they traverse the front of the articulation, and expanded on the front of the sternum, where they are mixed with those of the opposite side, with the perioseum, and with the fibres of insertion of the pectoralis major, by which this ligament is covered in front. The superficial fibres are long: the more deeply-seated are shorter, and proceed directly from the cartilage to the neighbouring portion of the sternum. They are intermixed, not only with the opposite fibres, but also with those of the ligament immediately above and below. From the union of all these fibres a thick stratum is formed, covering and strengthening the sternum, and more strongly marked below than above. The posterior ligament differs from the preceding by being thinner and having its fibres less apparent: in other respects they are nearly similar, that is, they proceed in a radiated manner from the cartilages to the sternum. The fibrous stratum on this surface of the bone is as thick as on the other, but it exhibits a more uniform kind of organization. We do not see in it the decussation of numerous distinct fasciculi, but a smooth and almost polished stratum, adhering very closely to the bone, with many of its fibres not derived from the ligaments of the ribs, but pursuing rather a longitudinal direction. The synovial membrane is remarkable for its small extent, and for the want of polish on its surface. If we did not discern a small quantity of synovia in the joint, we might be inclined to doubt the existence of such a membrane. In this respect it very much resembles that of the costo-vertebral articulation. In general, it is rather more loose in the two or three lower articulations, than in the superior ones. In the adult it certainly does not exist in the first: the cartilage is continuous with the bone, which explains the small amount of motion, of which this rib is susceptible. In the articulation of the second rib there is a small inter-articular ligament. A small elongated and very thin fibrous fasciculus goes from the lower edge of the seventh rib obliquely downwards and inwards to the front of the ensiform cartilage, where it forms an angle with the ligament of the opposite side. It is covered by the rectus abdominis.

Articulations of the Cartilages of the false Ribs.—We have stated, that the neighbouring edges of the sixth and seventh, and of the seventh and eighth cartilages, are articulated by means of oblong surfaces. These are covered by synovial membranes much more apparent, more loose, and containing more synovia than those which are found between the supe-

rior cartilages and the sternum. Sometimes between the fifth and sixth, more rarely between the eighth and ninth, a similar articulation, and consequently a similar synovial membrane, are found, which manifestly refer only to the mobility of these cartilages. To maintain the cartilages of the false ribs in their positions, several ligamentous fibres, holding them strongly, particularly in front, pass from the last true to the first false rib; from the latter to the second, and from it to the third. These fibres are particularly evident in front of the synovial membranes which we have mentioned. Analogous fibres attach the extremity of each of the first three false cartilages to the lower portion of the cartilage immediately above it. The only connection of the two last is by means of the muscles. Ligamentous fibres also pass between the cartilages of the sixth and seventh true ribs.

The Chest considered in general.—We shall arrange the description of this cavity under the divisions of its external and internal surface; superior and inferior circumference. The external surface comprises four regions; an anterior or sternal, a posterior or vertebral, and two lateral or costal. The anterior is the narrowest, more or less flattened or projecting in different subjects, and according to the prevalence of certain predispositions. In the middle we have the cutaneous surface of the sternum, on the sides the cartilages of the true ribs, and a series of lines, which indicate in each rib the point of its union with the corresponding cartilage. This series may be conceived as united into one general line, running obliquely from above downwards and from within outwards, forming the lateral boundary of the anterior region, which, from this particular disposition, is much broader below than above. Between these cartilages broad intervals appear in the first true ribs, narrower ones in the last: they are still more narrowed in the first false ribs, but grow broader again in the two last of this class.

The posterior region presents the row of dorsal spinous processes; the corresponding portions of the muscular channels of the vertebræ; the transverse processes of the dorsal vertebræ; their articulations with the tubercles of the ribs; a series of surfaces belonging to the latter, broader in proportion as they are lower, comprehended between the tubercles and the angles, and giving attachment to the longissimus dorsi; and, lastly, a general line running obliquely from above downwards and within outwards, formed by the series of angles of the ribs. The distance between the angles and the tuberosities increasing downwards, determines the obliquity of the line just mentioned, the increasing breadth of the surfaces which it terminates, and the form of this region, which is of considerable breadth below, and becomes narrower as we trace it upwards. This disposition is analogous to that of the anterior region, where the obliquity of the lateral lines produces in the same manner an inequality of breadth.

The lateral regions are convex, narrow above, and broader below, formed by the ribs and the intercostal intervals. The latter are, in general, disposed like the bones which form them, but with some varieties. They are short, and broad above; then diminish successively in breadth, and increase in length down to the junction of the two classes of ribs; after which, without growing broader, they again decrease in length to the last, which is very short: all of them are broader before than behind; hence the distance is much greater between the anterior than the posterior extremities of the first and last ribs. These spaces are all filled by the intercostal muscles.

The internal surface of the chest, which lodges the principal organs of respiration and circulation, also offers four regions to our observation. The anterior entirely resembles that

that of the external surface, and is composed of the same parts. The posterior has in the middle a prominence formed by the bodies of the dorsal vertebrae, concave from above downwards, and dividing the chest into two internal halves. On each side of this is a considerable elongated concavity, narrow above, broad below, deeper in the middle than in any other part, and containing the posterior convexity of the lungs. The lateral regions are concave; formed by the internal surfaces of the ribs and the intercostal spaces. The pleura lines them, as well as the posterior hollows and the pectoral portion, excepting as much of the latter as corresponds to the mediastinum.

The superior circumference is small, in comparison with the inferior, and represents an oval placed transversely. It is formed behind by the vertebral column, in front by the sternum, and on the sides by the first ribs: the clavicles project a little at their inner ends, so as to contract this opening in a slight degree. The trachea, the œsophagus, the large blood-vessels, which either go from the heart to the upper parts of the body, or return from the latter to the heart, and several important nerves pass through this opening.

The inferior circumference is very large, at least four times greater than the former, and differs from it in being susceptible of enlargement and contraction. The superior, formed by two ribs nearly immovable, preserves always the same capacity, and is, moreover, protected by a considerable thickness of parts from the impressions of extraneous bodies, that might tend to contract it. To the mobility of the inferior circumference are chiefly owing the variations in the dimensions of the chest, produced by inspiration and expiration, by causes which act on it from within outwards, and dilate it, as dropsy, pregnancy, and the various abdominal tumours, or by those which affect it in the contrary way, and tend to contract it, as the stays of women. It should be observed, at the same time, that the viscera placed at this circumference can accommodate themselves to these varied dimensions: while those which pass through the superior aperture, particularly the trachea, would be affected very dangerously by any contraction of its sides. In this inferior circumference there is a large notch in front, of a triangular figure, with the basis downwards, the sides of which are formed by the edges of the cartilages of the false ribs: in the apex of the triangle the ensiform cartilage projects. On each side of this notch there is a convex edge, formed by the cartilages of the false ribs. Behind these convexities there is a small notch on each side, formed by the inclination of the last rib, with respect to the vertebral column. Several of the abdominal muscles are attached to all parts of this circumference.

Development of the Chest.—The heart and the thymus, which are situated on the median line of the chest, in the fetus, and are of very considerable size, require a proportional extent in the antero-posterior diameters, which then predominate, while the transverse are comparatively small, on account of the imperfect condition of the lungs. The sternum, separated by a wide interval from the spine, makes a considerable prominence in front, so that a large space is left for the heart and thymus. The posterior fossæ, at the sides of the vertebral column, are small, as the ribs are not much curved at this part: hence the prominences behind, formed at the sides of the spine by the curves of the ribs, are not sensible at this time. The chest is particularly narrow in this direction at the angles of the ribs. The want of this posterior curvature is the principal cause of the augmentation of the antero-posterior diameters. In fact, the ribs are nearly as long, proportionally, at this time as after-

wards; but they swell less behind and at the sides, are thrown more forwards, and, consequently, carry the sternum in that direction. These curves are formed in the progress of age; the posterior fossæ of the chest are, consequently, developed, and the sternum comes nearer to the spine. The transverse diameters are now increased; but the general capacity of the chest is not much augmented in proportion to other parts, as it loses in one direction what it gains in the other, and its differences in the fetus, and in the subsequent times, are referrible to the different relations of its diameters. These changes affect the superior and inferior circumferences. The former is more capacious from before backwards, but less from side to side: the latter is very wide between the ensiform cartilage and the spine; it is one-third wider here than in the adult, in proportion. The transverse diameters are less contracted here than in the rest of the chest; so that the inferior circumference altogether is remarkable for its great capacity in the fetus, a disposition which is accommodated to the very marked volume of the gastric viscera, and particularly of the liver, which it includes.

The different bones of the chest are not developed in an uniform proportion. The ribs are almost entirely ossified at the time of birth: they are more approximated, particularly below, probably from the great size of the liver. The perfection in the ossification of the ribs may be explained from the nature of the function in which they are employed. Respiration commences at the moment of birth, and requires in its organs as great a degree of perfection as is necessary at any subsequent age: the newly-born child respires at once as it will respire always. The organs of locomotion, on the contrary, go through a kind of education, advance very slowly to perfection, and are, consequently, slowly developed.

The sternum, which is less directly concerned in respiration, but concurs more immediately in giving solidity to the chest, is not so much advanced as the ribs: on the contrary, it is almost entirely cartilaginous.

The contents of the thorax undergo a great change at the time of birth: the lungs, hitherto contracted, are distended by the admission of air to a much greater volume than they possessed before; and that part of the chest which contains them must be proportionally increased.

Towards the period of puberty, although no remarkable change occurs in the ordinary series of phenomena connected with the growth and progress of the bones, yet the form of the chest seems to acquire its fixed character. It either assumes that lateral expansion, and happy conformation which indicate a vigorous constitution, or the sternum projects in front, and gives the alarming presage of a disposition to phthisis. At this time the cartilages become more dense, and the ligaments stiffer. The motions of the ribs are more confined. Hitherto they have been the chief agents in respiration: but in future the diaphragm is more excited. The different pieces of the sternum are joined; the ribs receive more earthy matter, and become more brittle. At a later period the cartilages begin to be converted into bone at their centres, and ossification goes on until they are made completely bony. The twisting of the cartilages, which we shall mention presently, is now impossible, and the upper part of the chest no longer admits of motion in its individual parts. Hence in the old subject respiration is effected chiefly by the diaphragm.

Mechanism of the Chest.—This part of the trunk has two principal uses to fulfil: it protects the included organs by its solidity or power of resistance; and it concurs by its mobility in the various functions of these organs, particularly of

the lungs. We have to consider it under this double point of view.

The resistance of the chest to the action of external force is different on its anterior, posterior, and lateral aspects.

1. The thick muscles placed behind annihilate the effects of falls and blows on that part. Two prominences formed by these muscles, and separated by a groove corresponding to the spinous processes, occupy the place of the two longitudinal channels observed in the skeleton: these support the effects of blows. The provisions for protection in this situation, refer to the spinal marrow as much as to the pectoral viscera. 2. In front, where the muscles are fewer, the mode of resistance varies in inspiration and expiration. When the chest is strongly dilated, the sternum supports any effort directed against it in the manner of an arch, and more efficaciously in proportion as the inspiration is stronger. In this way, individuals lying on their backs support enormous weights on the front of the chest: e. g. a blacksmith's anvil, on which a horse-shoe has at the same time been hammered. Here, however, the mechanism is not the same as that by which the cranium supports a weight bearing on it perpendicularly: in that case the bony arch alone is concerned, the muscles have nothing to do with the phenomenon. In the chest, on the contrary, the external muscles, particularly the serratus anticus, draw the ribs strongly outwards, and resist their depression: they are the active supports of the bony arch represented by the chest. If the force be superior to the resistance, fracture ensues: this may either be direct, and affect the sternum, which is rare; or it may take place by contrecoup at the part which has experienced the greatest effort, as in the middle of the ribs. These observations manifestly apply to the true ribs only. Fractures by contrecoup may also take place from sudden blows, where the muscles have no time to contract and support the ribs, and the latter are consequently left to the full operation of the force. In expiration the chest eludes the force by yielding: the ribs are pressed inwards, and the viscera are in some degree compressed. This yielding is much more manifest in the lower ribs. 3. The effects of blows, or violence of other kinds, affecting the sides of the chest, are obviated in nearly the same manner, whether in inspiration or expiration. The arch represented by the rib has its points of support in the sternum and the vertebral column: the bone may be directly fractured at the point where the violence is offered, which is the most common case, or by contrecoup, which is more rare. The strength of the ligaments at the anterior and posterior articulations is so considerable, and the support afforded by the transverse processes so firm, that luxations cannot take place while the joints are in a healthy state. The last ribs, which terminate loosely in the abdominal parietes, cannot be said to offer any resistance to the force which is applied to them: they yield towards the abdomen. The first and second ribs are so covered by external parts, that they can hardly be affected by blows or other kinds of force.

The motions of the chest are directed to two principal objects; its dilatation and contraction, which correspond to inspiration and expiration. It may be dilated in three different directions; perpendicularly, transversely, and from before backwards. 1. The diaphragm alone is the agent of perpendicular dilatation, and produces alone in the adult those slight inspirations, in which but little air enters the chest. Its fleshy sides, which correspond to the lungs, descend much more than the tendinous centre, which supports the heart. (See DIAPHRAGM.) 2. In the next or greater degree of inspiration the chest is first dilated perpendicularly, and then transversely by the intercostal muscles. (See INTERCOS-

TALES.) Besides the causes mentioned in that article for the little power of motion in the first rib, we may notice the inconsiderable length and great breadth of its cartilage, and its consolidation with the sternum, instead of being joined by a moveable articulation. The remarkable shortness and breadth of the rib itself also concur in producing the same effect. In consequence of the oblique position of the ribs, they cannot be elevated without having their middle carried outwards, which produces a transverse enlargement of the chest; moreover, this elevation twists the cartilages, which throws the ribs still more outwards. 3. In the preceding motion the ribs are carried a little forwards, and as this effect takes place in a greater degree below, where the ribs are longest, the sternum is carried forwards at its lower extremity, the upper remaining nearly motionless; and the chest is consequently enlarged from before backwards. This motion, however, is very small in amount, as we may ascertain by observing the respiration of a lean individual; it is insignificant in comparison to the motion by which the ribs are carried outwards. As the sternum corresponds to the heart, while the ribs surround the lungs, enlargement is less needed in the former than the latter direction.

The contraction of the chest, corresponding to expiration, is effected by a mechanism exactly opposite to that which we have just explained. It takes place from below upwards by the elevation of the diaphragm. In the transverse direction it is effected by the depression of the ribs, which are carried inwards by the twisted cartilages recovering their original state. The elevation of the bone in inspiration produces a twisting of the cartilage; and in expiration the recovery of the latter depresses the former; so that the bone and the cartilage reciprocally determine motion in each other. The effect of this twisting of the cartilages must not, however, be over-rated: in order to make it considerable, they ought to be consolidated to the sternum, whereas their articulation to that bone allows a certain degree of motion. The greater this motion, the less will be the twisting; and it would not exist at all if the articulation were loose enough to allow full scope to the elevation of the rib. It cannot have any effect in the false ribs. In proportion as the ribs descend and are carried inwards, the sternum is also restored, its inferior portion passing backwards.

All these movements, whether of dilatation or contraction, are much more sensible at the lower part of the chest, in consequence of the more extensive motion enjoyed in this part; a circumstance that coincides with the greater breadth of the inferior portion of the lungs.

We have to point out, in the next place, the powers by which these motions of the chest are effected. We may distinguish two kinds of changes taking place in the chest; an enlargement and subsequent contraction in the perpendicular direction, and another acting circularly. The diaphragm is the sole agent of the perpendicular enlargement; and as it extends the chest downwards, where the cavity is most ample, it produces a very considerable dilatation. (See DIAPHRAGM.) This muscle can descend three inches, or more, and has four or five times as much effect in the enlargement of the chest, as all the other powers put together. Hence injuries or diseases of it produce the greatest disturbance in the function of respiration. The perpendicular contraction is effected by the abdominal muscles; that is, by the obliqui externi and interni abdominis, the transversi and recti. These, which form the sides and front of the abdominal parietes, yield to the viscera thrust downwards by the descent of the diaphragm: hence an elevation of the belly is perceptible on inspiration. They then contract, push backwards and upwards the parts which had before descended, restore

restore the diaphragm to its former state, and consequently diminish the capacity of the chest.

The enlargement of the thorax in the circular direction is ordinarily effected by the intercostal muscles, (see INTERCOSTALES); and the subsequent contraction is owing partly to the restoration of the ribs by the elastic power of their cartilages, and partly to the action of the triangularis sterni. But other powers assist occasionally, when the circulation and consequently the breathing are hurried; or when disease of the chest causes this function to be performed laboriously. Under such circumstances, every muscle is brought into action that can assist in elevating the sternum or ribs, or in fixing the upper pairs of these bones. Hence the scaleni, sterno-cleido-mastoidei, subclavii, cervicales descendentes, levatores costarum, serrati magni, serrati postici superiores, latissimi dorsi, pectorales majores & minores, and trapezii, are all employed. The shoulders are elevated, the neck is stretched, and the head itself thrown backwards in the most violent efforts of difficult expiration. There are also auxiliary powers occasionally employed in expiration, but these are not so numerous as those concerned in inspiration. The ribs may be depressed, not only by the triangularis sterni, but also by the obliqui, recti and transversi abdominis, the quadrati lumborum, longissimi dorsi, sacro-lumbalis, and serrati postici inferiores.

In the healthy subject the enlargement and contraction of the chest constantly succeed each other, and are performed in a regular alternate manner. The diaphragm and abdominal muscles seem to be chiefly employed; but the intercostal muscles also assist. In the female the latter powers are more concerned in respiration than in the male.

Although both modes of respiration are observed to concur in this function in the natural state, it may be and often is carried on by one exclusively. When a rib is broken, or the pleura inflamed, motion of the chest is exceedingly painful, and the diaphragm and abdominal muscles carry on the functions alone. On the contrary, in inflammation of the peritoneum, in the last periods of pregnancy, in large dropical accumulations, the abdominal muscles and diaphragm cannot act, and the intercostals only are then concerned.

In ordinary respiration, enlargement and contraction of the chest, or inspiration and expiration, are performed in regular alternate succession; but this order is often interrupted, and various modifications of the process take place, distinguished by particular names.

In *straining*, the diaphragm and abdominal muscles act together; a deep inspiration is first made, and the diaphragm descends considerably; the abdominal muscles then contract, but do not expel air from the chest, as they are resisted by the former power. The act of straining takes place in all powerful exertions of the body: by it the trunk is fixed, and affords a firm point from which the limbs may be most advantageously moved. The erectors of the spine at the same time extend that part, and firmly maintain it in that position. Thus all the power of the muscles moving the limbs is employed in jumping, dragging, pushing, moving a weight, &c.; and none is left in moving the thorax or pelvis towards the limbs, which would be the case if those parts of the trunk were not previously fixed. So long as the effort lasts, it is obvious that respiration must be interrupted; hence it is called, in common language, holding the breath: and when it is too long continued, all the inconveniences arising from such interruption take place.

The powerful action of the diaphragm and abdominal muscles subjects the contents of the abdomen to pressure: it impels them and whatever they may contain towards the cavity

of the pelvis, and must also compress the blood-vessels and absorbents. Hence this effort is employed in expelling the contents of the stomach in vomiting, in evacuating the rectum and urinary bladder, and in parturition; it is so essential in all these cases, that the different objects just mentioned could not be accomplished without it. Of the amount of the force exerted we may form some estimate, when we see the effects occasionally produced by such efforts;—the contents of the abdomen are protruded and form tumours, the viscera are torn, and the tendons of the abdominal muscles lacerated.

Whether the passage of bile through its ducts, or of calculus through the same tubes or the ureters be facilitated by straining, is a doubtful point.

In *panting* there are short and frequent inspirations, succeeded by short and quick expirations. It is accompanied with great anxiety, and is attended with, or caused by, a more rapid return of blood to the lungs; hence it heats and fatigues. It is produced by violent motion of the body, in wounds of the chest, in diseases of the respiratory organs, and of en in the struggle preceding death.

A long and deep inspiration, followed by an expiration of the same kind, constitutes a *sigh*. It seems to be an effort at promoting the passage of the blood through the lungs; and has been said to be employed when the action of the heart is languid, when it is oppressed by the quantity of the blood, or when obstacles exist to its passage through the lungs. Sighing takes place under mental affliction or considerable bodily fatigue: we generally recover from a state of syncope by a sigh, and asthmatic persons frequently sigh.

In *yawning* there is a still larger inspiration than in sighing, performed in a very slow and protracted manner, and accompanied by a similar corresponding expiration. In both a peculiar sound is usually produced. The mouth is opened widely, indeed to the utmost extent that the articulation of the lower jaw will allow. Yawning is often ended by a sigh. That it is produced by bodily fatigue, observed most frequently on the approach of sleep and on waking, and takes place also when hunger is troublesome; also that newly born children yawn in their first attempts at respiration, are well known facts, but we cannot explain how this happens. Soemmerring says, "that the circulation of the blood through the lungs goes on more slowly before yawning; and that we endeavour to obviate by a strong inspiration, which may promote the circulation through the lungs, the sense of weight, inconvenience, and sleepiness that would arise from this cause." De Corporis humani Fabrica, t. vi. p. 82.

Coughing is an effort of the respiratory organs, generally made for the purpose of removing from the trachea or its branches some irritating matter, as mucus, pus, or any foreign body, through the means of powerful expirations, preceded by similar inspirations. Yet the presence of a stimulus in the situation just mentioned is not necessary, although it is the most frequent cause: irritation of the diaphragm, as from diseased liver, or an action of the will, can produce coughing. A large quantity of air furnished by a considerable inspiration, is violently and suddenly expelled, with a considerable noise, by a very strong and almost convulsive expiration, and in its passage clears away mucus, or any thing else which may happen to be in the air passages. The air may be driven out at once or at several expirations: in the latter case the expirations are continued often as long as any air can be expelled, and the emptied chest is again supplied by an inspiration accompanied with a peculiar noise, as in the whooping cough. Violent and protracted coughing from the interruption of the respiratory phenomena, is accompanied with turgescence and livid colour of the

the parts about the head, and with a sense of suffocation: when continued for a long time it causes head-ache, soreness of the chest, &c.

Sneezing is an action similar in its nature, but more violent in degree than coughing; and it has a different cause, *viz.* irritation of the membrane lining the nose. A short but generally full inspiration is followed by a most vehement expiration, shaking almost the whole body. The expelled air, which in coughing passes through the mouth, is directed in sneezing, through the nose, for the purpose of removing the irritating cause. Any extraneous bodies brought into contact with the pituitary membrane, as instruments or irritating powders, such as snuff, &c. or its own mucous secretion, and in some individuals sudden exposure to strong and dazzling light, will produce sneezing. Although it is an involuntary effort, it may be in some degree increased or diminished by the will. It is a singular fact, that pressure about the bridge of the nose, applied when the inclination is felt, will generally prevent it.

How far the following observation of Soemmering tends to elucidate the manner in which stimuli applied to the pituitary membrane act on the respiratory muscles, in exciting this convulsive motion of them, is left to the judgment of the reader. "Sneezing arises from some re-action of the brain, when irritated, through the medium of the nasal nerves, *i. e.* the olfactory and fifth pairs, upon the phrenic nerve; and that it must be produced in this way is proved by the fact, that the phrenic and these nerves have no connection out of the head." *De Corporis humani Fabrica*, t. vi. p. 84.

In *laughing*, a full inspiration is followed by frequent, imperfect, and as it were broken expirations, by which the chest is not completely emptied. As respiration is hurried beyond its natural rate in this act, the circulation is rather quickened; and from the convulsive kind of action in which it consists, a general agitation must be imparted to the abdominal contents. In many individuals, a very obvious shaking of the chest and abdomen accompanies laughter, particularly when violent, so as to have become matter of very common observation: hence the soreness experienced from its long continuance. The features are at the same time affected in a peculiar manner. In some individuals the latter circumstance is chiefly observed. The slightest cases of laughter, which are rather called smiling, consist merely of this change of features; but when it goes further, the diaphragm and abdominal muscles are brought into action. A considerable production of sound takes place at the same time, representing in men chiefly the vowels *a* and *o*; in women *e* and *i*. The mouth and its neighbouring parts are principally affected in the face; the corners are drawn upwards and outwards, so as in many cases to expose the teeth; the cheek is swelled, and the general elevation of the integuments raises the lower eye-lid, so as to contract the aperture between the two lids. As the interruption in the regular performance of respiration produces turbulence about the head in violent and long continued laughter, the lacrymal secretion is augmented, and a copious flow of tears often ensues.

The causes of laughter are partly moral and partly physical; with the former we have nothing to do in this article, except to observe that laughing and weeping seem quite peculiar to the human subject. Gentle friction and pressure of various parts of the body, as the soles of the feet, the axillæ, hypochondria, &c. commonly called tickling, are the chief of the latter kind.

Involuntary laughter is a symptom of some diseases, as hysteria; and the ancients were of opinion that injuries of

the diaphragm produced it: in this case they called it *risus sardoniacus*. Modern observations do not confirm this fact.

Weeping begins with a deep inspiration, which is followed by short, interrupted expirations, at longer intervals from each other than in laughing: these often shake the thorax and abdomen, and even the head. They are finished at last by a strong expiration, followed by another inspiration or a sigh. This, like laughing, is generally produced by certain mental affections; but in some instances it owes its origin to physical causes, as bodily pain; and diseases, as hysteria, hypochondriasis, &c. Children generally cry immediately on their birth. The features are considerably affected in weeping; the eye-lids are contracted, and the forehead wrinkled: the mouth has its corners drawn downwards.

Hiccough is sometimes associated with weeping. It consists of a full, violent, sonorous, and short, or sometimes even convulsive involuntary inspiration through a contracted glottis. Some consider that the epiglottis is concerned in producing the peculiar sound of hiccough, and that this organ is struck by the air as it forcibly enters the larynx. The diaphragm appears to be the part principally concerned in this convulsive inspiration. Sometimes an expulsion of air from the stomach through the œsophagus is joined with hiccough. Two, three, or more natural inspirations and expirations take place in the interval between two hiccoughs. It may be occasionally prevented by depressing the diaphragm, and thus holding the breath; or by swallowing something slowly.

There are many causes exciting it. The nearness of the stomach to the diaphragm occasions the latter to be often affected by particular states of the former organ. Eating or drinking too much, or unwholesome articles, is a frequent source of the complaint. Wounds or diseases of the stomach, or of the diaphragm, may produce it; as also various general diseases of the frame, in which it often appears as the precursor of death.

Inspiration is immediately concerned in the act of *sucking*. The lips are closely applied round an object, *e. g.* those of the child to the mother's nipple. The air contained in the mouth is then more or less completely exhausted by inspiration, and the pressure of the surrounding air forces into this more or less complete vacuum the contents of the lactiferous tubes. When a liquid is sucked through a tube into the mouth, the vacuum is formed in that tube, which is embraced by the lips, and the air, pressing on the surface of the liquor, forces it up the tube into the mouth. If the lips are directly immersed in the fluid, a vacuum is formed, and the fluid rises into it exactly in the same way. The act of *drinking* is effected on the same principles.

Description of the Pleura and Mediastinum.—The pleura is a thin transparent serous membrane, lining the cavity of the thorax, and reflected over the contained lungs. Each of the latter organs is enclosed in a particular bag of its own, which bears the same relation to the lung, as the pericardium does to the heart; surrounding it like a loose bag or sheath, and immediately investing its surface: hence we naturally distinguish two parts of this membrane, *viz.* the lining of the chest (pleura costalis), and the external covering of the lung (pleura pulmonalis.)

As there are two lungs, there must also be two pleuræ, a right and a left. We may form a notion of them by conceiving two membranous bags, forming entire and imperforated cavities, placed laterally with respect to each other, and forming, by their apposition, a partition dividing the chest into a right and a left side, and containing in its substance several of the organs belonging to this cavity. That the two membranous bags are perfectly distinct, so that

that nothing can pass from one to the other, is rendered obvious; 1st, by anatomical examinations, in which they may be separated without any injury; 2dly, by experiments on dead bodies, in which fluids may be thrown into one pleura without passing into the other; and 3dly, by observations on diseased subjects, in which water, pus, &c. are often contained for long periods in one pleura only.

In order to understand the relations of the pleura to the lungs and to the other thoracic organs, let us describe it as if it began behind the sternum. From this part it extends outwards, covering the ribs, their cartilages, and the internal intercostal muscles, consequently lining the sides of the chest. At the heads of the ribs it covers the ganglia of the great sympathetic nerve, and their branches. When it has reached the back of the cavity, and the vertebral column, instead of passing in front of that column, it is continued from behind forwards, on the side of the aorta and the œsophagus, in front of which it is applied against the membrane of the opposite side, to form the posterior part of the mediastinum. It would be continued in this way from the spine to the sternum through the whole length of the chest, if it did not meet with the fasciculus of vessels entering the root of the lung; it is reflected over these, and over the surface of the lung, to the substance of which it is closely connected, forming its exterior covering. At the front of the root of the lung it covers the anterior surface of these vessels: then is continued from behind forwards on the side of the pericardium. It is then applied to the bag of the opposite side, to form the front of the mediastinum, and, lastly, terminates on the back of the sternum, where we supposed it to begin. Below it extends over the whole superior surface of the diaphragm.

Thus it appears that the figure of the pleura is completely determined by that of the cavity which the membranes line. Each of these bags is conical: it rises into an obtuse point within the space included by the first rib; on the anterior, outer, and posterior aspects it is convex, where it lines the ribs and intercostal muscles; below it is concave and expanded over the diaphragm; and on the inside, where it contributes to the mediastinum, nearly plane, but slightly concave in the situation of the heart. Some anatomists distinguish in the pleura three portions, according to the parts of the chest which they cover: *viz.* the costal, the diaphragmatic, and the mediastinal.

The pleura adhere with different degrees of firmness to the parts which they line. The medium of this connection is a cellular tissue, continuous below with that of the abdominal parietes, above with that of the neck and upper extremities, and in all directions with that which fills the interstices of the muscles forming the sides of the cavity. In the neighbourhood of the vertebrae, and in some parts of the mediastinum, this tissue is copious, and often contains fat: the adhesion is closer to the ribs and intercostal muscles, and most firm to the diaphragm.

The relative situation of the two bags varies at different parts of the chest, as different organs are interposed between them. Towards the upper and anterior part, immediately under their obtuse points, behind the arteries coming from the arch of the aorta, and above the pericardium, they are contiguous and separated only by cellular texture. In the middle and lower part of the chest, they are widely separated by the intervention of the heart, pericardium, large blood-vessels, &c. Hence the axis of the cavity must pass from above obliquely downwards and outwards.

The right and left do not precisely correspond to each other. The former, on account of the oblique position of the heart, lines nearly the whole posterior surface of the

sternum: hence it is broader than the left; but it is at the same time shorter, because the diaphragm is more strongly arched on this side. The left is applied, for the space of some inches, to the aorta.

The capacity of the two pleurae taken together is about one hundred cubic inches in the dead body. It is generally larger in the male than in the female sex; and is very disproportionately small before birth. The right encloses the left in the same proportion as the right is larger than the left lung.

The *mediastinum* is the partition which separates the two bags of the pleurae, and divides the chest into a right and a left side. It is formed by the apposition of the two membranous sacs, and extends from the vertebral column to the sternum and cartilages of the last ribs. We describe in it two lateral surfaces, a posterior and an anterior edge, a basis and an apex. The lateral surfaces are smooth, and contiguous to the internal surfaces of the lung, except where the pulmonary vessels enter those organs: they form the inner portions of the two bags of the pleura. The posterior edge is attached to the spine, of which it exactly follows the direction. The anterior is fixed in an oblique line to the sternum above, and to its edge and the cartilages of the last ribs below. Hence, if we thrust a pointed instrument through the middle of that bone, it will penetrate the right pleura, and not touch the mediastinum. The oblique position of the heart seems to carry with it, as a consequence, this obliquity of the mediastinum. Yet this disposition does not hold universally: in some subjects the mediastinum descends along the middle of the sternum: in others, which indeed are very rare, it is inclined from left to right, so that the right side of the chest is narrower than the left. Sometimes the right layer of the mediastinum is fixed to the middle of the sternum, while the left is attached at the articulations of the cartilages. The basis of the mediastinum corresponds to the superior surface of the diaphragm, and presents a wide separation of the pleurae, lodging the heart and pericardium. The apex corresponds to the upper end of the chest; it encloses the trachea, the œsophagus, and the vessels and nerves which are entering into or going out of the chest.

The mediastinum is formed by the two pleurae, which, instead of coming into contact with each other, leave a considerable interval between them filled by various organs. Above and in front, they lodge the thymus: below and in front, the heart with its pericardium, and the large vessels connected to its basis: behind, the œsophagus and aorta. The two laminae of the mediastinum touch each other only in front of the pericardium, between the lower end of the thymus and the diaphragm, and behind that membrane, in front of the œsophagus, from the first dorsal vertebra to the cardiac orifice of the diaphragm. The latter circumstance has occasioned a division of the mediastinum into an anterior and a posterior part; the first includes all that is placed in front of the œsophagus, the latter all behind it. These divisions are often called anterior and posterior, or sternal and dorsal mediastina. The former is the broadest and shortest of the two; it ends about the fifth or sixth rib: while the latter extends to the eleventh.

In the anterior mediastinum, or triangular space placed behind the sternum and cartilages of the last ribs, besides some fat and cellular substance, and some absorbing glands, we have the thymus, the trunks of the internal mammary arteries, and the heart. In the posterior mediastinum, or interval of the pleura immediately in front of the vertebrae, are found, in addition to some adipous and cellular texture, and several absorbing glands, the end of the trachea

with the commencement of the bronchi, the greatest part of the œsophagus, with the nerves of the eighth pair, the pulmonary artery and veins, the descending aorta, the thoracic duct, and the vena azygos.

When the sternum is raised, in order to expose the contents of the thorax, the space separating the two pleuræ behind that bone, and forming the anterior mediastinum, is increased, because the membranes are partly detached from the sternum and ribs, to which they before adhered. The cellular substance occupying the interval becomes filled with air, and is consequently rendered more sensible.

The laminae composing the mediastinum are rather thinner than the pleuræ in other situations. They are united to each other, and to the parts included between them, by a cellular tissue continuous with that of the general external surface of these bags. This tissue, as well as that connecting the different parts together, is tolerably copious, and contains more or less fat. It is susceptible of inflammation and suppuration, as in other parts of the body; but less frequently. Hence abscesses sometimes occur here. The laminae of the mediastinum are, however, more closely attached to the surface of the pericardium; it is difficult to separate the two membranes completely. The right lamina is more tense than the left; a considerable protuberance is observed in the latter, and formed by the situation of the heart: hence the former only, if either, can have any effect in supporting the diaphragm.

The mediastinum receives its peculiar blood-vessels. In front its arteries come from the internal mammary, and the comes nervi phrenici; behind, from the inferior thyroid, the superior intercostal, the pericardiac, œsophageal, and bronchial arteries. The veins correspond to, and accompany these.

The mediastinum divides the chest into two lateral halves; separates the membranous bags containing the lungs, and renders their action independent of each other. It confines also to one side various morbid affections, as effusions of blood, pus, &c. Some physiologists conceive that it is further useful, by supporting the weight of the opposite lung, when we lie on the one side, and protecting therefore the lung of the same side on which we lie.

The pleura is nearly transparent, so that we can easily distinguish through it the colours of the subjacent parts. The fibres of the diaphragm and intercostal muscles, the intercostal vessels and the ribs are immediately discerned through this membrane. We can still more clearly perceive all the shades of colour in the lung through the pleura pulmonalis; this indeed is thinner than the pleura costalis, and adheres very closely to the organ. Boiling destroys this transparency, and gives the membrane a dirtyish white appearance. It is very strong in proportion to its thickness. Concerning its intimate organization we have nothing farther to say than what the reader will find in the general account of the serous membranes.

The arteries and veins of the pleuræ, besides what have been already mentioned as belonging to the mediastinum, are derived chiefly from the intercostal vessels. The absorbents are exceedingly numerous, and pass through glands situated about the heads of the ribs to the thoracic duct.

The internal surface of the pleura is in all parts smooth, pale, and covered by a serous moisture produced from the exhaling vessels of the membrane. This observation applies as well to the pleura pulmonalis as to the p. costalis: the internal surface of the former constitutes the outer surface of the lung: the two portions of the membrane are contiguous at all points. In a living animal, or in one recently slaughtered, and opened whilst yet warm, this serous exhalation ef-

apes in the form of a light whitish smoke: the surface of the membrane has a soft slippery feel, but no actual fluid is discerned in the chest. When the body has cooled, this vapour is condensed into a few drops of liquor, which is soon increased by the transudation through the blood-vessels, and then it constitutes what authors have described under the name of liquor pleuræ. It has been questioned whether this, or the fluid of the pericardium, which is also in very small quantity, composed the watery part of what issued from the side of our Saviour when pierced by the soldier. We are of opinion, that the period, at which this occurred after death, was too recent for us to suppose that any fluid, or if any, not more than an exceedingly minute portion of fluid, could be contained in the pleura or pericardium. Consequently the fact does not admit of a natural explanation, but must be referred to the miraculous powers so signally exerted in other respects on this occasion.

This serous exhalation is constantly absorbed and renewed. It keeps the lung in an insulated state, and separates it from the parietes of the thorax. How far this is essential to the functions of the organ, will be examined presently.

The exhalation of the pleura is variously changed in disease. It consists of actual fluid, either deposited in unusual abundance, or not absorbed with the usual activity, in hydrothorax. In pleuritis it is the coagulating part of the blood, which afterwards forms the adhesions of the two pleuræ, so commonly seen in the dead body, that hardly any subject is entirely free from them.

As the pleura pulmonalis and costalis are always contiguous, it follows that the lung always fills the cavity of this membranous bag. If we dissect away carefully the muscular parts, that fill the interval of two ribs, so as to expose, without penetrating the pleura, the transparency of the latter membrane allows us to see the lung through it, and to see that there is no interval between them, but that they are in accurate contact in all parts of the chest. The result of this examination is the same, both in the living and the dead subject. From this representation it follows that the motions of the chest must be accompanied by corresponding changes of the lungs; that air will enter into or pass out of those organs through the trachea, which is constantly open, according as the chest is enlarged or diminished; and, in fact, that the dilatation and contraction of the thorax are constantly attended with a similar dilatation and contraction of the lungs. These motions of the chest refer entirely to the functions of the lungs, which are passive in respiration, which possess in themselves no independent power of enlargement and diminution.

Different opinions were, for a long time, entertained on this subject; it was supposed that a space filled with air, separated the lungs from the containing cavity. A frequent and careful performance of the dissection mentioned above, has however shewn the lung always in contact with the pleura, when the latter has not been injured; and the chest has been opened under water without a single particle of air escaping. Indeed it is only by this contact that the function of respiration can be explained, if we admit the passive nature of the lung: the expansion and contraction of the chest would be no longer attended with enlargement and diminution of the lung, if air were contained between this viscous and the sides of its containing cavity.

All the preceding observations apply to the natural state of the parts, in which the bag of the pleura is entire; if that be wounded, so as to make a communication between its cavity and the external air, the lung no longer continues in contact with the sides of the chest. It has been almost universally received, that when an opening is made into the thorax

thorax in the living subject, the lung falls from the sides of the cavity, becomes diminished in size, or, in technical language, *collapses*, and remains motionless. Such is the representation given by Haller (*Element. Physiol. lib. viii. sect. 2. § 6.*) If an extensive wound be made on both sides, it seems generally admitted that the lungs are rendered motionless, that respiration stops, and the animal dies. But it is not equally clear that a small wound is attended invariably with collapse and a fatal termination. Cases are recorded, in which penetrating wounds of the chest have been attended with protrusion of the lung—a state apparently the direct reverse of collapse. And Mr. Norris, who had met with such an instance, opened the thorax in sheep, on one and both sides, sufficiently to enable him to introduce a finger. Respiration was not rendered difficult. (See *Memoirs of the Med. Soc. of London, vol. iii.*) Thus it should seem that the size of the wound influences the result of the experiment in a living animal; which is not irreconcilable to the representation we have already given of the passive state of the lung. For the surface exposed to the external pressure of the atmosphere by a small wound may not counteract the effect produced by the contact of the two pleurae in the whole of the rest of their extent. In all these experiments the wound should be carefully kept open, if we are to derive any instructive inferences from the result: if its sides are allowed to come in contact, no collapse of the lung could be expected. We do not know how to explain the protrusion of the lung from wounds.

If a wound be made in the lung, when there is no communication between the thorax and the external air, as by a broken rib, air escapes into the thorax, and cannot pass out: a collapse of the lung is a necessary consequence. This is what occurs in emphysema, and occasions the difficulty in breathing; the air also escapes through the wound of the pleura into the cellular substance of the body.

When a wound is made into the chest, in the dead subject, the lung, which was before in contact with the pleura, immediately recedes from it. The separation is more marked in front, less at the sides; and at last the lung, much diminished in volume, lies against the back of the chest. Of course an empty space is left, proportioned to the collapse of the lung, and the pleura is stretched over this, with a whitish opaque appearance. This experiment never fails, except when the lung is adherent. The air contained in the chest at the time of death is cooled as the rest of the body grows cold; its volume must be diminished, and the lung containing it must undergo a corresponding diminution, by virtue of its contractility of tissue. Hence a tendency to the formation of a vacuum ensues, in consequence of which the pressure of the external air pushes the diaphragm strongly upwards, and makes it very concave towards the abdomen. This is the condition in which that muscle is constantly found in the dead subject, although we might suppose that the weight of the thoracic contents, pressing on it above perpendicularly, would drive it downwards when it is no longer supported by the abdominal viscera below. If a small opening be made in it penetrating the chest, it immediately sinks, and a space is created above it by the atmospheric air entering the cavity.

How is the collapse of the lung in the dead subject to be explained? Are we to conceive that air escapes through the glottis when the lung sinks in consequence of an opening in the chest? On this supposition the organ must previously have been maintained by its contact with the sides of the cavity, in a state of greater distention than it would exhibit if left to itself. The access of the air to the thorax enables the lung to pass into its natural state, by allowing its con-

tractility of tissue full scope for exertion. But we have ascertained that the phenomenon, called collapse of the lungs, takes place in the dead body, when a ligature is placed on the trachea, so that the contractility of tissue cannot operate. It depends entirely on the sinking of the diaphragm, which gives way towards the abdomen, and is followed by the lung. The latter organ therefore is not diminished in size, and cannot with any propriety be said to have suffered collapse. Let it be remembered that the concavity of the diaphragm is maintained by the pressure of the atmosphere, forcing it into the chest, to fill the space left by the gradual diminution of volume of the lung consequent on the cooling of the air, and its contractility of tissue; and that this arises entirely from the accurate mutual contact of the lung and thoracic cavity. When the latter is exposed, the air presses on the lung at the situation of this exposure above, as much as it does against the diaphragm below, and these two organs consequently take that position which their weight and connections, independently of any other cause, would determine. We believe that the contractility of tissue of the lung has been exerted nearly to its full extent, before the chest is opened, and that it would be exerted to the utmost extent, if the diaphragm could be forced up sufficiently to fill all the space left by the contraction of the organ. It seems to us that the lung does contract after the chest has been opened, and consequently that the diaphragm is not capable of filling all the space which the contractility of the lung might leave. Bichat refers the collapse of the lung in the dead subject entirely to the cooling of the air contained in this organ after death. This, he says, produces a vacuum between the lung and the pleura costalis; the lung collapses before the chest is opened, because the air-cells contract in proportion as the air is condensed. The assertion that a vacuum exists is contrary to all observation; indeed this thing is obviously impossible. If we understand him rightly, he denies that the collapse takes place on opening the chest. "Thus," says he, "there is this difference between opening a dead and a living body: in the former the lung has already collapsed; in the latter it collapses at the instant of the opening. The contraction of the cells, when the cooled air is condensed and occupies less space, is an effect of the contractility of tissue, which remains in the organs to a certain degree after death. Moreover, if the lung collapsed in the dead body at the moment of opening the chest, the current would be in the pressure of the external air, which would expel through the trachea what was contained in the organ. But if, in order to prevent the exit of the air, you close the trachea, and then open the chest, the lung is found in the same state of collapse; therefore the air had quitted it already. Make the same experiment on a living animal, and you will always prevent the collapse of the lung." *Recherches sur la Vie et la Mort, p. 193, note 1.*

It remains for us to advert again to the serous secretion which moistens the surface of the pleura. Is this secretion necessary to the phenomena of respiration? Is that function sensibly impeded, when the serous fluid is no longer produced, and the pleura pulmonalis and costalis are united together throughout? For a long time the affirmative of this question has been maintained, and it has even been usual to attribute habitual difficulty of breathing to adhesions between the lungs and pleurae. Yet the following considerations render this supposition very doubtful. 1. It has been clearly proved, that in the healthy state the lungs and the containing cavities are perfectly contiguous, both in inspiration and expiration: reasoning alone might have shewn this. What end do the movements of the chest serve, if the lungs possess in themselves an independent power of motion?

Since, then, the lungs and chest always move together, how can there be an empty space between them? and if there can be none, how can an accidental union obstruct the motions? 2. Adhesions between the pleura pulmonalis and costalis are extremely frequent. They are found, not only in individuals who have died after a long disease, but also in those whom a violent death has surprised in a state of health. In many instances the whole surface of the lung adheres to its cavity: yet in general the individuals have enjoyed perfect freedom of respiration. We must therefore conclude, that a continuity of surface between the lungs and chest does not injure the freedom of the respiratory functions. The utility of the serous fluid does not then appear so clear to us in the pleura, as in other cavities of the body. In the respiratory apparatus, the motions of the sides of the cavity and of the contained organs hold a certain necessary and invariable relation to each other. The brain tends to move in an immovable bony case; the gastric viscera may change their position and relations to each other, without any alteration in the abdominal parietes: in the synovial cavities there are two surfaces constantly moving in an inverse direction to each other, &c. We every where see the different portions of a serous surface sliding on each other in a more or less marked degree, and we naturally conclude that the presence of a fluid is indispensable to that motion. The thorax alone presents to us two serous surfaces always in contact at the same points.

The *two lungs* occupy the serous cavities on the sides of the chest, lined, as already described, by the pleurae. They are separated from each other by the mediastinum, but united by the circumstance of their receiving from two common trunks (the trachea and pulmonary artery) the air and blood which are necessary to their phenomena. They are not symmetrical, but differ both in size and form, exhibiting the irregularity which belongs to the organs of the organic life; or rather holding a middle place in this respect, as well as in their functions, between those and the organs of the animal life. The heart, which is turned to the left, and placed almost entirely on the left side of the chest, diminishes the transverse diameter of the corresponding pleura: the liver elevates the diaphragm very sensibly on the opposite side, so as to reduce the perpendicular measurement of the right pleura. Hence the left lung is the longest, and the right the broadest of the two.

Their volume, in the natural state, is always exactly the same as the capacity of the bags of the pleurae: their external surface is constantly in contact with these cavities. As they have no power of motion in themselves, and follow every change which the sides of the chest undergo, their capacity is constantly varying: when the chest is enlarged, they are dilated by the entrance of air into their substance through the trachea, and when it is contracted, they undergo a corresponding diminution by the expulsion of air. For further explanation and proofs on this subject, see the account of the pleura. Yet we cannot always judge of the volume of the lungs by the apparent extent of the pectoral cavity: the heart differs considerably in size, and similar variations of the liver, influencing the height to which the diaphragm ascends, are still more common. The collapse of the lungs, which we have considered in speaking of the pleura, is less marked when these organs are distended with blood: it is generally less in children than in adults, and does not take place at all in the conversion of these organs into a solid mass like the liver, at least in the parts immediately affected. Thus the bulk of the lungs depends more on the fluids which they contain, particularly the blood and air, than on their solid substance. They are dilated in in-

spiration; but still thoroughly penetrated with air in the most complete expiration. Long and continued compression or extraction of the air by an exhausting syringe reduces them to so small a bulk, that they do not equal one-fourth of the cavity which is designed to contain them. Preternatural accumulations of fluid, as water or pus, diminish the size of the organs in the same way during life. The most numerous incisions and the strongest pressure will hardly get rid of all the air from the lungs: if we cut a very small portion, and squeeze it most forcibly, there is still enough air to keep up the fire beyond what the solid matter would cause, and it still swims in water. In short, this air can be completely got rid of only by ebullition, maceration, or means that entirely destroy the texture of the organ.

The lungs generally contain more blood after death than during life, as an accumulation takes place in their vessels in the act of dying: the quantity of this fluid influences the bulk of the organ, when the cavity of the chest is exposed. When there is much blood, incisions into the lung produce a less marked diminution of volume than we might expect: they only give issue to the air and not to the blood. The ready escape of the air, too, requires a free communication of the air-cells with each other, which the stagnation of the blood prevents, by confining the air in every part, so that only the cut portion is evacuated by the incisions. Where the individual has died of hemorrhage, the lungs are almost entirely free from blood, and owe their volume to the air: here superficial incisions produce a sudden and marked collapse. This has been particularly observed in persons executed by the guillotine: three or four incisions have speedily reduced the lung to nearly the half of its original size. (Bichat, Anat. Descript. t. iv. p. 12.) For the same reason, the degree of collapse of the lung will be much influenced by the quantity of mucous fluids contained in the air-vessels and cells of the lungs.

The lungs are the lightest organs in the body; they constantly swim when immersed either entire, or in parts, in water. This property depends obviously on the same cause as their volume, namely, the air which they contain. When entirely deprived of this fluid, and reduced to their own substance, they do not swim. This is seen when one of them is so compressed and flattened by the effusion into the chest of a large quantity of fluid, as to serve no longer for the purposes of respiration. In certain diseases, too, the lung is rendered solid and impervious to air, and then sinks in water; but this is a pathological phenomenon. Immersion in water is, therefore, the ordinary and best method of determining the specific gravity of the lung. The greater or smaller quantity of blood which may be contained in their vessels at the time of health occasions them to vary in weight when compared in different subjects.

There can be no doubt that the lungs of a person, who has died of asphyxia, are heavier than those of one who has perished from hemorrhage: and that these organs will be lighter after a chronic disease, which has exhausted the vital powers, and diminished the energy of the circulation, than after strangulation, in which there is a considerable afflux of blood into them to the last moment.

The form of these viscera is in general conical, with the basis downwards, and the apex upwards. This form is tolerably constant, because it depends on that of the thorax, which varies little in its natural state. They correspond immediately to the solid sides of the chest only at the upper and outer parts: on the inner side they lie against the heart, and below are separated from the abdominal organs by the diaphragm: in the two latter aspects, therefore, their form is influenced by that of the neighbouring parts. The heart, placed

placed chiefly on the left side of the chest, leaves a much narrower space for the basis of the left than for that of the right lung. The natural or accidental varieties in the form of the chest, as curvatures of the spine, with the concomitant deviations in the figure and direction of the ribs, are always attended with corresponding varieties in the lungs. We may describe in each lung, besides the basis and apex, two surfaces, an internal and external.

The external surface is convex in its whole extent, and corresponds to the thoracic parietes, from which it is separated by the pleura costalis; it is smooth and polished, and lubricated by a serous exhalation. A considerable groove is observed in it, beginning behind a little below the apex, and running obliquely forwards and downwards to the basis. This groove runs throughout the substance of the lung, which it divides into two nearly equal halves called lobes: these are connected together at the root of the organ by the reflexion of the pleura, and by receiving their blood-vessels from a common trunk. The two lobes are in contact with each other by broad and flat surfaces, which are smooth and lubricated, like the external surface of the lung, as they are covered throughout by the pleura. The upper lobe of the right lung is marked by another groove, directed obliquely from above downwards, and within outwards; so that its mass is divided into three lobes: the middle is the smallest, and triangular in its figure. This secondary groove is more variable than the former in its existence, its length and depth. Sometimes, but very rarely, it is not found; and it is often incomplete, so as not to divide the middle lobe entirely from the superior. It is very seldom seen in the left lung.

The internal surface is nearly plane, and divided into two unequal portions by the insertion of the bronchi and pulmonary vessels, which takes place towards its upper and back part.

It is at this point, which is called the root of the lung, that the pleura is reflected over the organ: here, therefore, the pleura pulmonalis and costalis are continuous. This is the only situation in which the lung adheres to the containing cavity; the surface is free and unattached every where else; it is sometimes called, from this circumstance, the *ligamentum pulmonis*.

The bronchus, the pulmonary artery and veins, the nerves and lymphatics of the organ, surrounded and connected by cellular substance, and forming a single large fasciculus, pass out of the mediastinum to the lung. The pleura is reflected over this fasciculus, covers it, and is continued over the lung. That portion of the inner side of the lung which is behind the root is narrow, and corresponds to the lateral surface of the vertebral column: the anterior division is broader, and is contiguous to the heart and pericardium; it is slightly concave at this part. Above and below the insertion of the vessels the inner surface of the lung is not divided into these two parts.

The external and internal surfaces of the lung are united by two edges. The anterior is thin, particularly below, irregular in its outline, directed obliquely downwards and forwards, and has in the left lung a small notch corresponding to the apex of the heart. The posterior is obtuse, not clearly marked, directed vertically, and corresponding to the hollow at the angles of the ribs. On the latter is seen, above, the commencement of the great groove, which divides the lung into two lobes.

The basis of the lung rests on the diaphragm, and is concave, to suit the convexity of that great muscular partition. It is directed obliquely from within outwards, from above downwards, and from before backwards; corresponding in this respect entirely to the diaphragm. The concavity of

the basis is more marked in the right than in the left lung, on account of the greater convexity of this side of the diaphragm produced by the liver. The termination of the great groove is found on this surface of the organ, so that the two lobes are distinct here as well as in other situations; but the superior lobe contributes to the formation of the basis only in a very small part of its extent, particularly on the right side. The circumference of the basis presents a thin edge, with a rather irregular outline interposed between the ribs and the diaphragm, near the attachment of the latter. This is more sensible on the right than on the left side.

Its appearance varies according to the different states of the lungs; the preceding description applies to the dead subject. In inspiration, the diaphragm descends and becomes nearly plane; the lung follows it, and assumes a corresponding figure, its edge, instead of being thin, becoming thick, and no longer included between the diaphragm and ribs.

The apex of the lung is small and obtuse, and corresponds to the cul-de-sac of the pleura under the first ribs. In this way it is completely insulated from the lower part of the neck. It exhibits several more or less marked tubercular ringings.

The whole surface of the lungs is unconnected to the cavity, except in the situation of the *ligamenta pulmonum*. The opposed surfaces of the lobes are in the same way unconnected to each other, and covered by the serous membrane. All these parts are moistened by a serous exhalation.

The colour of the lungs, when not influenced by that of the fluids which they contain, is extremely pale; sometimes a slight tawny brown, but more frequently grey or ash-coloured; and sometimes completely white. This colour is seen over the whole organ, both on its surface, and in the interior, when it is quite free from blood; but is no longer visible when the lung is loaded with that fluid. Hence we understand why we meet with it so seldom in the dead body, since a distention of the pulmonary vessels with blood is one of the most ordinary phenomena of death. The only cases in which we can expect with some certainty to find the lungs exhibiting this pale colour throughout, are those of deaths from hemorrhage. It was noticed by the French in individuals who perished by the guillotine. We may often observe it in some particular points of the organ, where the absence of blood may be ascertained by incisions. The tawny or greyish colour of the lungs is interrupted by small black or brown spots, irregularly disseminated over the surface, and very variable in number and form. Often the organ is very thickly spotted in this way; at other times they are scattered here and there at considerable distances; sometimes, but very seldom, they do not exist at all. These spots do not depend in the least on the blood. Simple inspection is sufficient to prove that they belong to the organization of the part. They are very distinct in the palest and most bloodless lungs, and may be easily recognised in the general livid tint of those which are most loaded; they seem to possess always the same intensity of colour; and they are always circumscribed, while the marks arising from the blood end imperceptibly. These black spots present every variety of figure. Some are superficial, others extend into the substance of the lung, and some are found in the interior of the organ. They seem to belong entirely to the pulmonary tissue, as they are never seen on the bag of the pleura, and are found in the substance of the lung.

But generally the lungs are loaded with blood at the time of death, and do not consequently exhibit the paleness which we have described as belonging to their proper tissue. They are usually livid, violet-coloured, brownish, or reddish; and the

mixture of these various tints gives them the marbled appearance, which has generally been regarded in dissecting rooms as the natural state of the organs, although it is merely produced by death. The brown, black, or violet colour is the most frequently observed, and occupies the lung most extensively. It depends on the presence of venous blood, which stagnates as soon as respiration has ceased to colour what the right ventricle still impels. The tint varies as the blood is accumulated more or less in particular situations. The highest degree of this congestion produces the black observed in the lungs of those who die of asphyxia; the brown or violet colour is caused by a slighter degree of the same effect. The colour is always the deepest in the most depending part of the lung, as the blood, obeying only the laws of gravity after death, settles in the lowest parts. From the ordinary position of the body this deep colour is usually seen at the back of the lung; but if the subject be laid on the face, the same phenomenon is exhibited in front. These dark colours are not the only ones observed in the lungs; more or less extensive patches of a bright red are often seen; this may occupy a large portion of the organ, while the rest is brown or violet-coloured. This red colour is universal in the lungs of children, which do not present the black spots; the former gradually disappears, and the latter increase with the progress of age. The same bright tint extends into the substance of the lung. We are at a loss for a satisfactory explanation of this appearance: if it arose from the blood being acted upon after death, by the air contained in the pulmonary air-cells, we should expect to find it more universal and more frequent. The parts of the lung, however, in which this tint is observed, certainly contain scarlet blood, and owe the colour to that.

The lungs are the least dense, and least resisting of all organs formed of solid tissues. They yield readily to compression, preserve the mark of the pressure, and are restored imperfectly to their original state. This observation applies only where they are not loaded with blood, but contain merely that quantity of air, which never leaves them after they have been once distended with it. When full of blood, they acquire a consistence foreign to their own substance, resist pressure more effectually, and restore themselves more readily. Hence softness and flaccidity more particularly characterize the lungs of persons who have died of hemorrhage. When we squeeze the air forcibly into a part of the lung, a peculiar crackling noise is produced by the bursting of the air-cells: this crepitation does not take place in diseased lungs.

The softness of the pulmonary texture arises from the lungs being entirely composed, as we shall see presently, of various vascular systems. It accords very perfectly with the passive part that they perform in the respiratory phenomena: possessing no power of motion in themselves, they expand and contract merely in consequence of motions of the chest.

The lungs are composed of a cartilaginous and membranous tube, by which air is conveyed into them; of the pulmonary artery and veins, of which the former terminates the system of black blood, and the latter commence that of red blood; of the bronchial vessels concerned in the nutrition of these organs; of a peculiar tissue, composing a congeries of minute cells, which receive the air admitted in respiration; and of lymphatics and nerves. These parts are all united by cellular tissue, and covered externally by the reflected pleura.

The air-vessels compose the essential part of the lungs, with respect to their functions as organs of respiration. They introduce the fluid by which the blood is changed;

this process goes on at their surface; and the air, after serving the purposes of respiration, is expelled through them. When taken altogether they form the cavity of the respiratory apparatus, which is analogous to that of the digestive canal, in having a mucous lining, but differs in its arrangement, as it is subdivided into a vast number of canals, decreasing successively like arteries. These are the only tubes in the body constantly open; it is necessary that the air should have free and constant access to them. This order of tubes is begun by a single trunk, which unites the two lungs, and necessarily renders their phenomena simultaneous. The common trunk is called trachea (*aspera arteria*, *trachée artère*); and its primary divisions the right and left bronchi.

The *trachea* is placed in front of the vertebral column, extends from the upper part and middle of the neck to the upper part of the chest, beginning immediately below the larynx, and ending about the level of the second or third dorsal vertebra. It is placed on the middle line of the body, and is symmetrical in its whole extent; in this respect it approaches to the external organs: the symmetry ceases in its divisions. It appears cylindrical in front, but is flattened behind. Its diameter varies according to the age of the subject, and the natural volume of the lungs; it may be about eight or ten lines in the adult, and is exactly the same with that of the larynx, measured at the cricoid cartilage. It continues the same through the whole length of the trachea.

In front it is covered above by the two portions of the thyroid gland, which unite together at the middle of the tube. Lower down the sterno-hyoidei and sterno-thyroidei, and the inferior thyroid veins cover it. In the chest it is enclosed in the posterior mediastinum, and corresponds to the thymus, to the left subclavian vein, the *arteria innominata*, and the arch of the aorta. Behind it covers the oesophagus, and towards the right the vertebral column. On the sides it is covered above by the lateral portions of the thyroid gland, and is contiguous below to the common carotids. A loose and abundant cellular tissue forms the medium of its connection to all these parts. The superior extremity is connected to the cricoid cartilage by a ligamentous substance; the inferior is placed at the right side of the descending aorta, is bifurcated, and produces the two bronchi. The latter begin about the second or third dorsal vertebra, and separate from the common trunk nearly at a right angle, yet they go with some obliquity, downwards and outwards, each to its corresponding lung. Here we begin to meet with the irregularity of form that characterizes the organs of the internal life. The left bronchus is smaller than the right, and takes a much longer course: it passes under the arch of the aorta, while the other goes immediately to its lung. These tubes enter the lungs at the situations already described as the roots of those organs. They ramify in every direction, and divide into branches, becoming successively smaller and smaller. These subdivisions are so numerous, that every part of the lung contains them. The exact manner of their termination is not understood.

The air-tubes are composed of three parts, an exterior membrane, of a fibrous and probably muscular texture; a cartilaginous structure, which is united to the preceding; and a mucous lining. The exterior membrane rises above from the circumference of the cricoid cartilage, and occupies the whole extent of the trachea and bronchi; forming a very essential part of those tubes. It is tolerably thick in the greatest part of its course, but grows thinner in the smaller ramifications of the bronchi, where it cannot be easily traced. It is formed of parallel and closely arranged longitudinal fibres, the nature of which is doubtful; some consider

consider them as muscular, others regard them as a fibrous organ, to which their appearance is very similar. This membrane alone constitutes the solid portion of the trachea behind; and hence arises the flattened figure of the tube at that part. This peculiarity in the back of the trachea has been referred to the situation and motions of the diaphragm, which lies close behind it: but the same structure exists in the bronchi also, where it cannot admit of that explanation. The arrangement is different on the anterior part and sides of the trachea, in two-thirds at least of the circumference of the tube. The fibrous membrane is interrupted by portions of cartilage (anuli cartilaginei), which keep it on the stretch, and thereby preserve the air-tubes constantly open. Each of these cartilages represents two-thirds of a circle. They are bent on themselves, flattened on their surfaces, uniform in length, but of different breadths. Their convexity forms a part of the exterior surface of the tube; their concavity corresponds to the mucous membranes, from which a thin cellular stratum separates them. Their superior and inferior margins are rounded, continuous on the outside with the fibrous tissue, and slightly prominent through the mucous membrane on the inside. Their extremities project more or less behind in the fibrous tissue, are all on the same level, are rounded, and a little bent upwards. They vary in number from about sixteen to twenty; they may be more or less broad; and, as the length of the tube is nearly uniform, they must be more numerous in proportion as they are narrower. In general, they are broader in front, and diminish progressively to the back part: but the reverse of this sometimes happens; or two may be united at their edges. Commonly their direction is horizontal to the axis of the trachea; but many of them are often more or less oblique.

In colour and texture they resemble the fibro-cartilages of the organs of sense: they are very elastic.

The first cartilage is generally much larger than the succeeding ones; the last has a prolongation from its middle corresponding to the bifurcation of the bronchi.

In the ramifications of the bronchi the cartilages become less regular in their form, and fewer. They no longer exhibit that annular form, but consist merely of small pieces, sometimes separate, and sometimes united. As the subdivisions are multiplied, the cartilages become less firm, and at last disappear altogether, so that we find only a membranous structure when we have traced the air-tubes as far as the eye can go.

The external surface of this fibrous membrane is sprinkled behind with small lightish brown and flattened bodies of very variable figure, round, oval, &c. These are mucous glands, of which the excretory ducts open on the internal surface of the tube. They are smaller on the bronchi than in the trunk of the trachea, and they become more minute in proportion as the vessels ramify. Their structure seems to be very simple; one duct comes from each gland generally; but sometimes two or three glands are united, and there the ducts are more numerous. The fibrous membrane exhibits none of these glands in the intervals of the cartilages, on its external surface. The inner surface of the membrane, in the same situation, corresponds to the mucous lining of the tube, from which it is separated by numerous small and closely arranged granular bodies, which are probably mucous glands. At the back part of the tube there is found, under the fibrous membrane, a stratum of transverse fibres extended between the extremities of the cartilages, to which they are attached. These are disposed in small fasciculi, have not the white aponeurotic appearance of the fibrous membrane, and seem to be real muscular fibres. They are connected

to the mucous lining by a loose cellular tissue, and may be most advantageously seen by dissecting away that membrane from the inside. In what manner these fibres affect the phenomena that occur in the trachea we do not know. The longitudinal ones, that compose the fibrous membrane already described, have generally been regarded as of a muscular nature: but their appearance by no means warrants this representation. They possess considerable elastic power, so that the trachea, when extended, recovers itself very quickly and completely: this property is frequently brought into exercise in the living state from the motions of the head and neck. The effect of the cartilaginous semi-circles, which are incorporated with this membrane, in preserving the air-tubes permanently open, and the necessity of this arrangement to the execution of the respiratory functions, are too obvious to require any detailed illustration.

The mucous membrane, or the third constituent portion of the air-tubes, is the second division of that great mucous apparatus, called by Bichat *gastro-pulmonaire*. We trace its continuation from the pharynx into the larynx, through that cavity into the trachea and bronchi, to their ultimate ramifications. In the latter, it is said to exit alone, or without the other two parts already mentioned: but the minuteness of the parts makes it difficult to ascertain this point by direct examination, although such a structure would be favourable to that more intimate connection between the blood and air-vessels, which is necessary to the chemical phenomena of respiration, according to the notions commonly entertained respecting these phenomena. The external surface corresponds behind to the transverse fibres; and in the rest of its extent to the fibrous membrane and cartilages, which latter project through it. The connecting medium which attaches it to all these parts is a cellular substance, admitting easily of separation. The internal surface is smooth, and constantly lubricated by a mucous secretion: it forms the cavity of the air-tubes. The excretory canals of the mucous glands open on it in many parts very distinctly. In the back of the tube, where there is no cartilage, it exhibits numerous prominent and regular longitudinal folds: these extend into the bronchi and their ramifications. They are not produced by the contraction of any parts situated exteriorly, but exist when the membrane has been detached, and are not affected by transverse extension of the tube: they seem to arise from small fibrous columns forming a part of the structure of the membrane.

For the organization of this membrane, we must refer to the general view exhibited in the article MEMBRANE. It is thinner, less spongy and soft, and more firmly attached in the trachea than in the larynx: the orifices of the mucous ducts are also smaller; in the bronchi it is still more delicate, and this thinness increases as the tubes divide. In the natural state it is white, so as to indicate that the capillary system is not very clearly marked in it. These vessels are developed and become perceptible under numerous circumstances, particularly in catarrhal affections, to which the pulmonary mucous membrane is very subject. The blood is then accumulated in the capillaries, and gives to the membrane a red colour, which it does not possess naturally.

It is supposed that this membrane composes entirely the air-cells, or vesicles of the lungs, in which the minute ramifications of the air-tubes end. If we impel air into the trachea, the whole lung becomes distended, and increases in volume in proportion to the quantity of air inflated. Attentive observation will then convince us that its whole substance is composed of small cells, which we can readily discern on the surface. If the inflated lung be dried, or if the organ be distended with spirit of wine, and then cut, its whole

whole substance is found to be composed of these cells, as well as its external surface. Injection with quicksilver will demonstrate the same structure. This gives to the lung, when cut or torn, a porous and spongy appearance throughout. The cells, when attentively surveyed on the surface of the lung, have a roundish figure, but their outline is often irregular. When inflated they measure $\frac{1}{16}$ th or $\frac{1}{8}$ th of a line in diameter. They communicate together in all directions so completely, by the ramifications of the air-tubes, that air might pass easily from a single cell into all parts of the lung; but the cells of the neighbouring lobules do not seem to have any direct communication.

The mucous membrane, in an extremely delicate state, continued from the minute ends of the air-tubes, is supposed to compose these cells; but the minuteness of the objects renders our description of them, excepting a few general facts, rather uncertain. Anatomy discovers to us rather a spongy net-work, filled with air, and formed by blood-vessels crossing in every direction, than any clear arrangement of distinct cells, connected to the bronchial ramifications, like grapes to their stalks, as they have been described and drawn by several anatomists.

In this view of the subject, the extent of surface of the mucous membrane must be enormous. Many attempts have been made to express it in numbers. Hales makes the air-cells $\frac{1}{16}$ th of an inch in diameter; the surface of the air-tubes equal to 1035 square inches; and that of the air-cells to 20,000. Keil estimates the number of the vessels at 174,418,615, and the whole internal surface of the lung at 21,906 square inches. Lieberkuhn carries his estimate of the surface as high as 1500 cubic feet. We mention these circumstances only to shew the great extent of the mucous membrane, and not because we place much faith in their accuracy. In reading descriptions of the minute structure of the lungs, and, indeed, in all other analogous parts of anatomy, we should always bear in mind the observation of Haller; "*Ea fere hominum est infelicitas, ut omnis ultima rerum physicarum historia parum firma sit, et ut altera illa, rerum gestarum memoratrix, in mythices fines terminatur.*"

A mucous fluid constantly lubricates the whole of this surface. It is limpid, mild, and nearly insipid, or slightly salish, and but little tenacious in the natural state. When free from air, it sinks in water. It is produced in so small a quantity, that it seems to be dissolved in the air, and thus to pass off insensibly in expiration, or to be taken up by the absorbents. It is poured out much more abundantly under various circumstances, and is altered in colour and consistence: it is then expelled by the expiratory efforts which constitute cough. In children it has a reddish colour; and it is often rather livid in adults.

The watery vapour discharged from the lungs in expiration concurs in lubricating the surface of the air-passages. Whether there be any exhalation from the general mucous surface, in addition to the mucous secretion, seems a point hardly susceptible of positive determination.

The pulmonary mucous membrane is the part in which the chemical phenomena of respiration are carried on; its surface is in contact with the air taken into the lungs. The latter fluid is the only one, in addition to its natural mucus, of which it can bear the contact. All other substances, even the clearest water, are immediately and powerfully rejected by it. In itself it possesses no power of expelling any irritating matter from its surface; but it excites the expiratory muscles which act convulsively and repeatedly until the cause is removed.

The vessels and nerves of the lungs are principally distri-

buted on the air-tubes, of which they every where follow the course. The arteries of the trachea come from the inferior thyroidal; those of the bronchi are derived immediately from the aorta, and are called the bronchial arteries. The latter ramify in conjunction with the air-tubes, and adhere closely to them: they are distributed chiefly on the internal membrane. Several branches are spent on the bronchial glands, and on the parietes of the pulmonary vessels. Do they anastomose with the pulmonary artery? We should be inclined to suppose that they do not, from considering that the two kinds of vessels contain blood of different natures, and have altogether different offices. The bronchial arteries convey arterial blood for the nutrition of the lung; the pulmonary artery takes the venous blood, that it may be submitted to the action of the air in respiration. Yet it has been asserted by several anatomists, that such an anastomosis does take place. The bronchial veins accompany the arteries; their trunks end in the vena azygos on the right side, and in the superior intercostal vein on the left.

The par vagum furnishes nearly all the nerves belonging to these organs: those of the trachea come from it altogether. The nerves of the bronchi are derived from the pulmonary plexuses formed principally by the par vagum, but partly also by branches from some ganglia of the great sympathetic. As these nerves seem to be distributed entirely on the air-tubes, perhaps the epithet bronchia would be more proper for them than pulmonary.

The vascular system of the lungs may be divided into three parts, distinct in their nature, properties, and the immediate object of their phenomena. The first is the pulmonary artery, or the end of the general system of black blood; the second, the pulmonary veins, or commencement of the general system of red blood; and the third, the capillary system intermediate to the two preceding. (See CIRCULATION AND HEART.) The pulmonary artery arises from the upper and anterior part of the right ventricle, in front of the origin of the aorta. It passes upwards and backwards, lying close on the left side of the root of the aorta, and, after a course of about an inch and a half, divides into a right and left branch destined for the corresponding lungs. These two divisions separate most widely at their origin, going off from the trunk at right angles, and hardly forming a sensible angle with each other. The separation takes place on the left side of the aorta. The right trunk goes immediately behind the aorta and superior vena cava, and follows a transverse course to the right lung; the left has an analogous course on the left side of the body, but is much shorter than the right, on account of the latter passing behind the aorta and vena cava. Both are placed in front of the bronchi, and cross the course at first, being directed a little from below upwards; but they are subdivided exactly like the bronchi, and follow their course, being closely connected to them throughout: the artery is generally placed above its corresponding air-tube. For the organization of this vessel, we refer to the article HEART.

The pulmonary veins, arising from the capillary system, follow a course analogous to that of the arterial divisions. These also accompany the air-tubes, and are situated under them. They unite gradually into larger and larger tubes, and form ultimately four considerable trunks, two belonging to each lung, and terminating in the left auricle of the heart. The superior right pulmonary vein passes out of the lung below the bronchus, and goes with a little obliquity downwards: the inferior ascends obliquely towards the auricle. The left veins have a similar arrangement; one descends, and the other ascends: they are more approximated than on

the right side. For the organisation of these vessels, see HEART.

The capillary vessels of the lung are distributed in infinite number through all parts of the organ, of the proper tissue of which they compose a very considerable share. As they have no connection with the nutrition of the part, and perform no secretion, they give passage only to the blood, and are hence remarkably distinguished from the general capillary system. These vessels cover in vast profusion the air-cells of the lungs; so that when they are injected with coloured fluids after death, the whole substance of the organ appears dyed of the peculiar colour. In them the blood is exposed to the air, and converted from the dark or venous into the red or arterial state.

The substance of the lungs, on superficial examination, offers a soft spongy mass, yielding easily to pressure, and restoring itself afterwards to its original state in an imperfect manner. When we view it more attentively, we observe on the surface small whitish lines circumscribing spaces of different figures, as triangular, quadrangular, &c. These are called lobules of the lungs, and vary considerably in size as well as figure. They are again divided into other smaller parts. These lobules are all connected together by a loose and soft cellular substance, which never contains any fat; and the same substance unites the reflected pleura to the external surface of the lung. If we tear the substance of the organ, and inflate it, the air fills the cells of this cellular texture, and makes it more sensible: it is also in some cases rendered more obvious, by being the seat of a watery deposition, which constitutes anasarca of the lungs. Its cells have no communication with the air vesicles, unless the latter be broken by inflation, as when we squeeze the air in them forcibly, they crack, and the air escapes into the cellular texture, uniting the lobuli. On the other hand, we might inflate the cellular substance distinctly from the air-cells.

Each lobules of the lung consists of a branch of the air-tube with a corresponding proportion of cells, a branch of the pulmonary artery and vein, a portion of the pulmonary capillaries of the bronchial vessels and nervous ramifications, connected by the cellular substance already described.

The lymphatics of the lungs are numerous, and divided into a superficial and deep-seated set: the former constitute a net-work on the surface of the lung, and communicate also with the latter. They pass through numerous glands, called bronchial, placed on the trunks of the air-tubes and blood-vessels, partly within, but chiefly without the substance of the lung. Other larger glands are situated about the division of the trachea, and the absorbents of the right and left lung communicate in them. Some absorbents of the right lung terminate in the right absorbent trunk; the rest, with those of the left, end in the thoracic duct, passing through glands on the spine.

The bronchial glands are large in size, and numerous in proportion to the lung; but they vary in both these respects in different subjects. Several of the smallest are found on the bronchi, within the substance of the lung. Their colour is the most remarkable of their properties: in the adult it is a deep livid or black. Their consistence is rather soft, and a coloured fluid may be expressed from them, when cut or divided. It is now clearly ascertained that these bodies belong to the lymphatic system. Anatomists formerly conceived that they secreted a particular fluid, and poured it into the bronchi. We are quite ignorant of the cause of their peculiar black colour.

The lung, then, is made up of the tissues just described, covered on the surface by the very thin and transparent pleura pulmonalis, which is connected to the organ by

cellular substance, and gives it the smooth external surface.

Development of the Lungs.—The *fœtus* has no respiration: from the circumstances under which it is placed in the uterus, it must obviously be altogether precluded from exercising that function; but it begins immediately after birth: hence the lungs, formed nearly as soon as the principal organ of circulation, possess, at a very early period, a considerable development and well-marked form. Their organisation, too, is perfect, or at least they are capable of executing their functions, before the time at which they naturally come into action: for there are instances of children born long before the end of the ninth month, as, for instance, at the seventh, or even sooner, who have been preserved alive by great care. In the early periods their colour is reddish; they then assume a slightly tawny hue, which is continued till the time of birth, and is not even changed by respiration, although the admission of air into the organs at that time is followed by the entrance of a larger quantity of blood.

The lobuli are very distinct in the *fœtus*, and easily separable: the connecting substance appears to be more copious. Although the lungs are small in a *fœtus* at full time, compared to those of a child who has breathed, we cannot say, as some anatomists represent, that they are extremely diminutive, and confined to the back of the chest. As they are at this time entirely free from air, they possess a density, which makes them sink instantly in water, when plunged into it either entire or in slices. They are penetrated by much less blood than after breathing has begun, and therefore reduced almost entirely to their solid and organised contents: they form at this time about $\frac{1}{10}$ th of the weight of the whole body.

As the function of respiration, which commences at the moment of birth, goes on afterwards uninterruptedly, and as the phenomena are as regular and perfect at this time as in more advanced age, we have no reason to expect that the intimate structure of the organ, that is, the arrangement of the different component tissues, will be different at that age from what we know of it in the adult: but the vascular trunks belonging to these parts exhibit some peculiarities, of which the details will be found in the articles HEART and CIRCULATION.

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whole substance is found to be composed of these cells, as well as its external surface. Injection with quicksilver will demonstrate the same structure. This gives to the lung, when cut or torn, a porous and spongy appearance throughout. The cells, when attentively surveyed on the surface of the lung, have a roundish figure, but their outline is often irregular. When inflated they measure $\frac{1}{4}$ th or $\frac{1}{2}$ th of a line in diameter. They communicate together in all directions so completely, by the ramifications of the air-tubes, that air might pass easily from a single cell into all parts of the lung; but the cells of the neighbouring lobules do not seem to have any direct communication.

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In this view of the subject, the extent of surface of the mucous membrane must be enormous. Many attempts have been made to express it in numbers. Hales makes the air-cells $\frac{1}{8}$ -dth of an inch in diameter; the surface of the air-tubes equal to 1035 square inches; and that of the air-cells to 20,000. Keil estimates the number of the vesicles at 174,418,615, and the whole internal surface of the lung at 21,906 square inches. Lieberkuhn carries his estimate of the surface as high as 1500 cubic feet. We mention these circumstances only to shew the great extent of the mucous membrane, and not because we place much faith in their accuracy. In reading descriptions of the minute structure of the lungs, and, indeed, in all other analogous parts of anatomy, we should always bear in mind the observation of Haller; "*Ea fere hominum est infelicitas, ut omnis ultima rerum physicarum historia parum firma sit, et ut altera illa, rerum gestarum memoratrix, in mythices fines terminatur.*"

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The vascular system of the lungs may be divided into three parts, distinct in their nature, properties, and the immediate object of their phenomena. The first is the pulmonary artery, or the end of the general system of black blood; the second, the pulmonary veins, or commencement of the general system of red blood; and the third, the capillary system intermediate to the two preceding. (See CIRCULATION and HEART.) The pulmonary artery arises from the upper and anterior part of the right ventricle, in front of the origin of the aorta. It passes upwards and backwards, lying close on the left side of the root of the aorta, and, after a course of about an inch and a half, divides into a right and left branch destined for the corresponding lungs. These two divisions separate most widely at their origin, going off from the trunk at right angles, and hardly forming a sensible angle with each other. The separation takes place on the left side of the aorta. The right trunk goes immediately behind the aorta and superior vena cava, and follows a transverse course to the right lung; the left has an analogous course on the left side of the body, but is much shorter than the right, on account of the latter passing behind the aorta and vena cava. Both are placed in front of the bronchi, and cross the course at first, being directed a little from below upwards; but they are subdivided exactly like the bronchi, and follow their course, being closely connected to them throughout: the artery is generally placed above its corresponding air-tube. For the organisation of this vessel, we refer to the article HEART.

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The substance of the lungs, on superficial examination, offers a soft spongy mass, yielding easily to pressure, and restoring itself afterwards to its original state in an imperfect manner. When we view it more attentively, we observe on the surface small whitish lines circumscribing spaces of different figures, as triangular, quadrangular, &c. These are called lobules of the lungs, and vary considerably in size as well as figure. They are again divided into other smaller parts. These lobules are all connected together by a loose and soft cellular substance, which never contains any fat; and the same substance unites the reflected pleura to the external surface of the lung. If we tear the substance of the organ, and inflate it, the air fills the cells of this cellular texture, and makes it more sensible: it is also in some cases rendered more obvious, by being the seat of a watery deposition, which constitutes anasarca of the lungs. Its cells have no communication with the air vesicles, unless the latter be broken by inflation, as when we squeeze the air in them forcibly, they crack, and the air escapes into the cellular texture, uniting the lobuli. On the other hand, we might inflate the cellular substance distinctly from the air-cells.

Each lobulus of the lung consists of a branch of the air-tube with a corresponding proportion of cells, a branch of the pulmonary artery and vein, a portion of the pulmonary capillaries of the bronchial vessels and nervous ramifications, connected by the cellular substance already described.

The lymphatics of the lungs are numerous, and divided into a superficial and deep-seated set: the former constitute a net-work on the surface of the lung, and communicate also with the latter. They pass through numerous glands, called bronchial, placed on the trunks of the air-tubes and blood-vessels, partly within, but chiefly without the substance of the lung. Other larger glands are situated about the division of the trachea, and the absorbents of the right and left lung communicate in them. Some absorbents of the right lung terminate in the right absorbent trunk; the rest, with those of the left, end in the thoracic duct, passing through glands on the spine.

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The lung, then, is made up of the tissues just described, covered on the surface by the very thin and transparent pleura pulmonalis, which is connected to the organ by

cellular substance, and gives it the smooth external surface.

Development of the Lungs.—The fetus has no respiration: from the circumstances under which it is placed in the uterus, it must obviously be altogether precluded from exercising that function; but it begins immediately after birth: hence the lungs, formed nearly as soon as the principal organ of circulation, possess, at a very early period, a considerable development and well-marked form. Their organisation, too, is perfect, or at least they are capable of executing their functions, before the time at which they naturally come into action: for there are instances of children born long before the end of the ninth month, as, for instance, at the seventh, or even sooner, who have been preserved alive by great care. In the early periods their colour is reddish; they then assume a slightly tawny hue, which is continued till the time of birth, and is not even changed by respiration, although the admission of air into the organs at that time is followed by the entrance of a larger quantity of blood.

The lobuli are very distinct in the fetus, and easily separable: the connecting substance appears to be more copious. Although the lungs are small in a fetus at full time, compared to those of a child who has breathed, we cannot say, as some anatomists represent, that they are extremely diminutive, and confined to the back of the chest. As they are at this time entirely free from air, they possess a density, which makes them sink instantly in water, when plunged into it either entire or in slices. They are penetrated by much less blood than after breathing has begun, and therefore reduced almost entirely to their solid and organised contents: they form at this time about $\frac{1}{4}$ th of the weight of the whole body.

As the function of respiration, which commences at the moment of birth, goes on afterwards uninterruptedly, and as the phenomena are as regular and perfect at this time as in more advanced age, we have no reason to expect that the intimate structure of the organ, that is, the arrangement of the different component tissues, will be different at that age from what we know of it in the adult: but the vascular trunks belonging to these parts exhibit some peculiarities, of which the details will be found in the articles HEART and CIRCULATION.

Breathing begins immediately after birth; the enlargement of the chest occasions the lungs to be distended with air, and consequently to become specifically lighter; a greater quantity of blood passes through them, and thus they acquire greater absolute weight. The increase of volume must be limited by the capability of enlargement in the chest; and this cannot be very considerable immediately on birth. This enlarged size is not, therefore, sufficiently marked, to be relied on as a proof that respiration has begun. It is a well-known fact, which we have already stated, that the lungs of an individual, who has breathed, swim in water, whether they be immersed entire or in slices. This is a property remarkably contrasted with what takes place under the same treatment before birth. A criterion has been sought for in this source, to determine, in doubtful cases, whether a child has been born dead or alive; and the consideration is a highly important one, from the influence it may produce on medical opinions, in cases of suspected child-murder. We shall only observe here, that the convulsive attempts to establish respiration, although not successful, may introduce air enough into the lungs to make them buoyant in water; that attempts to inflate them, in order to preserve the child, or after it has died, may have the same effect; that the disengagement of air by putrefac-

tion

tion may thus make them specifically lighter than water; not to mention, that the child may have breathed and died afterwards: so that the mere naked circumstance of the lung swimming is altogether an insufficient proof that the child has been murdered; and to condemn a mother to death on such grounds, exhibits a degree of ignorance and barbarity worthy only of the dark ages.

The increase of absolute bulk in the lungs after birth is a phenomenon very worthy of being remarked. We have stated already, that these organs in the fœtus, at full time, are $\frac{1}{10}$ th of the body. According to the researches of some German and French anatomists, they are no more than $\frac{1}{10}$ th, or $\frac{1}{12}$ th in a child who has breathed. There may be some variation in this point, but the organs are never so light as to approach at all to the proportion which they exhibit before birth; a fact which is highly important in its application to questions of supposed infanticide.

The colour of the lungs does not remain through life the same as at the time of birth. In the earlier years it has still the reddish, mixed with a tint of yellow, which we have already mentioned. After the twentieth year the livid or black spots appear, and become more numerous as age advances.

Physiology of the Lungs.—Two very different kinds of phenomena take place in the lungs. The first are entirely mechanical, and relate to the motions of the sides of the chest, by which the cavity is enlarged or diminished; and to the dilatation or contraction of the air-cells, and the admission and expulsion of the air, which are consequent on these motions. These have been already considered in those parts of the present article which relate to the motions of the thorax. The phenomena of the second kind are purely chemical, and consist of the various alterations which the respired air undergoes, of the changes effected in the composition of the blood, &c. For an account of these, the reader is referred to RESPIRATION, and HEAT, *Animal*.

These two divisions of the respiratory phenomena belong respectively to the two great classes of vital processes; the animal and organic. The motions of the chest are performed by voluntary muscles, and consequently are subject to the influence of the brain: hence a section of the medulla spinalis above the origin of the phrenic nerve, or a division of the nerves which supply the muscles of respiration, immediately annihilates these motions. Commonly, indeed, the motions of the chest are performed spontaneously, that is, without any exertion of the will; and they go on during sleep, when the action of all voluntary organs is suspended. But an act of the will can accelerate, retard, or otherwise modify the movements of the chest; and many of the muscles concerned assist in moving the trunk, on occasions that have nothing to do with respiration. The changes of the blood, on the other hand, go on in the capillaries, and are performed without our consciousness: the brain has no influence on them. The respiratory functions, then, offer the point of union of the animal and organic lives, in which these may reciprocally influence each other.

The chemical and mechanical phenomena of respiration are in a state of mutual dependence: the interruption of one is always quickly followed by the cessation of the other. Without the former, the latter would have no materials to act upon. If the mechanical phenomena were interrupted, the blood would no longer be fit to excite the brain; and that organ could not influence, in the proper manner, the intercostal muscles of the diaphragm: hence these muscles would become inactive, and even the mechanical phenomena must cease.

The heart does not influence these two kinds of phenomena in the same way.

The heart of black blood has obviously no power over the mechanical phenomena of the lungs; but it is essentially concerned in producing the chemical phenomena, as it sends to the organ the fluid which derives certain properties from the air, and imparts others to it. Thus, when the functions of the auricle or ventricle of black blood, or of the great venous trunks, are interrupted, as by a wound, or a ligature applied in experiments, the chemical phenomena are at once annihilated; but the dilatation and contraction of the chest still goes on. No blood arrives at the left ventricle, and consequently the requisite motion cannot be imparted to the brain: hence its functions are suspended, and consequently the intercostal muscles and diaphragm cease to act.

In the case of a wound affecting the auricle or ventricle of red blood, the aorta, or its great branches, when a ligature is artificially applied to the latter, or an aneurism bursts, &c. the functions of the lungs cease in the following order: 1. No more impulse communicated to the brain; 2. No more motion of that organ; 3. No more action exerted on the muscles, and consequently no more contraction of the intercostals and diaphragm; 4. No more mechanical phenomena. Without the latter, the chemical phenomena cannot take place: in the foregoing case, they were stopped for want of blood; in this, they cease from the interruption in the supply of air.

The preceding observations are derived from the *Recherches Physiologiques* of Bichat. In the 6th, 7th, 8th, and 9th articles of the second part of that work, he has entered at length into the consideration of the influence of the lungs on the heart, the brain, and the organs of the body in general; of which subjects he has given more clear and connected views than any other physiologist. We shall, therefore, avail ourselves of his labours in this concluding division of the present article.

Influence of the Death of the Lung upon that of the Heart.—The cessation of action in the lungs may begin either in the mechanical or the chemical phenomena. A wound exposing them extensively on both sides of the chest, and producing their sudden collapse; a division of the spinal marrow suddenly paralyzing the intercostal muscles and diaphragm; are cases in which the death of the lungs begins in the mechanical phenomena. It commences in the chemical, in asphyxia from noxious gases, from strangulation, submersion, exposure in vacuo, &c.

The heart's action can be interrupted by the cessation of the mechanical phenomena of the lungs only in two ways: 1. Directly, if the blood meets in the lungs with a real mechanical obstacle to its circulation; 2. Indirectly, because where the mechanical action of the lungs ceases, they no longer receive air, which is necessary to their chemical phenomena, the cessation of which interrupts the action of the heart.

All physiologists have admitted that the pulmonary circulation is interrupted in the former of these two ways. They have conceived, that where the lung is not distended, its vessels are folded and compressed, and therefore transmit the blood with difficulty: and by this explanation, derived from hydraulic phenomena, they have accounted for the death which ensues, where expiration is too long continued.

Goodwyn proved that a sufficient quantity of air remained in the pulmonary vessels to allow mechanically the passage of the blood; and, consequently, that protracted expiration is not fatal in the way commonly supposed. (Con-
nection

section of Life with Respiration, &c.) An experiment, which any one may very easily perform in his own person, will prove that point very easily. Let him expire as fully as possible, and not inspire again: the pulse is not changed, and consequently the circulation through the lungs is not impeded. But the numerous and varied experiments of Bichat place the subject beyond all doubt. Exhant, says he, the lungs of an animal, by means of a syringe inserted in the trachea, and open the carotid artery. Here the circulation ought to be suddenly interrupted, according to the common supposition, since the pulmonary vessels are reduced from their ordinary degree of distention to the greatest possible collapse and folding: yet the blood continues for some time to be forcibly thrown out of the opened artery, and must consequently circulate through the lung in this state of extreme collapse. The same circumstance is observed when the lungs collapse, in consequence of the thorax being opened on both sides; even if, in addition to this collapse, we exhaust the air more effectually with a syringe.

The pulmonary circulation is continued, and even performed with facility, when collections of water, pus, or blood, exist in the chest, and diminish, in a very considerable degree, the air-cells of the lungs; and when, consequently, the angles and folds of the vessels, if they are found at all, must be very considerable. We may conclude, then, that the interruption of the mechanical phenomena of respiration does not stop the heart's action directly; but that it operates indirectly, by cutting off the supply of the material, which is necessary for the exercise of the chemical phenomena.

The death which succeeds to protracted inspiration has been ascribed to the mechanical distention of the pulmonary vessels by the air, which has been supposed to impede the circulation through them. But this explanation is as ill-founded as that which we have just considered. Distend the lungs of an animal by injecting a large quantity of air, and confine this by a stopcock fastened in the trachea; then open the carotid artery. The blood continues to flow for some time with its natural freedom.

Two opinions have been entertained concerning the manner in which the interruption of the chemical phenomena of the lungs produces a cessation of the heart's action. According to Goodwyn, the black blood does not stimulate the left ventricle; so that, in his manner of viewing asphyxia, death takes place, because that cavity sends nothing to the different organs. Its source, therefore, is exclusively in the heart. Bichat conceives, that when the chemical phenomena of the lungs are interrupted, there is a general affec-tion of all the organs: that the black blood carries to every part debility and death, so that the organs do not cease to act because they receive no blood, but because they receive no red blood. The effects of the contact of black blood on the organs of the body will be illustrated presently; we shall consider here the phenomena of its contact with the parietes of the heart.

Many circumstances shew that the black blood is capable of stimulating the left ventricle, so as to excite it to contraction. If this were not the case, death should commence in asphyxia with the cessation of the heart's action, and the annihilation of the functions of the brain should be secondary. But, kill an animal by stopping the trachea, by placing it in vacuo, by drowning, or immersion in noxious gases, &c. and you will constantly observe, that the animal life is first interrupted, that the sensations, motions, and voice are suspended, so that the animal is dead externally, while the heart still beats and the pulse is kept up for some time. The different organs, therefore, do not cease to act in asphyxia,

because the heart sends them no blood, but because it sends a kind of blood which is not suited to them.

Let the trachea of an animal be stopped and an artery opened, the blood issuing from the latter is at first red, then grows gradually darker, and at last is black venous blood. Nevertheless, it is still expelled for some time with considerable force. If the lungs be exhausted by a syringe, previous to closing the trachea, and an artery then opened, black blood comes from it immediately, without going through the shades mentioned before, and a tolerably strong jet is kept up for some time. If the black blood did not possess the power of exciting the left ventricle, its flow should be suddenly interrupted in this case, where it can undergo no change from the lung, and exists in the aorta in the same state as in the venæ cavae.

It is moreover stated by Bichat, that he has re-excited the contractions of the left ventricle, after they had ceased in various kinds of violent death, by injecting black blood through one of the pulmonary veins. It is obvious too, that when suspended respiration is restored by inflating the lungs, the left ventricle must first propel the black blood with which it is loaded, before the red blood can arrive at the lungs. The heart of red blood has, therefore, the power of impelling black blood into all the organs; and in this way we explain the peculiar colour of the different surfaces in asphyxia.

The mere contact of black blood has no more sensible action on the internal surface of the arteries than on that of the heart. If, when the trachea is closed, an artery of the foot be opened, the blood is propelled from it for some time with the natural force.

"From these considerations and experiments we may conclude," says Bichat, "that the black blood has the power of exciting the internal surface, and determining the action of the heart and arteries; and that if no other cause interfered with their functions the circulation might be continued, not, perhaps, with equal force, but at least in a very sensible manner. What then are the causes which interrupt the circulation in the heart of red blood and in the arteries, when the lung transmits to them only black blood? For when the latter has flowed for some time, the jet is gradually weakened, and at last entirely ceases: if the stopcock fixed in the trachea be now opened, it is again speedily restored. I believe that the black blood acts upon the heart as upon all other parts, as we shall see that it influences the brain, the voluntary muscles, the membranes, &c.; that is to say, by penetrating its tissue, by debilitating each individual fibre. I am well convinced, that if black blood could be circulated in the coronary vessels, while the red should pass as usual through the left auricle and ventricle, the circulation would be interrupted almost as quickly as in the preceding cases." We conclude then, in general terms, and without attempting to determine how this takes place, that the heart's action ceases when the chemical phenomena of the lungs are interrupted, because the black blood, which penetrates its muscular fibres, is not capable of keeping up their action.

In this view of the subject, the right ventricle will be as much affected as the left, since the black blood is distributed equally to the fibres of each. Yet the latter ceases to act first, and this is so constantly and well known a fact, that the right side of the heart has been called the *ultimus moriens*. This arises, as Haller has already clearly explained, from the circumstance of the right cavities being longer excited than the left. (See HEART, and CIRCULATION.) It does not prove that the left ventricle dies first in asphyxia. If that were the case, the left auricle and ventricle should be distended with blood after death, and this distention should

be propagated from them into the pulmonary veins and right side of the heart; that is to say, the congestion of blood should begin in the reservoir which first ceases to act, and it should be propagated from that into the others. The examination of animals, who have perished from asphyxia, shews us, on the contrary, that the cavities of red blood and the pulmonary veins contain but a small quantity of black blood in comparison with that which distends those of the opposite side; that the point at which the blood has stopped is principally in the lung, from which we are to trace its stagnation in the whole venous system; and that the arteries contain as much in proportion as the corresponding ventricle, so that death cannot be supposed to have begun in it rather than in any other part.

Bichat states afterwards, that he cannot entirely reject the notion of the less aptitude of the black blood to stimulate the left ventricle. When an artery is opened, a stopcock being fixed in the trachea and closed, the jet of blood is gradually weakened; open the stopcock, and the blood becomes again immediately red, and is thrown out more forcibly. This change is too sudden to admit of our accounting for it by the red blood penetrating the tissue of the heart. Yet it may happen from the powerful motions of inspiration and expiration which the animal makes as soon as air enters the chest. For if an artery be opened, and respiration thus hurried, the jet of blood will be manifestly increased. On the whole, therefore, even if it be allowed that red blood is a more powerful stimulus to the heart than black, the excess must be very trifling.

In connection with this subject, we may consider the explanation of the remarkably distended state, in which the pulmonary artery, the right cavities of the heart, and the venous system are found in instances where death commences in the chemical phenomena of the lungs, compared with the comparatively empty condition of the system of red blood. The phenomenon is so remarkable as to have attracted the attention of all who have opened the bodies of animals killed by asphyxia; it has been commonly explained by the folds of the pulmonary vessels, which we have already considered.

The lungs are found in two very different states, according to the manner in which life ends: when death is instantaneous, they are not loaded with blood; the auricle and ventricle of black blood, the pulmonary artery, and the general venous system, are not remarkably distended. On the contrary, when the chemical phenomena of respiration are slowly destroyed, when an animal has been kept as long as possible in the distress and anguish which attend interruption of the functions of the lungs, these organs are extremely loaded with blood, and distended to a volume very far exceeding that which they present in the other case. In whatever condition the lungs of an animal, which has perished by asphyxia, may be found, whether they be loaded or empty, and consequently whether death have been brought on slowly or suddenly, the vascular system of black blood is always full of this fluid, particularly about the heart; there is constantly a great difference in this respect between it and the vascular system of red blood, and consequently the principal obstacle to the circulation is in the lung.

Bichat explains this phenomenon from certain considerations connected with the blood, the lung, and the heart.

1. The black blood circulating in the arteries is incapable of furnishing to the organs of secretion, exhalation, and nutrition, the various materials necessary for the exercise of those functions; or if it conveys the materials, it cannot excite the organs. Hence, the venous system receives an unusually large quantity of blood, as all that portion, which

is ordinarily removed by the functions just mentioned, enters it; and the difficulty of the passage through the lungs is proportionally augmented. All observers have been struck by the great abundance of blood found in the vessels in these cases.

2. The lung is no longer excited by red blood: the bronchial vessels carry black blood to it, and hence its powers are enfeebled, as those of the heart are by the same fluid conveyed to it by the coronary arteries. Again, the pulmonary capillary system contains nothing but black blood. That the tonic powers, by which the circulation is carried on in those vessels, must be much depressed from this cause, cannot be doubted. Moreover, the habitual excitation of the mucous surfaces by the atmospheric air is interrupted; and this must assist in lowering the tonic powers.

3. The auricle and ventricle of black blood act more weakly, and are less capable of surmounting any resistance in the lung in consequence of their fibres being penetrated by black blood. They can no longer resist the blood brought by the *venæ cavæ*, and become distended by it.

These considerations seem to account satisfactorily for the distention of the system of black blood in asphyxia; we have next to explain why the system of red blood contains a quantity comparatively so small. As the obstacle exists in the lungs, a smaller quantity arrives at the left side of the heart. The natural strength of the left ventricle and the arteries exceeds that of the right and the veins; consequently the former can more easily overcome the resistance of the capillaries of the body in general, than the latter can that of the pulmonary capillaries. Again, there is only one cause of retardation in the general capillary circulation, *viz.* the contact of black blood with the organs; while there is added to this cause in the lungs, the absence of the habitual excitation produced by the atmospheric air. Thus, we find in the lungs more resistance to the blood brought by the veins, and less force to overcome that resistance; while in the body in general the obstacles at the junction of the arteries and veins are more feeble, and the force tending to overcome them is greater.

Although the general capillary system offers less resistance to the arteries, than the pulmonary capillaries do to the veins in asphyxia, yet there is a manifest obstruction even here; and it gives rise to two remarkable phenomena. Black blood is collected in the arteries in a much greater quantity than usual, although in a smaller proportion than in the veins; hence injection succeeds badly in such subjects. The accumulation of black blood in the extremities of the arteries gives a livid colour to all the surfaces of the body, and a bloated appearance to the various parts, as the face, tongue, lips, &c. These two phenomena indicate a congestion of black blood in the arterial extremities, as the analogous appearances of the lungs denote a difficulty of passage through the pulmonary capillaries, where indeed the congestion is much more manifest, because the system is concentrated within a small space, while the other is spread over the whole body.

Influence which the Death of the Lung produces on that of the Brain.—The black blood acts upon the brain as it does on the heart; that is, by penetrating its tissue, and depriving it of the excitation necessary for keeping up its action. What we have said concerning the heart is therefore equally applicable to this subject. The experiments of Bichat on this point have been very numerous and diversified. He first transfused through a tube the blood of the carotid of one dog into the carotid of another: this does not hurt the animal if a vein be opened to obviate plenitude of the vessels.

It proves that the contact of extraneous red blood does not injure the cerebral functions. He then opened the jugular vein and carotid artery of a dog, received the blood of the former in a syringe heated to the temperature of the body, and injected it into the latter. The animal was almost immediately agitated; the respiration was hurried, and the distressing kind of suffocation that belongs to asphyxia was produced. Soon all the symptoms of the latter state appeared; the animal life was entirely suspended; the heart still continued to beat, and the circulation went on for half an hour, at the end of which time the organic life also was extinct. This experiment was often repeated, and invariably with the same result: about six ounces of black blood were injected. If the point of the syringe was inserted into the vein, so as to draw up the blood without any possibility of its coming in contact with the air, the result was the same, except that death came on rather more slowly. Various other substances, such as ink, oil, wine, water coloured blue, urine, bile, mucous fluids, produced the same effects. That the fatal effects arise in these cases from the action of the black blood, &c. on the brain, and not on the internal surface of the arteries, is proved by injecting them into the crural artery; the injection is never mortal, although numbness and even paralysis generally follow. If blood be taken from the carotid artery of an animal who is suffering asphyxia, and injected into that of another, the same effects with those already mentioned are produced. Also, if the carotids of two dogs are united by a silver tube, so that the heart of the one sends its blood to the brain of the other, and a stopcock be placed in the trachea of the former, no bad effect is produced, so long as that remains open. Close the stopcock, and black blood will be sent instead of red. Now, the dog whose carotid receives this blood becomes confused and agitated, drops his head, and loses his senses; but these phenomena come on more slowly than when black blood taken from the venous system is injected into the artery. If the transfusion be stopped, the symptoms of asphyxia may go off, and the animal recover; but death invariably follows the injection of black blood with a syringe.

In summing up his experiments, Bichat concludes, that the nature of the principles contained in the black blood render it either incapable of exciting the action of the brain, or actually injurious to the organ; but he cannot decide whether its influence is exerted negatively or positively.

He proceeds to make some interesting observations on the nature and treatment of asphyxia. "We might conclude," says he, "from the above-mentioned facts, that the best mode of treating those who are suffering from asphyxia, would be to impel into the brain red blood, which is its natural stimulus. Two points of time should be distinguished in asphyxia; 1, that in which the central functions alone are suspended; 2, when the circulation as well as the movements of the chest have stopped; for, in this affection, the animal life is first suddenly extinguished, and the organic ceases after a certain interval. In the first of these periods, the transfusion of red blood towards the brain, from the carotid of another animal, gradually re-animates the powers of motion; the cerebral functions are partly restored, and the arrival of blood in the brain is often announced by sudden agitations of the head, eyes, &c.; but this improvement soon disappears, and the animal relapses for the cause continues, as for example, if the stopcock in the trachea remains shut. On the other hand, if the stopcock be opened in this first period, the arrival of fresh air in the lungs almost always gradually re-animates these organs. The blood assumes the red colour, and is sent in that state to the brain,

and life is restored without transfusion, which is completely ineffectual in the second period of asphyxia, that is, when the organic movements, particularly those of the heart, are suspended. The transfusion of red blood towards the brain does not, therefore, afford us any remedy in the case of asphyxia. Neither does it succeed after the injection of venous blood into the brain by means of a syringe, which is invariably fatal. Asphyxia produced by injecting blood taken from the vein into the brain is more prompt and certain, than that occasioned by the gradual change of the red into black blood, consequent on interrupted respiration; and the nature of the two cases is manifestly different."

The phenomena of asphyxia, as observed in the human subject, coincide very well with what is observed in experiments on animals. In all cases the brain is first affected, its functions are annihilated, and the animal life, particularly so far as regards the senses, ceases; the internal functions are subsequently arrested. When asphyxia is produced in an animal with an artery open, it is curious to observe how the affection of the brain coincides with the change of colour in the blood, while the energy of the heart is unabated. Most of those who have been exposed to asphyxia, and have escaped suffocation, have experienced only a general kind of benumbing or paralysis, the seat of which is manifestly in the brain; while all in whom the pulse and heart have ceased to beat, certainly die. Almost all who have recovered say, that they felt first more or less violent pain in the head, produced probably by the first contact of black blood with the brain. Bichat considers the common notions of the effects of charcoal vapours on the head, and the expressions concerning the heaviness, giddiness, &c. produced by them, as strong proof that the first influence is in fact exerted on the brain. He observes further, that many individuals who have recovered from asphyxia produced by this cause, exhibit, for a longer or shorter period, various affections of the intellectual functions and voluntary motions, as for instance confusion of ideas, and unsteady motions of the lower limbs; the same effects, in a smaller degree, which apoplexy produces more sensibly. Convulsive motions have sometimes taken place almost immediately after exposure to mephitic vapours; and a pain in the head has often lasted many days after the disappearance of the other symptoms.

From the foregoing considerations, Bichat deduces the following conclusions; 1st, that when the chemical phenomena of the lungs are interrupted, the black blood acts upon the brain as upon the heart, that is, by penetrating its tissue, and thereby depriving it of the excitation necessary to its action; 2dly, that its influence is much more promptly exerted on the former than on the latter of these two organs; 3dly, that the inequality of their influence determines the difference observed in the cessation of the two lives in asphyxia, where the animal always ceases before the organic. Hence we may infer, how unfounded the opinion is, that in those who are executed by the guillotine, the brain still continues to live some time, and that sensations of pleasure and pain may still be referred to it. The action of this organ is intimately connected to its double excitation; 1st, by the motion, and 2dly, by the nature of the blood which it receives. As this excitation is suddenly interrupted in that mode of death, all feeling is as suddenly suspended.

Influence of the Death of the Lung on that of the Organs of the Body in general.—Bichat commences his view of this subject by examining the changes of colour which the blood undergoes when the chemical phenomena of the lungs are interrupted. He found the best method of observing these changes to be by fixing a stopcock in the trachea of an

animal, by which the quantity and kind of air introduced into the lungs can be regulated, and placing a small tube with a stopcock in an artery, as the carotid or crural, which enabled him to ascertain how the blood was altered.

1. When the stopcock is closed immediately after an inspiration, the blood grows darker in thirty seconds; it has acquired a deep tint in a minute, and it possesses entirely the appearance of venous blood in a minute and a half, or two minutes.

2. The production of the black colour takes place more quickly by several seconds, if the stopcock be shut after expiration, particularly if it has been a complete one.

3. If the air be drawn out of the lungs by a syringe, the blood becomes immediately black: twenty or thirty seconds are sufficient for the change. No successive gradations of colour are observed.

4. If the lungs be extended by injecting air into them, and closing the stopcock, a longer time is necessary for changing the blood into the black state: three minutes will then be required.

These phenomena are observed in the passage of the animal from a state of asphyxia to death: a series of an opposite nature is seen when it is restored from asphyxia to life.

1. When the stopcock, after being closed for some minutes, is opened, the animal immediately performs six or seven great inspirations and expirations. A jet of red blood succeeds the black, which was flowing before: and the interval between the two is at most thirty seconds. There is no successive change of tint, but a certain and decided alteration.

2. If a small quantity only of air be admitted, the change of colour is less considerable.

3. If fresh air be injected, and the stopcock then closed, the blood becomes red, but less manifestly than when the air is admitted by voluntary respiration: in the latter case the animal first expels the air that had become spoiled.

4. If the air inclosed in the lung be drawn out by a syringe, and fresh air injected, the change of colour is effected more rapidly than in the preceding case.

5. When the lung is exposed by cutting through the ribs, the circulation is continued for a certain time. If it be alternately distended and emptied by means of a syringe, the red and black colours are still produced so long as the circulation is kept up.

From the rapidity with which the blood, in these experiments, is changed from black to red on opening the stopcock, we cannot help concluding that the principle which causes this alteration passes directly from the lung into the blood, through the membranous lining of the air-cells. The acceleration of the motions of the heart in animals undergoing asphyxia, as in the famous experiment of Hook, by injecting air into the trachea, must be referred to the red blood penetrating the fibres of the heart, and putting an end to the debility which the contact of black blood was producing. Yet this method will never re-produce the motions of the heart when they have been once annihilated by the contact of black blood. Bichat has often tried this without success. The heart, says he, cannot be re-animated by the action of the air, unless the blood, coloured by that fluid, could penetrate the organ. When the circulation is stopped, how can this take place?

Hydrogen and carbonic acid gases were employed in respiration by filling bladders with them, and fixing them to the tube in the trachea. The bladder is alternately distended and emptied as the animal expires and inspires. He is at

first tolerably quiet, but in about three minutes begins to be agitated; respiration becomes hurried and troubled, the blood flowing from an artery grows darker, and is black at the end of four or five minutes. There was very little difference in the time required for the change, or intensity of the colour, whichever of the two gases was employed.

The reason why the change of colour takes place more slowly when these bladders are adapted to the stopcock, than when the latter is closed, seems to be, that the air contained in the trachea and its branches is repeatedly thrown from the lung into the bladder, and *vice versa*; so that its whole respirable proportion is successively presented to the blood. This motion cannot take place in the latter case; so that as soon as the pure part of the air contained in the bronchial cells is exhausted, the blood is no longer converted into the red state, although the trachea and its large divisions still contain a considerable quantity of air capable of serving the purposes of respiration. It appears that the conversion of the blood goes on only at the extremities of the bronchial ramifications, and that the internal surface of the large air-vessels has no connection with this phenomenon.

We have already seen that the action of the heart continues for some time after the chemical phenomena of the lungs have been interrupted; the arterial circulation is therefore still maintained, although the arteries contain a different fluid from that which is natural to them; and the organs of the body, accustomed only to the red blood, become penetrated, in consequence of this circulation, by black blood. Bichat has proved this by exposing various parts in an animal, while the stopcock in its trachea was closed, and the animal was consequently undergoing asphyxia. He has examined in this way the muscles, the nerves, the skin, mucous and serous membranes, and the granulations of wounds, and found that the black blood penetrated them all, and produced more or less conspicuous alterations in their colour, which was rendered either brown or livid. The phenomenon is very obvious in the skin, which always presents more or less extensive livid spots in asphyxia. These can only be explained by the existence of an obstacle to the transmission of the blood in the general capillary system: in the same way we account for the swelling of various parts, as the cheeks, lips, and head in general.

The black blood does not penetrate at all into some parts of the general capillary system, and the natural colour is consequently preserved: in others it manifestly enters and is obstructed, producing a dark colour at the part, and moreover a tumefaction, if it enters in large quantity: or, lastly, it may pass this system and enter the veins. In the two former cases the general circulation is arrested in the capillary system; in the latter, which is the more general, the course of the blood is suspended in the capillaries of the lungs.

The fact that the black blood continues to be circulated for some time after the chemical phenomena of the lungs have been interrupted, explains a phenomenon, which must have been observed by all who are much employed in dissections; *viz.* that in the dead body we meet with black blood only, even in the vessels which naturally carry red blood. However death may be produced, the functions of the lungs are troubled in the last moments of existence, and end before those of the heart. The blood still moves, although it no longer receives the influence of the air: it is therefore circulated black for a certain length of time, and remains in that state in the organs, although the circulation is much less evident than in asphyxia.

After having shewn that the interruption of the chemical phenomena of respiration prevents the black blood from being

being converted into the red state, and that this black blood is circulated through the body by the still surviving action of the heart, Bichat proceeds to shew that the black blood is not capable of maintaining the vital powers and activity of the organs, which are therefore killed by its contact. The red blood, he says, gives to the organs their natural and healthy excitation, by which their vital powers are supported. Possibly this effect may be produced by the combination of the different principles that colour it, with the various organs in which it is contained.

The organs of the animal and of the organic life have their actions terminated in different ways. The former, being entirely dependent on the brain, have their functions suspended as soon as those of the brain cease. We have already shewn that the contact of black blood produces the latter effect almost instantly; consequently the organs of sensation, locomotion, and the voice, must be suddenly paralysed in asphyxia. But the circulation of the black blood produces still further effects: when it penetrates the nerves, it renders them incapable of keeping up the communication between the brain and the senses on one side, and the locomotive and vocal organs on the other. The contact of the black blood with the organs themselves also annihilates their action. Inject into the crural artery of an animal blood drawn from one of its veins; the motions are soon weakened very perceptibly, and sometimes a momentary paralysis is produced. The effect cannot be ascribed to tying the artery, for that alone is often attended with no such consequence, whereas the result of injecting black blood is always the same, except indeed that it varies in duration and intensity. Sensation is also manifestly suspended in this experiment, but later than the power of motion. The effect is always produced, particularly if the injection of black blood be repeated three or four times at small intervals.

The organs of the internal life being independent of the cerebral action, have not their functions arrested, like those of the external life, by the suspension of that action. It is the contact of the black blood only that acts in this case, and consequently the death of these organs has one cause less than that of the locomotive and vocal parts, &c. We have already explained the influence of the black blood on the organs of circulation, and have shewn how the heart ceases to act as soon as it is thoroughly penetrated by that fluid. Its circulation in the vessels of the coats of the arteries and veins weakens those tubes, and suspends their action. It must be exceedingly difficult, if not impossible, to bring forward any strict proof that the secretions, exhalation, and nutrition cannot derive from the black blood materials suited to their offices; for that blood does not circulate in the arteries long enough to admit of our making experiments on those functions. We must rely, therefore, chiefly on the analogy of what happens in other parts, to prove that the organs of secretion, exhalation, and nutrition have their functions interrupted when black blood is sent to them. This statement is very much corroborated by the quantity of blood found in the vessels of those who have perished by asphyxia; it is so large as to be very troublesome in dissecting such bodies, which might naturally be expected when the usual outlets of the secretions, &c. are stopped.

From the preceding considerations Bichat concludes, that when the chemical functions of the lungs are interrupted, all the organs of the body cease to act simultaneously, in consequence of the contact of black blood; that their death coincides with that of the heart and brain, although it is not derived immediately from that cause; that, if it were possible for these two organs to receive red blood, while black was sent to the others, the functions of the latter would cease,

while those of the former would be continued: in a word, that asphyxia is a general phenomenon, taking place at the same time in all the organs, and not more decidedly marked in any particular one.

By resumming and comparing what has been said concerning the influence of the lungs on the heart, the brain, and the organs in general, we shall easily form an idea how all the functions successively terminate, when the respiratory phenomena are interrupted. When the mechanical phenomena are suspended; 1, there are no more chemical phenomena, for want of air to support them; 2, no more action of the brain, for want of red blood to excite it; 3, cessation of the animal life, that is, of the sensations, locomotion, and the voice, because the organs are no longer excited by the brain, nor by red blood; 4, cessation of the general circulation; 5, cessation of the capillary circulation, of secretion, absorption, and exhalation, in consequence of the organs of those functions being no longer excited by red blood; 6, no more digestion, for want of secretion and excitation of the digestive organs, &c.

When the chemical functions of the lungs are interrupted, the phenomena of death succeed in a different order: 1, interruption of the chemical phenomena; 2, suspension of the action of the brain; 3, cessation of the sensations, and of voluntary motions, consequently of the voice, and the mechanical phenomena of respiration; 4, stoppage of the heart's action, and of the general circulation; 5, termination of the capillary circulation, of the secretions, exhalation, absorption, and consequently of digestion; 6, annihilation of animal heat, which is the result of all the functions, and which does not leave the body until every kind of vital process is extinguished. In whatever function death may begin, it always ends in this.

There is a very intimate connection between the brain and the lungs: as soon as the former ceases to act, the functions of the latter are interrupted. This phenomenon, which is constantly observed in warm-blooded animals, can happen only in two ways: 1, because the action of the brain is directly necessary to that of the lung; or 2, because the latter receives from the former an indirect influence through the intercostal muscles and diaphragm, an influence which ceases as soon as the brain becomes inactive.

The lung can influence the brain directly only through the par vagum and the great sympathetic nerve. Irritation of the former renders respiration hurried, but this is an effect produced by any considerable pain. Division of one nerve of the eighth pair affects the breathing for a time: but this goes off, and the respiratory functions are then carried on with their accustomed regularity. If both nerves are cut, respiration is still more hurried: it does not return to its ordinary rate, as in the preceding experiment, but continues laborious for four or five days, when the animal perishes. Hence we see that the eighth pair is necessary to the pulmonary functions, and consequently that the brain has some influence on these functions: but the agency is not a very active or important one, since the functions of the lung are continued for a long time without it, and consequently respiration is not suddenly stopped, through its interruption in injuries of the brain. Experiments shew that the interception of the influence derived from the great sympathetic is equally inadequate to interrupt the functions of the lungs.

Since the lung is not affected immediately from the interruption of the action of the brain, there must be some intermediate organs, through which the former is acted on by the latter. These are the muscles of respiration. Subject, by the nerves which they receive, to the immediate influence of the brain, they become paralytic as soon as the action of

the

the latter has ceased. If the spinal marrow be divided between the last cervical and first dorsal vertebra, the intercostal muscles are paralysed, and respiration is carried on by the diaphragm only. If the phrenic nerves be cut, the diaphragm is rendered motionless, and the intercostals alone perform breathing. In either of these cases life may be continued for some time. But if the phrenic nerves and the spinal marrow about the bottom of the neck be both divided; or, which comes to the same thing, if the spinal marrow be cut through above the origin of the phrenic nerves, all communication between the brain and the agents of respiration is suspended, and death immediately follows. The difference of half an inch in the height at which the section is made is so important, that, if it be done at one point, the animal shall live fifteen or twenty hours, if half an inch nearer to the brain, he will die immediately. In the former case it is below, in the latter above the origin of the phrenic nerve: in the one instance respiration and consequently life ceases, because the diaphragm and intercostal muscles can act no longer; in the other the diaphragm carries on the respiratory functions, and consequently supports life for some time.

The facts just detailed shew, that when the nervous system is injured above the origin of the phrenic nerves, the phenomena of death succeed in the following order: 1, suspension of the action of the voluntary nerves below the injury, and consequently of the intercostal and phrenic; 2, paralysis of all the muscles of the animal life supplied by those nerves, particularly of the diaphragm and intercostal muscles; 3, cessation of the mechanical phenomena of respiration, for want of the agents necessary to those phenomena; 4, annihilation of the chemical phenomena. The interruption of all these motions is as rapid as their succession is quick in the natural order. Death comes on in this way from a division or compression of the medulla spinalis near the brain, from a luxation of the second vertebra, from concussion or compression of the brain, &c.

Thus we see that respiration is a function of a mixed kind, placed in a manner between the two lives, and serving as their point of contact, belonging to the animal life by its mechanical, and to the organic by its chemical phenomena. Hence the activity of the lung depends as much on that of the brain, which is the centre of the former, as on that of the heart, which is the central organ of the latter.

LUNGS, *Consumption of*. See CONSUMPTION.

LUNGS, *Dropsy of*. See DROPSY.

LUNGS, *Inflammation of*. See PERIPNEUMONY.

LUNGS, *Polypus of the*. See POLYPUS.

LUNGS, *Wounds of the*. See WOUNDS.

LUNGS *of Insects*. See ENTOMOLOGY and INSECTS.

LUNGS, *Sea*, in Zoology. See MEDUSA.

LUNGS, *Ship's*. See VENTILATOR.

LUNGSARP, in Geography, a town of Sweden, in West Gothland; 57 miles from Gotheborg.

LUNGSUND, a town of Sweden, in Warmeland; 25 miles N.E. of Carlstadt. N. lat. $58^{\circ} 48'$. E. long. $13^{\circ} 54'$.

LUNGU, a small island in the East Indian sea, near the coast of Queda. N. lat. $6^{\circ} 39'$. E. long. $99^{\circ} 42'$.

LUNG-WORT, in Botany, &c. See PULMONARIA.

LUNG-WORT, *Cow's* or *Bullock's*. See VERBASCUM.

LUNISOLAR, in Astronomy and Chronology, denotes something composed of the revolution of the sun, and of that of the moon.

LUNISOLAR Year, is a period of years made by multiplying the cycle of the moon, which is nineteen, by that of the sun, which is twenty-eight; the product of which is

five hundred and thirty-two; in which space of time those two luminaries return to the same points.

LUNKA, in Geography, a town of Samogitia; 40 miles N.E. of Miedniki.

LUNTENBURG, or BRZEDSLAW, a town of Moravia, in the circle of Brunn; 36 miles S.E. of Brunn.

LUNTZ, a town of Austria; 15 miles S.E. of Bavarian Waidhofen.

LUNULA, in Geometry. See LUNE.

LUNULA, the Half-moon, among the Romans, an ornament the patricians wore on their shoes.

LUNULA was also an ornament in form of a moon, worn by the ladies.

LUNULAR ANGLES. See ANGLE.

LUNULARIA, in Botany, so called from the crescent-shaped calyx, as it is now thought to be, of the male flowers. Mich. Gen. 4. t. 4. See *Marchantia cruciata* of Linnæus, who by mistake cites it by the name of *Lunaria*.

LUNULATUM FOLIUM. See LEAF.

LUOPIOIS, in Geography, a town of Sweden, in the province of Tavastland; 23 miles N. of Tavasthus.

LUPANNA, an island in the Adriatic, near the republic of Ragusa, which has a good and safe harbour. The soil, though stony, is by the industry of the inhabitants rendered fertile. The coasts abound with fish.

LUPARA, a town of Naples, in the Molise; 17 miles N.E. of Molise.

LUPATA, a chain of African mountains in Mocaranga. S. lat. 13° to 17° .

LUPERCALIA, feasts celebrated in Greece, and at Rome, in honour of the god Pan.

The word comes from *Lupercal*, the name of a place under the Palatine mountain, where the sacrifices were performed.

The Lupercalia were celebrated on the fifteenth of the calends of March, that is, on the fifteenth of February; or, as Ovid observes, on the third day after the ides. They are supposed to have been established by Evander, or brought by him from Arcadia into Italy. The Arundel Marbles ascribe the institution of these feasts to Lycaon, king of Arcadia, who afterwards polluted them by sacrificing human victims. This feast, after having been interrupted for some ages, was re-established in Athens, in the time of Pandira, as we learn from the 10th era of the same marbles. Lycurgus abolished at Lacedæmonia the barbarous custom of offering human victims. Valerius Maximus is of opinion, that this festival was only introduced in the time of Romulus, at the persuasion of the shepherd Faustulus.

On the morning of the feast, the Luperci, or priests of Pan, ran naked through the streets of Rome, striking the married women they met on the hands and belly with a thong, or strap, of goat's leather; which was held an omen promising them fecundity and happy deliveries.

The reason of this indecent custom, in celebrating the Lupercalia, took its rise, as it has been said, from Romulus and Remus: for while they were assisting at this feast, a body of robbers, taking hold of the occasion, plundered them of their flocks. Upon this the two brothers, and all the youth that were with them, throwing off their clothes, to be the more expedite, pursued the thieves and recovered their prey. This succeeded so well, that henceforward this ceremony became a part of the Lupercalia.

This feast was abolished in the time of Augustus; but it was afterwards restored, and continued to the time of the emperor Anastasius. Baronius says it was abolished by pope Gelasius, in 469.

LUPERCI,

LUPERCI, a name given to the priests of the god Pan.

The Luperci were the most ancient order of priests in Rome; they were divided into two colleges, or companies; the one called *Fabii*, and the other *Quintilii*: to these Cæsar added a third, which he called *Julii*.

Suetonius mentions the institution of this new college of Luperci as a thing that rendered Cæsar more odious than he was: however, it appears from the same passage of Suetonius, that this new company was not instituted by Cæsar, nor in honour of Pan, but by some friends of Cæsar, and in honour of himself.

LUPI CREPITUS. See **CREPITUS**.

LUPI, DIDIER, in *Biography*, a good harmonist. In the sixteenth century he set to music the spiritual songs of Guillaume Guerret, published in 1548. He is mentioned by Rabelais in the prologue of his fourth book.

LUPIA (from *λπιω*, to mangle,) denotes, in *Surgery*, a tumour of the ganglion kind, or, according to Cullen, a wen.

LUPIÆ, in *Ancient Geography*, a town and colony of Italy, in Messapia, supposed to have been near the site of the modern Lecce; 24 miles S.E. of Brundisium; but in that vicinity no vestige of antiquity remains.

LUPINASTER, in *Botany*, Bastard Lupine; a name given by Buxbaum and Ammann to a Siberian species of Trefoil, *Trifolium Lupinaster* of Linnæus.

LUPINE, the common name of a species of wild pea, cultivated principally for being turned in as a manure.

This plant requires but little trouble or labour in its cultivation, as it will thrive in any soil, except the bad chalky, and such as are very wet. It will even grow well upon poor, hungry, worn-out land, especially if it be dry and sandy. When sown in February or March, after a single very shallow ploughing, and slightly harrowed in, it will blossom two or three times between May and August, and prove an excellent enricher of the ground when ploughed in, just after its second blooming. The best time for mowing this sort of crop, is after a shower of rain, as the seeds drop easily out of the pods when they are gathered too dry. They must, however, be laid up very dry, or worms soon breed in them. They are inferior to many other plants for the above use.

LUPINUS, in *Botany*, so called by Pliny and other ancient writers. Professor Martyn says that the word owes its origin to *lupus*, a wolf, because plants of this genus ravage the ground, by over-running it, after the manner of that animal. *Lupinus* is also said to be derived from *λυπε*, grief, whence Virgil's epithet, *tristes lupini*, from the fanciful idea of its acrid juices when tasted producing a sorrowful appearance in the countenance. Both these ideas are avowedly taken from Vossius.—Lupine.—Linn. Gen. 371. Schreb. 492. Willd. Sp. Pl. v. 3. 1022 Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 1. v. 3. 28. Loureir. Cochinch. 429. Tournef. t. 213. Juss. 354. Lamarck Dict. v. 3. 620. Illustr. t. 616. Gærtn. t. 150.—Class and order, *Diadelphia Dican-dria*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminosæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, cloven. *Cor.* papilionaceous: standard heart-shaped, roundish, emarginate, its sides reflexed, compressed; wings nearly ovate, almost the length of the standard, not affixed to the keel, joined together in the lower part; keel cloven at the base, falcate in the upper part, pointed, undivided, of the same length but narrower than the wings. *Stam.* Filaments ten, all united, somewhat ascending, distinct above; anthers ten, five of them roundish, and as many oblong. *Pist.* Germen superior, awl-shaped, compressed, villous; style awl-shaped,

ascending; stigma terminal, obtuse. *Peric.* Legume large, oblong, leathery, compressed, acuminate, of one cell. *Seeds* numerous, roundish, compressed.

Ess. Ch. Calyx two-lipped. Five of the anthers round, five oblong. Legume leathery, torulose, compressed.

Obs. The calyx is subject to variations in different plants of this genus. Linnæus was acquainted with only seven species of Lupine, at least he has only described that number. Lamarck has seventeen in his dictionary; and Willdenow gives nineteen, which he arranges in three sections. *Se&.* 1. Herbaceous, with digitate or fingered leaves. *Se&.* 2. Shrubby, with similar leaves. *Se&.* 3. Herbaceous, with simple leaves.

Of the first section are

L. albus. White Lupine. Linn. Sp. Pl. 1015. (Lupini; Matth. in Diosc. v. 1. 392. *L. sativus*; Ger. em. 1217.)—Flowers alternate. Calyx without appendages; its upper lip emarginate, the lower undivided. A native of the Levant, cultivated in various parts of Italy and the south of Europe for food. The seeds are boiled; and afterwards steeped in water to extract their bitterness. It is common with the Romans to carry them in their pockets, eating them as they walk along in the streets. The flowers appear in July, the seeds in autumn.—*Stem* about two feet high, branched towards the top. *Leaves* fingered, composed of seven or eight narrow, oblong leaflets, hairy, of a darkish grey colour, covered with a silvery down. *Flowers* terminal, in loose spikes, white and sessile. *Legumes* straight, hairy, about three inches long, containing five or six seeds, which are roundish, flattened, extremely smooth and even, perfectly white, and unspotted.

L. luteus. Yellow Lupine. Linn. Sp. Pl. 1015. Curt. Mag. t. 140.—Flowers in whorls. Calyx with appendages; its upper lip cloven, the lower three-toothed.—A native of Sicily. It flowers in July and August.—*Stem* a foot high, branching. *Leaves* fringed, composed of seven, eight, or nine hairy leaflets. *Flowers* yellow, fragrant, in whorled spikes. *Legumes* ovate, flattish, hairy. *Seeds* ovate, a little compressed, yellowish-white, variegated with dark spots.—This is very commonly cultivated in flower-gardens, and should be sown in the spring with other annuals.

The second section consists of seven species, all natives of the Brazils or of Peru, and described originally by Lamarck only, from whom Willdenow has adopted them.

The third section comprises two fine species, *villosus* and *integrifolius*, of which we are not acquainted with any figure; the former is a native of Carolina, the latter of the Cape.—Loureiro describes two others of this section, *L. exchinchinensis* and *africanus*, but from the latter having its leaves ternate, like those of *L. trifolius*, Cavan. Ic. v. 8 t. 59, we are inclined to think it should be referred to some other genus.

LUPINUS, in *Gardening*, contains plants of the hardy, herbaceous, annual, and perennial showery kinds; of which the sorts mostly cultivated are, the white lupine (*L. albus*); the small blue lupine (*L. varius*); the narrow-leaved blue lupine (*L. angustifolius*); the great blue lupine (*L. hirsutus*); the yellow lupine (*L. luteus*); and the perennial lupine (*L. perennis*).

In the fourth sort there is a variety which has flesh-coloured flowers, and which is usually denominated the *royal* lupine.

Method of Culture.—These well-known flowering plants may be readily raised by sowing the seeds in patches in the borders, with other annuals in the spring, where they are to remain;

remain; thinning them afterwards where they are too close, and keeping them clean from weeds. In order to have a succession of flowers, the seed should be sown at different times, as in April, May, and June. The seed of those only which are first sown, however, ripens well. And in order to have good seed of the fourth kind, some seeds should be sown in a sunny border under a wall, or in pots placed under frames, the plants in the latter case being turned out and planted with balls of earth about them in the spring. The last sort should be sown at different times.

These are all useful plants for producing variety in the borders, clumps, and other parts of pleasure grounds and gardens.

LUPO, in *Geography*, a town of Hinder Pomerania, on a river of the same name; 15 miles E. of Stolpe.

LUPOGLAVO, a town of Iliria; 22 miles S.E. of Trieste.

LUPPURG, a town of Bavaria, in the principality of Neuburg; 16 miles N.W. of Ratibon.

LUPULUS, in *Botany*, the diminutive of *lupus*, a wolf, a name applied by the older botanists to the Hop, (see HUMULUS,) because, as the wolf preys upon other animals, so this plant, by immoderately impoverishing the soil in which it grows, starves its vegetable neighbours. Such at least is the explanation of Ambrosinus.

LUPUS, WOLF, in *Astronomy*, a southern constellation joined to the Centaur, whose stars in Ptolemy's Catalogue are nineteen; in the Britannic Catalogue, with Sharp's Appendix, twenty-four. See CENTAUR, and CONSTELLATION.

LUPUS SERVATUS, in *Biography*, a French abbot, celebrated for his learning, eloquence, and piety, descended from a considerable family in the diocese of Sens, was born about the commencement of the ninth century. He had from early youth a decided turn for theological pursuits, and in 828 he went to the abbey Fulda in Germany, where he studied the scriptures under the celebrated Rabanus, who, at his request, composed his "Commentaries upon the Epistles of St. Paul." He obtained considerable church preferment by the patronage of Lewis le Debonnaire, and Charles the Bald; and by the latter he was sent ambassador to pope Leo IV., and he was appointed, in conjunction with the celebrated Prudentius, to reform all the monasteries in France. The time of his death is unknown, but it is ascertained that he was living in 861. He was a considerable theological writer: and he published accounts of the lives of St. Wighbert, and of St. Maximin. A collection has been made of 130 of his "Letters" upon different subjects relating to difficulties in grammar, civil and ecclesiastical affairs, points of doctrine, discipline, and good morals, which are written with elegance, and throw much light on the history of the period in which he lived. Moreri.

LUPUS, CHRISTIAN, a learned Flemish monk of the order of St. Augustine, was born at Ypres in 1612, and embraced a religious life at the early age of fifteen. He completed his maturer studies at Cologne, and was afterwards sent to Louvain to teach philosophy; in which he acquired such celebrity, as to secure the particular esteem of the learned Fabio Chigi, then the papal nuncio in Germany, afterwards known as pope Alexander VII. In 1655, Lupus was one of the deputies sent to Rome by the university of Louvain, to negotiate some matters of importance with the papal court, which he executed to the satisfaction of his employers. On his return he was appointed professor of divinity at Louvain, the duties of

which he performed with great success. After this he filled the principal posts belonging to his order in that province. Pope Clement IX. would willingly have made him a bishop; and from Innocent XI. and the grand duke of Tuscany, he received repeated marks of esteem; the latter was desirous of settling upon him a considerable pension, that he might attach him to his court. He died in 1681, at the age of seventy. He left behind him many valuable works, of which the chief are "Commentaries on the History and on the Canons of Councils, both general and particular," in five volumes 4to.; "A Collection of Letters and Monuments, relating to the Councils of Ephesus and Chalcedon;" "A Collection of the Letters of St. Thomas of Canterbury, with a Life prefixed;" "A Commentary on the Rescriptions of Tertullian." Moreri.

LUPUS, in *Ornithology*, a name given by some authors to the *monedula*, or jackdaw, from his voracious appetite and habit of stealing. See CORVUS *Monedula*.

LUPUS, in *Surgery*, the disease frequently called *noli me tangere*.

LUPUS, in *Zoology*, a species of *Canis*. See WOLF.

LUPUS *Aureus*, the gold-coloured wolf, the name by which Latin authors call the creature known in English by the name of the jackal. See AUREUS.

LUPUS *Cervarius*, a name by which many authors have called the lynx, from its feeding on deer. See FELIS *Lynx*.

LUPUS *Marinus*, a name given by Jonston, Bellonius, and Gesner, to the *Canis hyæna*. See HYÆNA.

LUPUS *Marinus*, the Sea-wolf, the *Anarhichas lupus* of Linnaeus, in *Ichthyology*, a fierce and voracious sea-fish, confined to the northern seas of our globe. It is found in those of Greenland, Iceland, and Norway, on the coasts of Scotland and of Yorkshire, and in that part of the German ocean which washes the shores of Holland. Its head is larger in proportion to its size than that of the shark, and rounder, a little flattened on the top; the nose blunt; the nostrils very small; the eyes small, and placed near the end of the nose; the body is long, and a little compressed sideways; the back, sides, and fins, are all of a livid lead colour; the two first marked downwards with irregular, obscure, dusky lines, which in different fish have different appearances. The young are of a greenish cast; the belly is white; the skin is smooth and soft, but his teeth so remarkably hard and strong, that if he bites against an anchor of a ship, or other iron substance, he makes a loud noise, and leaves his marks in the iron; the fore-teeth are strong, conical, diverging a little from each other, stand far out of the jaws, and are commonly six above and six below, though sometimes there are only five in each jaw; these are supported withinside by a row of lesser teeth, which make the number in the upper jaw seventeen or eighteen, and in the lower eleven or twelve. The sides of the lower jaw are convex inwards, and the grinding teeth of this jaw are higher on the outer than the inner edges, and join to the canine teeth, but in the upper are separated from them; in the centre are two rows of flat strong teeth, fixed on an oblong basis upon the bones of the palate and nose; these and the other grinding teeth are often found fossil, and called *busonites*, or toad-stones. The two bones that form the under jaw are united before by a loose cartilage, serving by a free motion to the purpose of breaking, grinding, and comminuting its testaceous and crustaceous food, as crabs, lobsters, prawns, muscles, &c. At the entrance of the gullet, above and below, are two very small echinated bones. It has two fins, like wings, situated just under the gills; and one long dorsal fin running from the head to the tail,

tail, and another reaching from the anus to the tail; the tail is round at its end, and consists of thirteen rays. This fish grows to a large size, being sometimes found on the Yorkshire coast of the length of four feet, and near Shetland more than seven feet. Pennant.

LURA, in *Geography*, a town of South America, in the province of St. Martha, on the Madalena; 8 miles S. of Teneriffe.

LURBAH, a town of Bengal; 20 miles S.S.W. of Doefa. N. lat. $22^{\circ} 41'$. E. long. 85° .

LURCH, To, in *Fencing*, is to make an opening in order to invite your adversary to thrust at you, when you, being ready, may find a favourable reposte at him.

LURCHER, among *Sportsmen*, a kind of hunting dog, like a mongrel greyhound, with pricked ears, a shaggy coat, and generally of a yellowish-white colour. See DOG.

LURCY-LE-SAUVAGE, in *Geography*, a town of France, in the department of the Allier, and chief place of a canton, in the district of Moulins; 7 miles E.N.E. of Donjon. The place contains 2461, and the canton 8548 inhabitants, on a territory of 265 kilometres, in 12 communes.

LURE, in *Falconry*, a piece of red leather cut in form of a bird, with two wings fluck with feathers; and sometimes baited with a piece of flesh: wherewith to reclaim, or call back a hawk.

The word comes from the French *leurre*, which signifies the lure: formed, according to Skinner, from the Anglo-Saxon, *lura*, traitor; or, according to Tripaud, from *lora*, craftiness. See FALCON and HAWKING.

LURE, in *Geography*, a town of France, and principal place of a district, in the department of the Upper Saône, near the Ougnon. The place contains 1918, and the canton 12,339 inhabitants, on a territory of $227\frac{1}{2}$ kilometres, in 25 communes. N. lat. $47^{\circ} 41'$. E. long. $6^{\circ} 34'$.

LURGAN, a market and post-town of the county of Armagh, Ireland; it is in the north-eastern angle of the county, near Down, and consists of one long wide street, remarkable for cleanliness. Its trade consists in articles of the linen and muslin manufactures, of which the weekly sales are averaged from 2500*l.* to 3000*l.* Fine diapers for table linen manufactured in this town have been highly valued. Lurgan is 68 miles N. from Dublin.

LURGAN, a township of America, in Franklin county, Pennsylvania, containing 758 inhabitants.

LURGAN Green, a small post-town of the county of Louth, Ireland, pleasantly situated on Dundalk-bay. It is on the great northern road, 27 miles N. from Dublin.

LURIDÆ, in *Botany*, from *luridus*, pale, livid, or ghastly, alluding to the livid and blueish aspect, frequent in the tribe of plants thus denominated, which seems to announce their deadly effects on animal life. They constitute the 28th natural order, among the *Fragmenta* of Linnaeus, and are exemplified by *Digitalis*, *Nicotiana*, *Atropa*, *Hyoscyamus*, *Datura*, *Physalis*, *Capsicum*, *Solanum*, *Verbascum*, *Celisia*, *Lycium*, *Cestrum*; to which *Triguera* of Cavanilles, as well as *Witheringia* of P'Heritier, are properly added by Giseke. But *Browallia*, *Ellisia*, *Strychnos*, *Ignatia*, and above all *Catebau*, are with less reason referred hither by Linnaeus.

The true *luridæ* have commonly a fetid herbage, though sometimes a sweet-smelling flower. They act powerfully upon the nerves, in whatever manner they are taken inwardly, and prove, under careful management, in some cases, very valuable medicines, though naturally violent poisons.

LURIGANCHE, in *Geography*, a town of Peru, in the jurisdiction of Lima.

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LURIN, a town of Peru, in the jurisdiction of Lima.

LURKJAN, a town of Persia, in the province of Chulistan; 50 miles N. of Suster.

LURY, a town of France, in the department of the Cher, and chief place of a canton, in the district of Bourges, situated on the Arnon; 13 miles W. of Bourges. The place contains 512, and the canton 4575 inhabitants, on a territory of 170 kilometres, in 9 communes.—Also, a town of the island of Corfica; 13 miles N. of Bastia.

LUS, *Str.*, a town of Mexico, in the province of Guatemala; 12 miles E. of Guatemala.

LUSATIA, a marquisate of Saxony, bounded on the N. by the Mark of Brandenburg, on the E. by Silesia, on the S. by Bohemia, and on the W. by Saxony; about 84 miles long, and 45 broad, divided into Upper and Lower Lusatia. The former abounds in mountains and hills, and enjoys a purer air than the latter, which is covered with a great number of woods. Peat and turf are found in different parts. Upper Lusatia is ill adapted to agriculture, but affords plenty of game. Lower Lusatia has heaths and fertile tracts. In both rye, wheat, barley, and oats are cultivated, together with buck wheat, peas, linets, beans, and millet. Flax is also cultivated. As to orchard and garden fruits, and the culture of hops, tobacco, and wine, Lower Lusatia is preferable to the Upper. Nevertheless, the products of the country are not adequate to its consumption, so that corn, fruit, hops, garden stuff, and wine, are imported into both these marquisates. Cattle are bred in considerable number, and the rivers, lakes, and ponds afford various sorts of good fish. In some parts are found pipemaker's clay, and stone quarries. Stones resembling the Bohemian diamonds, agates, and jaspers, and iron stone, are met with in several places; and here is a variety of medicinal springs. The chief rivers are the Spree, the Black Elster, and the Pulsnitz. In Upper Lusatia are reckoned six towns, called "The Six Towns," 16 smaller towns, and four market towns; and in the Lower four towns, which appear at the land diets, 13 county towns, and two market ones. The first known inhabitants of this country were the Semnones, or Senones, who were succeeded by the Wandalers, and these again in the 7th century by a Slavonian people, called the Sorber-Wends. In the 12th century the inhabitants of this country were intermixed by emigrants from the Low Countries and the Rhine. Some of the towns are now wholly peopled by Germans, but in the villages the Wends are more numerous than the Germans. Lutheranism was introduced into this country as early as the year 1521; it generally prevailed, and has been the permanent religion of the country. In 1750, the Hernhuters obtained protection as faithful subjects, and in consequence of purchasing several considerable estates, they have not only acquired civil power, but the patronage of churches. The inhabitants of Lusatia gain their subsistence by the manufacture of numerous woollen and linen stuffs; which mostly flourish in Upper Lusatia. The manufactures of Lusatia have been promoted by the emigration of the Protestants, who were driven thither from Bohemia and Silesia by the conduct of the emperors Ferdinand II. and III. and also of Leopold; and thus they have been extended, beyond cloth and linens of various sorts, to those of hats, leather, paper, gunpowder, iron, wax, glass, and wax-bleaching, and a variety of handicraft arts and operations. By these manufactures they have been enabled to carry on a trade, so that the commodities they dispose of exceed those which they import, which are wool, yarn, and silk, corn, fruit, hops, &c. The whole of Lusatia, except a small part which is subject to Prussia,

fia; belongs to Saxony, having been ceded to the elector about the middle of the 16th century, in consideration of a large sum of money advanced by the elector to the emperor, in his war with the Bohemians.

LUSCHETZ, a town of Bohemia, in the circle of Sclia; 8 miles S.W. of Prague.

LUSCINIA, in *Ornithol. gy.* a species of *Motacilla*, which see. See also NIGHTINGALE.—Also, a species of *Certhia*. See *CERTHIA Flavesc.*

LUSCINIOL A, the *Begonch* of Pennant, and *red warbler* of Latham. See *MOTACILLA Schoenob. aus.*

LUSCINIUS, OTTOMARUS, in *Biography*, a Benedictine monk, born at Stralsburg, but an inhabitant of Angsburg, published in 1536 a work, entitled “*Musurgia seu praxis Musicae*,” in small oblong quarto; a book chiefly curious and valuable for the representations of such musical instruments as were used in Germany at the time it was written, which, though coarsely cut in wood, are accurately drawn. There are, among keyed-instruments, the virginal, spinnet, and clavicord, all three in the form of a small modern pianoforte; an upright harpsichord; a regal or portable organ, chiefly composed of reed-stops, and in Roman Catholic countries used in processions; and a large or church-organ. Of bowed-instruments we have here only the monochord, rebec, or three-stringed violin, and the viol da gamba. The vielle, lute, harp, and dulcimer; cornet, schalmey, or base clarinet, both played with reeds; flutes of various size, among which is the *Storckflut*, flute traversiere, or, as we call it, the German flute; which accounts for its name, as we believe, at this early period, it was unknown to the rest of Europe. There are four other wind-instruments, peculiar to Germany and northern countries, exhibited here: as, first, the ruspflut, or Russian flute; second, the krumhorn, or crooked horn, a kind of shawm, in imitation of which we have a reed-stop in our old organs, called the cromhorn, which has by some been imagined to be a corruption of the word Cremona; third, gamsen horn, or wild goat’s horn; and, fourth, the zinke, or small cornet. After these we have the bag-pipe, trumpet, sacbut, fiddrum, kettle-drum, French-horn, bugle-horn, and even the Jews-harp, and clappers. Most of these instruments being in common use, and well known, need no representation after the rude types of them given by Luscinius, as they have been since much better delineated and engraved in Martenens, Kicher, and in still later musical writers.

LUSEPARA, in *Geography*, an island that lies in the south entrance of the straits of Banca. S. lat. 3° 10’ 30”. E. long. 116° 15’.

LUSHBURGH, or LUXENBURG, in our *Old Writers*, a base sort of foreign coin, made of the likeness of English money, and brought into England in the time of Edward III. to deceive the king and his people; on account of which it was made treason, for any one willingly to bring any such money into the realm, as knowing it to be false. Stat. 23 Edw. III. 3 E. R. 1.

LUSIAD of *Lancet*. See CAMOENS.

LUSIGNAN, in *Geography*, a town of France, in the department of the Vienne, and chief place of a canton, in the district of Poitiers. The place contains 1290, and the canton 13,147 inhabitants, on a territory of 342½ kilometres, in 10 communes. N. lat. 46° 26’. E. long. 0° 14’.

LUSIGNY, a town of France, in the department of the Aube, and chief place of a canton, in the district of Troyes. The place contains 1155, and the canton 7225 inhabitants, on a territory of 180 kilometres, in 14 communes.

LUSITANIA, in *Ancient Geography*, one of the two provinces into which Hispania Ulterior was divided; the

other being Bætica. (See HISPANIA.) Its limits have been variously defined by different authors, and particularly by Pliny and Ptolemy. Strabo intimates, that this province extended from the Tagus to the Cantabrian ocean, or at least the Promontorium Celticum. That part of it, situated betwixt the Anas and the Tagus, was denominated Celtica, or the country of the Celts. After Augustus made the disposition of Spain, referred to under the article *Hispania*, the Anas bounded Lusitania on the south, and the Durus on the north; so that the whole tract lying betwixt the Durus and the Cantabrian ocean was annexed to the Provincia Tarraconensis. The interior limits of Lusitania, upon the frontiers of the Vettones and Carpetani, are differently fixed by different authors. The Lusitani possessed the district bordering upon the Atlantic ocean, and stretching itself from the mouth of the Anas to the Promontorium Sacrum, now known by the name of Cape St. Vincent. The situation of the Celtici, whose true name was Mirobrigenes, according to Pliny, may be inferred from the preceding part of this article. Some of the ancient geographers make the Turduli and the Turdetani one nation, particularly Ptolemy and Strabo; though they were considered in a different light by Polybius. However this be, the Turdetani were undoubtedly a powerful people, since they occupied a considerable part both of Lusitania and Bætica, as we learn from Strabo. The same may be said of the Vettones, who spread themselves over a large tract, terminated on the north by the Durus, and on the south by the Tagus. Nevertheless, as the ancients differ with regard to the extent of territory every one of those nations or cantons possessed, it is probable that their frontiers were not always the same. Some authors assert Vettonia, or the country of the Vettones, to have been a province distinct from Lusitania, and limited on the south by the Anas; and this notion is countenanced by an inscription in Gruter. The principal cities of this province are Barbarium Promontorium, Olisippo, Tagi Fluvii Ostia, Fortes Fluv., Lunæ Montis Promontorium, Mondæ Fluv. Ostia, Vaci Fluv. Ostia, Doræ Fluv. Ostia, Hannibal. Inland towns were Lavara, Arctium, Salium, Elbocoris, Araducta, Verarium, Velladis, Eminium, Chretina, Arabriga, Scabificus, Tacubis, Concordia, Talabriga, Langobriga, Mendeculia, Caaurum, Turmogum, Burdua, Colernum, Mallæcus, Amma, Ebura or Eboræ, Norba Cæsarea, Liciniana, Augusta Emerita, which was the capital, Evandria, Geræa, Cæcilia Gemittina, Capasa, Conimbria, Collipo, Bletisa, Salamanica, Salatia, Pax Julia, and some others of less note. The chief promontories of Lusitania were the Promontorium Sacrum, or Cape St. Vincent; P. Barbarium, or Cape Spichel; and the P. Magnum, or Olisiponense, denominated by some moderns Cape de Rocca Santa; to which some add a fourth, called by Pliny Cuncus or the Wedge, supposed to be now known by the name of Cape St. Mary. The principal ports of this province were those of Olisippo or Lisbon, and Hannibal. The only island on the coast of Lusitania was the Londobris of Ptolemy, the Bælinga or Bailinges of the moderns. The only mountain of note in this country was the Mons Herminius of Hirtius, or the modern Arrimmo, since known by the name of Sierra de Ebreita, running from north to south, between the provinces of Beira and Trallos Montes. On the top are two extensive and deep lakes, calm when the sea is so, and rough when that is stormy. These lakes are supposed to have some subterranean communication with the ocean. Herminius Minor is now Sierra de Marvão. The warlike inhabitants of the former were called Plambarii, from their lead-mines and works. The most celebrated rivers of Lusitania

ania were the Anas, now Guadiana, the Tagus or Tago, and the Durio or Douro; to which may be added the Munda or Mendago, and the Vacus or Voga: all these flow from east to west, and discharge themselves into the Atlantic ocean. This province produced a considerable quantity of gold, particles of it being mixed with the sand of the Tagus. The lead-mine of Medobriga or Meidobriga, at the foot of Herminius Minor, was famous.

The Lusitanians, according to Strabo, preferred exulting upon the plunder of their neighbours to the improvement of their own lands, though the soil was naturally fertile and rich. In other cases their manner of living was rude and simple. They used to warm themselves by means of fire-stones made red-hot. They bathed in cold water, eat only of one dish at a meal, and very sparingly. Their dress was commonly black. They made no use of coin, but either bartered one commodity for another, or for some plates of silver, flatted with the hammer, and cut into pieces. They used, like the Egyptians, Gauls, and other ancient nations, to expose their sick on the highways, that travellers might direct them to proper medicines for their cure. They were exceedingly robust, and so warlike that the Romans did not conquer them without great difficulty and length of time. See PORTUGAL.

LUSITANICA *Rubra Bolus*, is an impure earth, of a florid red colour, compact texture, and heavy: it colours the hands, and is very friable, readily dissoluble in water, and raises with it a strong ebullition; it melts readily in the mouth, has a strong astringent taste, is gritty, and adheres firmly to the tongue. It acquires hardness and a brighter colour by burning; it is of an alkaline quality; it is dug in the kingdoms of Portugal and Spain; it is also found near the Havannah and La Vera Cruz in New Spain. It has been esteemed a very valuable astringent, and an effectual remedy for fluxes and other distempers of that kind. It has been also accounted alexipharmic by the Spaniards and Portuguese. They make an earthen ware of this bole, which they call bucaros: the ware is of a fine red colour, smooth, and polished, though it is merely dried, and not glazed. They use it to filter, cleanse, and cool the water. Vessels of the same kind are also brought from the Havannah and Vera Cruz.

LUSK, in *Geography*, a fair-town in the county of Dublin, Ireland. According to Archdehl, an abbey was founded here in the first ages of Christianity; and there is adjoining the angle of the steeple of the church, one of those ancient round towers so peculiar to Ireland: it is in good preservation, and rises several feet above the battlements of the steeple. It is 11 miles N. by E. from Dublin.

LUSPA, a town of Sweden, in East Bothnia; 28 miles E. of Chri linefadt.

LUSSAC, a town of France, in the department of the Gironde, and chief place of a canton, in the district of Libourne; 6 miles E.N.E. of Libourne. The place contains 2032, and the canton 9072 inhabitants, on a territory of 157½ kilometres, in 16 communes.—Also, a town of France, in the department of the Vienne, and chief place of a canton, in the district of Montmorillon; 6 miles W. of Montmorillon. The place contains 1379, and the canton 9470 inhabitants, on a territory of 400 kilometres, in 13 communes.

LUSSAN, MARGARET DE, in *Biography*, was born at Paris in 1682. Her parents were in the lower rank of life; the mother being a fortune-teller, and the father a coachman. She, by some means, attracted the notice of the learned Huet, who, struck with the vivacity of her temper, encouraged her to write romances. She derived great ad-

vantage in the formation of her taste, from her conversations with la Serre de Langlade, to whom she was much attached: but the love was not mutual; her charms were wholly mental; her person and manner were even so; but she was generous, humane, and constant in her friendships. She died at the age of 75. Her works are, "L'Histoire de la Comtesse de Gournay," "Anecdotes de la Cour de Philippe Auguste," "Mémoires Secrets et Intrigues de la Cour de France sous Charles VIII.," "Mars d'Angleterre," "Annales de la Cour de Henri II.," "La Vie du brave Crillon."

LUSSAN, in *Geography*, a town of France, in the department of the Gard, and chief place of a canton, in the district of Uzès; nine miles N. of Uzès. The place contains 907, and the canton 5493 inhabitants, on a territory of 239 kilometres, in 13 communes.

LUSSEMEN, a town of Prussia, in the province of Ermeland; 18 miles E.S.E. of Heilberg.

LUST, at *Sea*. If a ship heel either to the star-board or port, the seamen say she hath a *lust* that way; and they say so though it be occasioned only by the shooting of her ballast, or by the unequal stowing of things in the hold: though it is more properly said of a ship, when she is inclined to heel any way upon account of her mould or make.

LUST-cort, in *Botany*. See *SUN-dew*.

LUSTER, or **LUSTRE**, gloss, or brightness appearing on any thing; particularly on manufactures of silk, wool, or stuff.

LUSTER is also used for a certain composition, or manner of giving that gloss or brilliance.

The lustre of silks, in which their chief beauty consists, is given them by washing in soap, then clear water, and dipping them in alum-water cold.

The lustre of black taffety is given by double-brewed beer, boiled with orange or lemon-juice; that of coloured taffetas with water of gourds, distilled in an alembic. Curriers give a lustre, or gloss to the leather several ways, according to the colour to be illustrated. For blacks, the first lustre is with juice of barberries; the second with gura arabic, ale, vinegar, and Flanders glue, boiled together: for coloured leathers they use the white of an egg beaten in water: moroccos have their lustre from juice of barberries, and lemon or orange.

For hats, the lustre is frequently given with common water; sometimes a little black dye is added. The same lustre serves skinners, except that in white furs they never use any black dye. For very black furs they sometimes prepare a lustre of galls, copperas, Roman alum, ox's marrow, and other ingredients.

The lustre is given to cloths and molairs, by pressing them under the calender.

LUSTER, an appellation given to a branched candlestick, when made of glass. See *BRANCH* and *JESSE*.

LUSTIG, JACOB WILHELM, in *Biography*, organist of St. Martin's church in Groningen, published, in 1771, in the Dutch language, "An Introduction to the Art of Music, 2d edition, corrected and enlarged," 8vo. This introduction is better digested, and more abundant in useful information, than the generality of elementary treatises. The author had read, meditated, and studied music regularly, both in theory and practice; and was a good composer of the old school. He had been a disciple both of Mattheson and Telemann. We have seen a book of lessons of his composition, which has great merit. In this book we found the cross-hand jig, in $\frac{3}{8}$, which the little Frederica, afterwards Mrs. Wynne, and other infant performers, used to play at the end of a minuet of Tartini with variations by Pa-

radies, generally known by the name of Paradies' minuet. In 1772 we had the pleasure of converſing with this worthy profeſſor (*Luſtig*), and of hearing him play on the organ of St. Martin's church in Groningen, of which he had been organiſt 44 years; ſtill retaining his hand, and, a few allowances made for change of taſte and ſtyle, he was ſtill a very able and good organiſt.

LUSTRAL, an epithet given by the ancients, to the water uſed in their ceremonies, to ſprinkle and purify the people. From hence the Romanists have borrowed the holy water uſed in their churches.

LUSTRAL day, *dies Luſtricus*, that whereon the luſtrations were performed for a child, and its name given; which was uſually the ninth day from the birth of a boy, and the eighth from that of a girl. Though others performed the ceremony on the laſt day of that week wherein the child was born, and others on the fifth day from its birth.

Over this laſt day the goddeſs Nundina was ſuppoſed to preſide; the midwives, nurſes, and domeſtics, handed the child backwards and forwards, around a fire burning on the altars of the gods, after which they ſprinkled it with water; hence this feaſt had the name of *Amphidromia*. The old women mixed ſhiva and duſt with the water. The whole ended with a ſumptuous entertainment. The parents received gifts from their friends on this occaſion. If this child was a male, their door was decked with an olive-garland; if a female with wool, denoting the work about which they were to be employed. P. ter.

LUSTRATION, **EXPIATION**, in *Antiquity*, ſacrifices or ceremonies, by which the Romans purified their cities, fields, armies, or people deſiled by any crime, or impurity. Some of the luſtrations were public, others private.

There were three ſpecies, or manners of performing luſtration; viz. by fire and ſulphur; by water; and by air; which laſt was done by fanning and agitating the air round the thing to be purified.

There was alſo a peculiar kind of luſtration for young children.

Lomier has a volume expreſs on the luſtrations of the ancients: *John Lomieri Zutphanenſis Epimenedes, ſive de veterum Gentium Luſtrationibus*; firſt printed at Utrecht in 1681, and ſince, with additions, in 1702, 4to.

All perſons, ſlaves only excepted, he ſhews, were miniſters of ſome ſort of luſtration. When any one died, the houſe was to be ſwept after a particular manner, by way of purification; the prieſt threw water on new married people, with the like intention. To purify themſelves, people would even ſometimes run naked through the ſtreets; ſuch was their extravagance. And, as if fancy was not fertile enough in inventing modes of luſtration, they even uſed enchantments to raiſe the dead, in order to get inſtructions what they muſt do to purge themſelves of their ſins. Add, that they frequently raiſed the opinion of the ſanctity of their expiations by fictitious miracles.

It was common, on theſe occaſions, to ſhed human blood: the prieſts of Cybele, Bellona, and Baal, made cruel incifions on themſelves. Erechtheus, king of Attica, ſacrificed his daughter to Proſerpina. Several had their throats cut at Rome, to obtain the emperor's health from the gods. Thoſe who commanded armies offered one of their ſoldiers to appeaſe the anger of the gods; that he alone might ſuffer all the wrath the army deſerved.

All ſorts of perfumes, and odoriferous herbs, had place in luſtration. The egg was much uſed among them, as being the ſymbol of the four elements; its ſhells, they ſay, repreſent the earth; the yolk, a globe of fire; the white, reſembles the water; and beſides it has a ſpirit, they ſay,

which repreſents the air. For this reaſon it is, that the bouzes, or Indian prieſts, believe to this day that the world came out of an egg. There is ſcarce any pot-herb, pulſe, tree, mineral, or metal, which they did not offer the gods by way of expiation: nor did they forget milk, bread, wine, or honey; what is more, they made uſe of the very ſpittle, and urine.

The poets had feigned, that the gods purified themſelves, and they did not omit to purify their ſtatues. They made luſtration for children the eighth day after their birth. When a man who had been faſely reputed dead, returned home, he was not to enter his houſe by the door. It was a ſettled cuſtom to offer no expiation for thoſe who were hanged by order of juſtice; or that were killed by thunder. Neither did they offer any for thoſe who were drowned in the ſea; it being the common opinion, that their ſouls perished with their bodies. And hence it was, that perſons in danger of ſhipwreck, ſometimes thruſt their ſwords through their bodies, that they might not die in the ſea; where they thought their ſoul, which they ſuppoſed to be a flame, would be totally extinguished. The moſt celebrated expiatory ſacrifice was the hecatomb, when they offered a hundred beaſts; though they commonly did not offer ſo many, but contented themſelves with killing twenty-five; but thoſe being quadrupeds, their feet came to an hundred.

The manner of the Macedonians purifying their army by luſtration was this; at the time of their feſtival *Xanthica*, they divided a bitch into two halves, one of which, together with the entrails, was placed upon the right hand, the other upon the left; between theſe the army marched in this order: after the arms of the Macedonian kings, came the firſt line of the army, conſiſting of horſe; theſe were followed by the king, and his children, after whom went the life guards; then followed the reſt of the army: this done, the army was divided into two parts, one of which being ſet in array againſt the other, there followed a ſhort encounter in imitation of a fight. Potter, *Archæol. Græc. lib. ii. c. 20. tom. i. p. 417.*

Luſtrations, and luſtratory ſacrifices, were not only performed for men, but alſo for temples, altars, theatres, trees, fountains, rivers, ſheep, fields, and villages. When the Arval brothers offered a victim for the fields, their ſacrifice was called *ambarvalia*.

Cities were alſo to be purified, from time to time: ſome made the victim walk round their walls, and then ſlew him. The Athenians ſacrificed two men, one for the men of their city, and the other for the women. The Corinthians ſacrificed the children of Medea ſo: though the poets ſay, Medea killed them herſelf. The Romans performed the ceremony of purifying their city every fifth year; whence the name of *luſtrum* was given to the ſpace of five years.

Divers of the expiations were auſtere: ſome faſted; others abſtained from all ſenſual pleaſures; ſome, as the prieſts of Cybele, caſtrated themſelves; others, that they might live chaſte, eat rue, or lay under the branches of a ſhrub called *agnus caſtus*.

They caſt into the river, or at leaſt out of the city, the animals or other things that had ſerved for a luſtration, or ſacrifice of atonement; and thought themſelves threatened with ſome great miſfortune, when by chance they trod upon them. At Marſeilles, they took care to feed a poor man for ſome time; after which, they charged him with all the ſins of the country, and drove him away: thoſe of Leucade faſtened a number of birds to a man charged with their ſins, and in that condition caſt him headlong from a high tower; and if the birds hindered his being killed, they drove him out of the country.

Some

Some of these ceremonies were abolished by the emperor Constantine, and his successors; the rest subsisted till the Gothic kings were masters of Rome, under whom they expired; except that several of them were adopted by the popes, and brought into the church, where they make a figure to this day: witness the numerous consecrations, benedictions, exorcisms, ablutions, sprinklings, processions, feasts, &c. still in use in the Roman church.

LUSTRINGS. A company was incorporated for making, dressing, and lustrating alamanodes and lustrings in England, who were to have the sole benefit thereof, by stat. 4 and 5 W. and M. And no foreign silks known by the name of lustrings or alamanodes are to be imported, but at the port of London, &c. Stat. 9 and 10 W. III. c. 43. See **SILK**.

LUSTRUM, a term used by the Romans, to signify a space of five years.

Varro derives the word from *lucro*, to pay; because at the beginning of every fifth year they paid the census, or tribute imposed by the censors; whose authority, at their first institution, was continued them for five years; though afterwards it was abridged to one. Others rather derive the word from *lustrare*, to make a review; because once in five years the censors reviewed the army.

LUSTRUM was also a ceremony, or sacrifice used by the Romans, after numbering their people, once in five years. See **LUSTRATION**.

The census was accompanied always by a lustration of the people, so the word *lustrum* has constantly been taken by the ancients and moderns for a term of five years: yet if we enquire into the real state of the case, we shall find no good ground for fixing so precise a signification to it; but, on the contrary, that the census and *lustrum* were, for the most part, held irregularly and uncertainly, at very different and various intervals of time, as the particular exigencies of the state required. Middlet. of Rom. Sen. p. 107.

LUTANGER, in *Geography*, a small island in the East India sea, near the S. coast of Mindanao. N. lat. 7° 19'. E. long. 123° 15'.

LUTATION, in *Chemistry*, is used for the cementing of chemical vessels close together.

LUTAYA, in *Geography*, one of the smaller Philippine islands, near the island of Panay.

LUTE, **LUTUM**, in *Chemistry*, a composition of certain tenacious substances, wherewith to close the apertures and junctures of vessels in distillation, &c. See **CEMENT**, **CEMENT**, and **MORTAR**.

LUTE, *Leuto*, Ital., *Laute*, Germ., a musical stringed instrument, of which, though the shape or sound is now hardly known, yet during the sixteenth and seventeenth centuries it was the favourite chamber instrument of every nation in Europe, and in the beginning of dramatic music the recitatives were accompanied by the arch-lute, or theorbo, instead of the harpsichord.

Sir Thomas Wyatt, the elder, one of our best early poets, has left us a sonnet to his lute, written very early in the sixteenth century; and Congreve, at the end of the seventeenth, has celebrated the performance of Mrs. Arabella Hunt on that instrument.

The earliest mention of the lute that we have found among the moderns is in Boccaccio, *Giornata prima*, where the singing is generally said to have been accompanied by the lute. In Chaucer's Pardoner's tale, we are told:

“ In Flanders whilom was a compaignie
Of younge folk that haunted in folie,

As hazard, riot, fiewis and tavernes
Whereas with harpes, lutes, and giternes,
They daunce and play.”

In Shakspeare's first part of Henry IV. Mortimer tells his lady, who can speak no English, that her tongue

“ Makes Welsh as sweet as ditties highly penn'd,
Sung by a fair queen in a summer's bower,
With ravishing division to her lute.”

And in lord commissioner Whitelocke's MS. narrative of a masque given in 1633, to Charles I. and his queen, by the four Inns of court, he says, that “ he engaged forty lutes, besides other instruments and voyces of the most excellent kind in consort.”

There was a lute at the Italian opera in England, to the end of Handel's regency. And the place of lutenist in the king's chapel was continued till the death of Gighier, about the middle of the last century.

It seems as if in France there had been a time when there was no other instruments in use than lutes, as *luthier* not only implies the maker of lutes, but violins, violoncellos, and other instruments of the same kind.

There has been no satisfactory etymology given to the word lute, though Scaliger and Bochart have tried to find or frame one, deriving it from the Arabic *allaud*, whilst others have derived it from the German *laute*, or *lauten*, sonare.

The stringed instruments of the ancients were so numerous, and so various in their forms, that we know not the precise difference between the lyre and cithara. The *testudo*, among poets, not only implies the lyre, said to have been originally made by Mercury of the back or hollow shell of the *testudo aquatica*, or sea tortoise, but music itself.

As to the different names that may have been given to the same kind of instrument by the ancients, such as *organyon*, *xylos*, *testudo*, *cithara*, &c. we shall leave the dispute, says Merlennus, to grammarians, who may consult Athenæus, Julius Pollux, Arislides, Quintilianus, and other Greeks; for since we are in possession of the instrument, they may give it what name they please.

Vincenzo Galileo (Dial.) says the best lutes were made in England.

The lute consists of four parts, the table, the body or belly, which has nine or ten fides, the neck or finger-board, which has nine or ten frets or divisions marked with catgut or bowel strings, and the head or cross, where the screws or pins for tightening or relaxing the strings in tuning are fastened. This is called the lute with two necks, or the theorbo, which has sometimes only one string to each note. In the middle of the belly or table, there is a rose or passage for the sound. There is also a bridge, to which the strings are fastened, and a piece of ivory between the head and the neck, to which the other extremities of the strings are fitted.

In performing on the lute, the strings are struck with the right hand, and pressed upon the frets with the left.

Whoever wish to teach themselves to play upon this instrument, as it will be difficult now to find a good master, may attain considerable knowledge in the practice of it by a perusal of Père Merfenne's *Harmonie Universelle*, printed at Paris in 1636, folio, *livre ii. des Instrumens*, p. 45; and Mace's *Musick's Monument*, folio, 1676, Grassineau. This last book is written in a style amusingly quaint; but it probably contains all the essential rules known at the time it was written, both for playing, judging of the goodness of the instrument.

instrument of strings, placing the frets, &c. But after the decease of honest Thomas Mace, whose style much resembles that of Anthony Wood, though he exceeds him in quaintness and simplicity, there were probably many refinements discovered by great players, both in composing for the instrument and in performing upon it, which are now quite lost.

The inhabitants of Congo have a lute of a singular kind. The body and neck of this instrument resemble ours; but the belly, that is, the place where the rose or sound-hole has place in our lutes, is of very thin parchment; which probably implies that the whole table or belly of this instrument is covered with parchment instead of wood. It is strung with the hair of an elephant's tail, the strongest and the best that can be chosen; or else with the bark of the palm-tree. The strings reach from one end of the instrument to the other, and are fastened to rings fixed at different places of the lute one above the other. To these rings are suspended small plates of iron and silver of different sizes and different tones. In thrumming the strings these rings are put in motion, which likewise move the little metal plates, and the whole forms a kind of murmuring harmony, or rather a confused noise, which is pretended not to be disagreeable. The inhabitants likewise add, that in thrumming the strings of this instrument in the way we produce sound from the harp, the musician expresses his thoughts as clearly as if he were speaking. *Encycl. Suppl. folio.*

LUTE. *Archi.* See **ARCILUTO**.

LUTE. *Theorbo.* See **THEORBO**.

LUTEA, in *Natural History*, the name of a species of fly found frequently near waters after rain; it is of a dunish-yellow colour, the wings are long, and the eyes large and prominent; the tail is thick, and has two hairs of a considerable length growing at the head, so that it is of the bifurcated kind.

LUTEA is also a name by which some authors have called the yellow-hammer. See **EMBERIZA Citrinella**.

LUTEFGUR, in *Geography*, a town of Hindoostan, situated in a pass between the mountains of Benares, where the air is very insalubrious; 15 miles S.E. of Chunar.

LUTEOLA, in *Botany*, the herb Weld, Dyer's-weed, or Yellow-weed, so called from *luteus*, yellow, because it is of very general use in various countries for giving that colour to woollen cloth or yarn. See **RESEDA**.

LUTEOLA, in *Ornithology*, a name given by many to a small bird, the *MORACHIA Trochilus* of Linnæus (which see), called by others *afflus*, and by others *regulus non cristatus*; but this last is a name that has occasioned some confusion, as many have erroneously called our common wren the *regulus*, and as it has no crest, imagined it to be the bird meant by this name.

It is, excepting the crested wren, the smallest of all European birds, and it very little exceeds that in size; its head, neck, and back are of a greenish-brown; the rump is greener than the rest; it has a yellow line on each side, extended from the nostrils, beyond the eyes, to the hinder part of the head; the breast, throat, and belly are yellow, with a very faint taint of green; the wings and tail are brown, and all their feathers are tipped with green at their ends: the under part of the wings has much of a very fine green; the beak is extremely slender, and half an inch long; the mouth is yellow within; it makes a loud noise, like that of a grasshopper, and is principally found among willows; it is continually creeping and singing among the branches of trees; it builds with straw and feathers, and lays five eggs, which are white, and spotted with red; there is a considerable variation in the colours of these birds; some of them being

much greener on the back, and much whiter on the belly than others.

LUTEREE, in *Geography*, a town of Hindoostan, in Lahore; 33 miles N. of Junamoo.

LUTHER, **MAURITZ**, in *Biography*, the celebrated author of the Reformation in Germany, descended from parents in very humble circumstances, was born at Eisleben, in Saxony, in the year 1483. He discovered an early inclination for learning, and having attained the rudiments of grammar under his father's roof, he was sent to school at Magdeburg, where he continued only about a year, and during that short period he supported himself, like many other poor German scholars, by literally begging his bread. From Magdeburg he went to Eisenach, in Thuringia, and distinguished himself in a school of high reputation, by his diligence and proficiency. In 1501 he was entered at the university of Erfurt, and in a very short time, having a mind superior to the scholastic modes of instruction then in use, he became disgusted with those subtle and unillustrative sciences. He immediately applied himself with the greatest ardour and assiduity to the works of the ancient Latin writers, such as Cicero, Virgil, Livy, Sallust, &c. and such was the success with which he studied, that he became the object of admiration to the whole university. He took his degree of M.A. when he was scarcely twenty years of age, and immediately afterwards began to read lectures on Aristotle's physics, on ethics, and other branches of philosophy. He began now to consider the profession which he should adopt for his support in life, and, by the persuasion of his friends, he turned his attention to jurisprudence; but an accident, to which he was witness, viz. the death of a friend by the discharge of a thunder-cloud, so sensibly affected him, that he determined to retire from the world into a convent of the Augustine friars. No entreaties on the part of his friends could divert him from his plan, which he conceived to be a duty that he owed to God, and accordingly assumed the habit of that order. He now applied himself very diligently to the study of theology, and turned his mind so eagerly to the reading of the Latin bible, which he had met with by accident, as to excite the most lively emotions of surprise and astonishment among the monks, who were little accustomed to derive their notions concerning religion from that source. Having passed a year in the monastery of Erfurt, he took the vows, and was, in 1507, admitted to priests' orders. His great and profound learning, the sanctity of his moral conduct, and his extensive knowledge of the holy scriptures, were generally known and applauded; and in the following year, Frederick, elector of Saxony, having lately founded an university at Wittenburg, appointed Luther to the professorship of philosophy, and afterwards that of divinity. The duties attached to these offices he discharged with so much ability, and in a method so totally different from the usual mechanical and dull forms of lecturing, that he was crowded with pupils from all quarters, and was regarded as the chief ornament of the university. In 1510, Luther was sent to Rome by the monks of his order, to get some disputes between them and their vicar-general settled by his holiness the pope. While in that city, he made his observations on the pope and the government of the church of Rome; he examined the manners of the clergy, which he severely censured, particularly as to the hasty and slovenly method which they adopted in performing divine service. The carelessness with which they were accustomed to offer up their prayers to Almighty God, he declares excited in his breast sentiments of astonishment and horror. As soon as he had accomplished the object of his mission he returned to Wittenburg, where, in 1512, he had

had the degree of doctor of divinity conferred upon him, at the expense of Frederick, elector of Saxony, who frequently attended his pulpit discourses, and was as delighted with his eloquence as satisfied with his extraordinary merits. Luther was, at first, desirous of declining the honour offered him, considering himself too young for such a distinction, but his objections were over-ruled, and he was told "that he must submit to be thus dignified, inasmuch as the Almighty had important services to be performed in the church, and through his instrumentality." Little did they, who made use of this expression, whether in a tone of seriousness or levity, imagine how truly its prophetic language should be verified, and how extensively useful his future labours should be, in clearing away the corruptions that had almost overwhelmed the Christian world, as it was then called; for real Christianity, as dictated by its meek and holy founder, was as difficult to be discerned in the age preceding the great reformer, as it was among the most barbarian nations devoted to the superstitious and idolatry of Greece and Rome.

Under the article REFORMATION, we shall endeavour to exhibit, in its true colours, the state of the papal dominion and church, both with respect to the people and clergy, as it existed when Luther began his labour; to develop the causes which produced so important a change in the world; and trace its consequences with regard to mankind. In the present article we shall more particularly confine ourselves to the life and labours of Luther himself.

This great man, almost as soon as he was created doctor of divinity, felt it incumbent on him to shew that the title and honour had not been conferred without reason. He applied himself with all diligence to the duties of the theological chair. He read lectures on the several books of the scriptures. He commented on the epistle to the Romans and on the book of Psalms, and his illustrations were so striking, that, by the thoughtful and the serious, he was regarded as the harbinger of a new day ready to break out after a long night of darkness and ignorance; and he led multitudes to think and to reason on matters of high importance who had never reflected or thought before beyond the concerns of the present world. He opposed, with a vehemence that could scarcely be withstood, the errors which had been long current in the church and the schools, as truth, saying that the scriptures were the only test of sound doctrine and practical morality. He applied himself diligently to the study of the scriptures, in their original languages, and encouraged the cultivation of these languages in the university, as the only sure foundation on which a proper knowledge of religion could be built. Luther was a strict disciplinarian in the college, but he exacted no more from the young men under his inspection than he shewed himself an example of in his own moral conduct: and thus, by uniting a practical regard to religious duties, with an earnest zeal in enforcing them upon the minds of others, he contributed, in an eminent degree, to raise the university of Wittemberg to a high degree of reputation, which amply gratified the elector for his munificence in founding it. He had himself been early initiated in the Peripatetic philosophy, then universally taught in the schools; but his eyes were soon opened to its numerous defects and silly subtleties, and while a professor at Wittemberg, in 1516, he wrote to Jodocus, a zealous Aristotelian, who had been his preceptor at Erfurt, stating at first only his doubts respecting the doctrines in which he had been instructed, and which, in his turn, it was expected he should teach others. Jodocus, wholly unprepared for such remarks, made with firmness, mingled with modesty, was highly incensed against the author of

them, and in his next visit to Erfurt refused to see him. Luther had not a mind to be intimidated: even the respect which he felt for the instructor of his early years forbade him to recede a single step; he had set his hand to the plough, and could not look back; he had embarked in the quest of reform, and must necessarily advance, notwithstanding the difficulties that might be opposed to him by his dearest friends. He accordingly wrote a second letter to Jodocus, in which he gave, as his decided opinion, ground upon indisputable evidence, that it would be impossible to reform the church, without entirely abolishing the canon, and decretal, and with them the scholastic logic, philosophy, and logic, and instituting others in their stead.

In early life, Luther, whose comprehensive mind could grasp all subjects, had studied the writings of St. Augustine, Thomas Aquinas, Duns Scotus, and other celebrated schoolmen; and in the dispute concerning Universities, attached himself to the party of the Nominalists, but neither age and reflection instructed him to treat the whole controversy with contempt. This has been referred chiefly to his early acquaintance with the ancients, but it was probably owing rather to that peculiar strength and ardour of mind which led him easily to discover the absurdity of the peripatetic modes of reasoning, and of judging upon theological and philosophical subjects, and to observe with resentment and indignation the fatal effects of corrupt philosophy united with ecclesiastical tyranny. Under the article LEO X. we have alluded to the general sale of indulgences published by that pontiff: this proved the first link in a chain of causes which produced a revolution in the sentiments of mankind, the greatest, as well as the most beneficial that has happened since the publication of Christianity. When Leo was raised to the papal throne, he found the revenues of the church exhausted by the vast projects of his predecessors: he felt no desire to pursue a system of economy; his heart, as we have seen, (see LEO X.) was set on aggrandizing his family: to this may be added his love of splendour, his taste for pleasure, and his munificence in rewarding men of genius and merit, all which involved him in new expenses; in order to provide a fund for which, he tried every device that himself and friends could invent, to drain the credulous multitude of their wealth. Hence the sale of indulgences, which pretended to convey to the possessor, either the pardon of his own sins, or the release of any one, already dead, in whose happiness he was interested, from the pains of purgatory. Leo had not, however, the credit of the invention of this system: it may be referred back to the papacy of Urban II. in the eleventh century, who had contrived the lucrative trade in order that the pope might have the means of recruiting those who went to join the army of the crusaders, in the Holy Land. They were afterwards granted to the pope, being unwilling to serve themselves, hired a soldier for that purpose, and in a short time they were beloved on such a scale, gave money for accomplishing any pious work enjoined by the holy pontiff.

Julius II. had bestowed indulgences on all who contributed towards building the church of St. Peter at Rome, which, as we have seen, was begun while he sat upon the papal throne, and as Leo was carrying on that expensive building, his grant was founded on the same pretence. The right of promulgating these indulgences in Germany, together with a share in the profits arising from the sale of them, was granted to Albert, elector of Mentz, and archbishop of Magdeburg, who, as his chief agent for retailing them in Saxony, employed Tetzel, a Dominican friar of licentious morals, who executed his commission with great audacity and success, but without regard to any principles of prudence.

or decency. At length the trade was carried on with so little attention to the interests of society, that it became a general wish that some check should be given to it. Luther was not an inattentive spectator: he beheld, with concern and indignation, the artifices of those who sold, and the folly or simplicity of those who purchased indulgences. Having examined the subject, and finding that the practice derived no countenance from the scriptures, he determined openly to protest against such scandalous impositions on his deluded countrymen.

In the year 1517, he attacked, with all the vehemence in his power, from the pulpit, in the great church of Wittenburg, the vices of those very monks who dared openly to distribute indulgences: he tried their doctrines by the standard of scripture, and exhorted his hearers to look for salvation to the means appointed by God in his holy word. The boldness and fervour with which he uttered his exhortations did not fail to make a deep and lasting impression on the people, who, suspecting the delusions to which they had been long subject, were ready to join any person, especially one whose character for integrity stood so high as Luther's, in throwing off a yoke which they were scarcely able to endure. Luther was not content with undeceiving the persons who crowded round his pulpit; he advanced with dignity to a higher authority; he wrote to Albert, elector of Mentz, and archbishop of Magdeburg, remonstrating against the false opinions, as well as the wicked lives, of the defenders and distributors of indulgences, entreating him, in a most supplicatory tone, to exercise the authority vested in him for correcting these evils. The archbishop was, however, too deeply interested in these abuses to lend a hand in putting an end to them. In addition to his letter, Luther transmitted to the prelate ninety-five theses, which he had proposed as subjects of inquiry and disputation, and which he had publicly fixed in a church at Wittenburg, with a challenge to the learned to oppose on a given day, either in person or by writing; and to the whole he added a solemn protestation of his profound respect for the apostolic see, and implicit submission to its authority. On the appointed day no person appeared to contest Luther's theses, which rapidly spread all over Germany, and excited universal admiration of the boldness which he discovered in venturing to call in question the papal power and authority, and to attack the Dominicans, armed, as they were, with all the terrors of the inquisitorial authority. The friars of his own order were delighted with his invectives against the monks who sold indulgences, and were anxious to see them exposed to the hatred and scorn of the people; and he was secretly encouraged in his proceedings by his sovereign, the elector of Saxony, who thought they might contribute to give some check to the exactions of the court of Rome, which the secular princes had been long unsuccessfully endeavouring to oppose. The publication of Luther's theses brought into the field many zealous champions in defence of the holy church, who were less eager for the dissemination of the truth, than for the profits which existing abuses afforded them, and who accordingly traduced the character of Luther, endeavouring to excite the indignation of the clergy and populace against him. Luther, however, was not to be terrified by any measures which his present adversaries could adopt: he found a large body of the people adhering to his doctrines, and he was content, in their behalf, to go through evil report as well as good report: he even went so far, in a public declaration, as to say, "that if the pope and cardinals entertained the same opinions with his opponents, and set up any authority against that of scripture, there could be no doubt but that Rome was itself the very seat of antichrist, and that it

would be happy for those countries which should separate themselves from her."

It does not appear that, at this early period, Luther had any intention of setting himself against the power of the pope; he even wrote a letter to his holiness in the most respectful terms, shewing the uprightness of his intentions, and the justice of the cause of which he was the advocate. Shortly after this, by the incessant representations of Luther's adversaries, that the heretical notions he was propagating threatened the most fatal mischiefs to the interests of the church, Leo issued an order for his appearing at Rome to justify himself. The judges of his conduct were already appointed and selected on account of their hostility to him. The reformer, by means of his own petitions, and the interference of those friendly to his cause, was allowed to be heard at Augsburg, instead of being obliged to travel to Rome. Even here, his avowed enemy, cardinal Cajetan, was appointed to try the merits of the question. Luther arrived at Augsburg in the month of October, 1518, and was immediately admitted into the presence of the cardinal, who, in their several interviews, would not condescend to argue the matter with a person of such inferior rank: but, by the mere dictate of authority, required Luther, by virtue of the apostolic powers with which he was invested, to retract the opinions which he had advanced, and to submit, without hesitation, to the judgment of the pope. Luther, though, for the moment, surprised at the demand of recantation, declared that he could not, with a safe conscience, renounce opinions which he believed to be true, nor should any consideration induce him to do what would be so base in itself and so offensive to God: still, however, he declared his readiness to submit to the lawful determination of the church. He went much farther: he expressed a willingness to refer the controversy to certain universities which he named, and promised neither to write nor preach concerning indulgences, provided the same silence with respect to them were enjoined on his adversaries. These offers were rejected by the cardinal, who peremptorily insisted upon a simple recantation, and, at the same time, forbade the reformer to enter again into his presence, unless he came prepared to comply with what he required. As he had no intention to submit, he thought it more prudent to withdraw, which he did in as private a manner as possible, having first prepared a formal and solemn appeal from the pope, who was then ignorant of his cause, to the pope, at a time when he should have received more full and explicit information with respect to it.

The sudden departure of Luther enraged the papal legate, who wrote to the elector of Saxony, requiring him to withdraw his protection from so seditious a person, and either to send him prisoner to Rome, or to banish him from his territories. The elector refused to comply with either of these requests, though with many external professions of esteem for the cardinal; but he at the same time assured Luther privately, that he would not desert him. Being thus ably supported, Luther continued to vindicate his opinions, and he gave a challenge to all the inquisitors to come and dispute with him at Wittenburg, promising them not only a safe conduct from the elector, but liberal entertainment, free from all expences, while they continued at that place. In the mean time Leo's ambition urged him to issue a bull, by which he attempted, by his papal authority, to put an end to the dispute about indulgences, and in this public paper, he magnified, almost without bounds, the efficacy of indulgences, and imperiously commanded all Christians to assent to what he delivered, as the doctrine of the Holy Catholic church. Luther was now satisfied that the storm would speedily fall upon him, and therefore had recourse

recourse to the only expedient left him, to ward off the effect of papal censures, by appealing from the pontiff to a general council, which he maintained to be superior in authority to the pope. In January 1519 the emperor died, which rendered it expedient for the court of Rome to suspend any direct proceedings against Luther; for by this event, the vicariat of that part of Germany, which is governed by Saxon laws, devolved on the elector of Saxony, and was executed by him during the interregnum which preceded the election of the emperor Charles V. Under the administration of this prince, Luther enjoyed tranquillity, and his opinions were suffered to take root, and even to grow up with some degree of strength and firmness.

Leo now hoped he should be able to bring back Luther to submission and obedience, without having recourse to harsh measures. He accordingly fixed on Charles Miltitz, a Saxon knight, a person endowed with much prudence and dexterity, whom he sent into Saxony, as his legate, to present the elector with a golden consecrated rose, as a mark of peculiar distinction, and also to treat with Luther about the means of reconciling him to the court of Rome. Miltitz, by his great address and soothing manners, and his encomiums on Luther's character, produced a considerable effect on his mind, and he made such concessions as proved, that his principles as a reformer were by no means steadily fixed. He agreed to observe a profound silence on the subject of indulgences, provided his adversaries were bound to the same measures; and he wrote a humble and submissive letter to the pope, acknowledging he had carried his zeal and animosity too far; and he even consented to publish a circular letter, exhorting his followers and adherents to reverence and obey the dictates of the Holy Roman church.

Had the court of Rome been sufficiently prudent, and accepted this submission of Luther, and prevented its own champions from engaging in the field of controversy, the cause of the reformation would have been lost. But the inconsiderate zeal of some of Luther's opponents, renewed the divisions which were so nearly healed, and obliged Luther and his followers to examine deeper into the enormities which prevailed in the papal hierarchy, as well as the doctrines of the church. During this year a famous controversy was carried on at Leipzig, on the challenge of Eckius, between himself and Carlstadt, concerning the freedom of the will, and at the same time he urged Luther to enter the lists with him, on the subject of the pope's authority and supremacy. The challenge was accepted, and on the appointed day the three champions appeared in the field. The assembly which met to witness the combat was numerous and splendid, and each of the combatants conducted himself with great skill and dexterity; in the course of the debate, Luther no doubt was carried farther than he dreamed of going, led on from one argument to another: he at length maintained, that the church of Rome, in the earlier ages, had never been considered as superior to other churches, and combated the pretensions of that church and its bishop, from the testimony of scripture, the authority of the fathers, and the most approved ecclesiastical historians, and even from the decrees of the council of Nice, while the best arguments of his adversary were derived from spurious decretals, none of which could boast of an antiquity equal to that of four centuries. Hoffman, the president, refused to declare on which side victory had fallen, and the question was referred to the universities of Paris and Erfurt. Eckius clearly saw that the auditors generally declared in favour of the arguments made use of by his adversary, and from this moment he breathed fury and revenge against Luther. The latter had, however, the happiness to know, that he had

convinced the celebrated Philip Melancthon, at that time professor of the Greek, at the university of Wittenburg, of the justice of his cause, and he soon after found a vigorous auxiliary in Ulric Zuingli, a canon of Zurich, in Switzerland, whose extensive learning and uncommon sagacity were accompanied with the utmost intrepidity and resolution. The party of reformers now was great in the talents, and illustrious in the characters of their leaders, who made, at this period, the utmost efforts to draw over Erasmus to their side. The reputation and authority of this great scholar were of the highest weight in Europe, as well on account of his talents as of his strictures upon the errors of the church, and upon the ignorance and vices of the clergy. He had sown the seeds which Luther cherished and brought to maturity, but was, however, too wary to entangle himself so deeply in the dispute as to lead him into any danger. About this time the universities of Cologne and Louvain took part against Luther, against whose decrees he immediately wrote with his usual spirit and intrepidity. Eckius likewise repaired to Rome, intent on accomplishing the ruin of Luther, and he thought he had performed the deed when, by his exertions and influence, pope Leo assembled the college of cardinals to prepare a sentence against him with such deliberation, as it was hoped no exception could be taken, either with regard to form or matter.

On the 15th of June 1520, the bull was issued, in which forty-one propositions, extracted from Luther's works, were condemned as heretical and scandalous, and all persons were forbidden to read his writings on pain of excommunication; those who possessed any of them were commanded, under severe penalties, to commit them to the flames. Luther himself, if he did not within sixty days publicly recant his errors, and burn his books, was pronounced an obstinate heretic, excommunicated, and delivered unto Satan for the destruction of the flesh; and all secular princes were required, under pain of incurring the same censure, to seize his person, that he might be punished as his crimes should be found to merit. Short-sighted priests, and rash bigots, contemplated in this sentence the ruin of Luther, and the termination of those principles which he had espoused; but it has proved fatal only to the church which uttered it, and to the cause which it was intended to support. When an account of what had happened was brought to Luther, he was neither disconcerted nor intimidated, but calmly consulted the most proper means of present defence, and future security. He appealed a second time to a general council, and came to the resolution of voluntarily renouncing communion with the church of Rome, and in justification of his own conduct, which he might well expect would be every where, though not by all persons, condemned, he exposed to the world, without the least disguise or ceremony, the abominable corruptions and delusions of the papal hierarchy; he went still farther, and without hesitation declared, in the most solemn manner, before the whole world, that the pope was the predicted "man of sin," the anti-christ set forth in the writings of the New Testament. Being now released from all obedience to the pope, and setting himself up in opposition to his power, he declaimed, without scruple, against his tyranny, and he exhorted all Christian princes to shake off the ignominious yoke, which had been so long imposed on them, but the weight of which neither they nor their fathers could well bear. He made it the theme of his joy and exultation, that he was marked out as an object of ecclesiastical indignation, because he had ventured to assert and vindicate the liberty of mankind. Luther proceeded from words to acts; Leo had burnt the books of Luther, and he, by way of returning the compliment, assembled all

the professors and students of the university of Wittenburg, and with much ceremony, in the presence of a prodigious multitude of people of all ranks and orders, committed to the flames the pope's bull, and the decretals and canons relating to his supreme jurisdiction: the example was soon followed in several cities of Germany. He next collected from the canon law some of the most extravagant propositions with respect to the omnipotence of the papal power, and the subordination of all secular jurisdiction to the authority of the holy see, which he published with a commentary, pointing out the impiety of such tenets, and their evident tendency to subvert all civil government. Within a month after this, a second bull was issued against him, by which he was expelled from communion with the church, for having insulted the majesty, and disowned the supremacy of the Roman pontiff. The intimidating power of papal condemnation had now lost its effect in Germany, and the bull of Leo put his antagonist upon the project of founding a church upon principles directly opposite to those of Rome, and to establish in it a system of doctrine and ecclesiastical discipline, more consonant with the spirit and precepts of the gospel.

From this time Luther never ceased to attack the corruptions of the church of Rome, and his reasoning made deep impressions upon the minds of the people; their respect and reverence for ancient institutions and doctrines in which they had been educated were shaken. Students crowded from all parts of the empire to Wittenburg, and under Luther, Melancthon, Carlostadt, and other eminent, and, for the time, truly enlightened professors, imbibed principles, which, on their return, they propagated among their countrymen with zeal and ardour. On the arrival of Charles V. in Germany, the first act of his administration was to assemble a diet of the empire at Worms. This meeting was fixed for the sixth of January 1521; in the circular letter to the different princes, the emperor informed them that the express purpose of this meeting, was to concert with them the proper measures for checking the progress of those new and dangerous opinions, which threatened to disturb the peace of Germany, and overthrow the religion of their ancestors. At the same time the pope gave notice to the elector of Saxony, of the decree which he had issued against the heresies of Luther, and requested that he would so far concur with him as to cause all the writings of Luther to be publicly burnt, and that he would either put the author of them to death, or imprison him, or at least send him to Rome. He sent a similar message to Wittenburg, but neither the elector nor the university paid any attention to the exhortations of his holiness. To the elector of Saxony Luther was under infinite obligations, as by him alone was the emperor prevented from taking steps, which would have been fatal to the progress of his cause. As soon as the diet was assembled at Worms, the papal legates insisted that they were bound, without deliberation, to condemn a man whom the pope had already excommunicated as an obstinate heretic. The emperor in this was ready to acquiesce, but the elector again stepped forth in defence of Luther, and not only prevented the publication of any unjust edict against him, but insisted that he ought to have his cause tried by the canons of the Germanic church, and the laws of the empire. It was therefore resolved, that Luther should be summoned before the diet, and be allowed a hearing before any final sentence should be pronounced against him. To protect him against the violence of his enemies, the emperor, and all the princes through whose territories he was to pass, granted him a safe conduct, and Charles himself wrote to require his immediate

attendance, renewing, in the most solemn manner, his assurances of protection from injury or ill-treatment. Luther had no sooner received the summons than he prepared to obey it. Nor could the remonstrances of his friends prevent him from running the risk of being treated as his books had been already treated. Some of them, anxious for his safety, reminded him of the fate of the celebrated Huss under similar circumstances, and protected by the same security of an imperial safe-conduct, and filled with solicitude, advised and entreated him not to rush wantonly into danger. But Luther with calmness and dignity replied, "I am lawfully called to appear at Worms, and thither will I go in the name of the most high God, though as many devils, as there are tiles on the houses, were there combined against me."

On the 16th of April Luther arrived at Worms, where greater crowds are said to have assembled to behold him, than had ever appeared at the emperor's public entry. While he continued in that city, he was not only treated with respect, but his apartments were resorted to by persons of high rank, and by the princes of the empire. Before the diet he behaved with becoming respect; he acknowledged that he had sometimes been carried away by the ardour of his temper, and that the vehemence of his writings could not always be justified. While, however, he readily admitted his errors, he shewed no inclination to renounce a single important principle which he had been promulgating, and he displayed the utmost presence of mind when he was called on to plead his cause before the grand assembly, on the 17th and 18th of April. That his reasonings should not change the minds of those who came to condemn, cannot be a matter of surprize, but when he was called on to recant, he solemnly declared, that he would neither abandon his principles, nor materially change his conduct, unless he were previously convinced, by the scriptures, or the force of reasoning, that his sentiments were erroneous and his conduct unlawful. Enraged at his unbending spirit, some of the ecclesiastics proposed, notwithstanding the promises made to the contrary, to avail themselves of the opportunity of having an enemy in their power, to deliver the church at once from such a pestilent heretic. But the members of the diet and the emperor also refused to act in a manner that must blast their character for ever with the world, and Luther was permitted to depart in safety. Scarcely, however, had he left the city, when, in the emperor's name, and by the authority of the diet, he was, in a most severe edict, pronounced an obstinate heretic, a member cut off from the church, deprived of the privileges which he had enjoyed as a subject of the empire, and the severest punishments were denounced against those who should receive, entertain, or countenance him, either by acts of hospitality, by conversation, or writing, and all were required to concur in seizing his person, as soon as the term of his safe-conduct expired. This decree produced scarcely any effect; the emperor was too much engaged by the commotions in Spain, and in the wars in Italy and the Low Countries, to attend to Luther, and the sovereign princes who had not been present at the diet, and who felt for the liberties of the empire, and the rights of the Germanic church, treated it with the highest indignation, or the utmost contempt. Luther was still, to the elector of Saxony, the object of his most anxious solicitude; and the measures which he adopted at this critical juncture, effectually secured him from the threatening storm. In consequence of a preconceived plan, and, as some historians have imagined, not without the knowledge of the emperor, as Luther was on his journey, near Eisenach, a number of horsemen in masks rushed out of a wood, and surrounding his company, carried

ried him off with the utmost speed to the castle of Wartenburg. There the noble-minded elector ordered him to be supplied with every thing that he could want, but the place of his retreat was kept a profound secret. The sudden disappearance of Luther not only occasioned the most bitter disappointment to his adversaries, but rendered them doubly odious to the people of Germany, who, not knowing what was become of their leader in reformation, conjectured a thousand things, till at length they were ready to give him up as destroyed by the fury of his enemies. Luther was, however, living in peace, and in the enjoyment of whatever was necessary to his well being and to his amusement; he was frequently indulged with the exercise of hunting in the company of those who had the charge of him, living in this retirement under the name of Yonker George. During the period of his solitude, he translated a great part of the New Testament into the German language, wrote and published tracts in defence of his doctrines, which, as soon as they were seen, revived and animated the spirit of his followers, and wrote frequent letters to his friends; he had also, during this period, the satisfaction of knowing that his opinions were gaining ground, and that they had already made some progress in almost every city in Saxony. Luther, weary at length of his retirement, appeared publicly at Wittenburg, in March 1522: this step he took without the elector's knowledge or consent, but he immediately wrote him a letter to prevent the possibility of his taking offence, assigning as a reason, that it was in consequence of the information which he had received of the proceedings of Carlostadt, one of his disciples, who was animated with similar zeal, but possessed less prudence and moderation than his master. This person, in the absence of Luther, had attempted to abolish the use of masks, to remove images out of the churches, to set aside auricular confession, the invocation of saints, and in short had quite changed the doctrine and discipline of the church at Wittenburg, all which Luther said was unseasonably and rashly done. At this time the doctrines of the reformer were not known in France; and in England, the sovereign, Henry VIII., had made the most vigorous exertions to prevent them from invading his realms: he even undertook to write them down, in a treatise entitled "Of the Seven Sacraments," &c. This work he presented to Leo X. in October 1521. The pope was so well pleased with the royal attempt to confute the arguments of Luther, that he complimented him with the title of "Defender of the Faith." Whatever respect and reverence Luther might shew to kings as such, he had none for the arguments of an antagonist, though armed with royal authority, and answered Henry with much severity, treating his performance in the most contemptuous manner. Luther now published his translation of the scriptures, which produced sudden, and almost incredible effects on the people of Germany, and proved more fatal to the church of Rome than all his other works. It was read with the utmost avidity by persons of every rank, who, with astonishment, discovered, how contrary the precepts of Christ are to the inventions of his pretended vicegerents, and being in possession of the rule and standard of faith, they conceived themselves qualified to judge of established opinions, and to pronounce when they were conformable to that standard. About this time, several imperial cities in Germany abolished the masks, and the other superstitious rites of popery, and openly embraced the reformed religion. The elector of Brandenburg, the dukes of Brunswick and Lunenburg, and the prince of Anhalt, became avowed patrons of Luther's opinions, and countenanced the preaching of them in their territories. Luther now made open war with the pope and bishops, and to render them as

despicable as possible, he wrote one book against the pope's bull, and another against the order falsely called the order of the bishops. The same year he wrote to the assembly of the states of Bohemia, in which he assured them that he was labouring to establish their doctrine in Germany, and exhorted them not to return to the communion of the church of Rome. Ferdinand, archduke of Austria, the emperor's brother, promulgated a very severe edict against the translation of the scriptures, and forbade all the subjects of his imperial majesty to possess any copies of it, or of Luther's other works. In this state of things Leo X. died, and was succeeded on the papal throne by Adrian VI., who immediately concerted measures with his cardinal concerning the best means for stopping the progress of heresy. The diet of the empire was holden soon after at Nuremberg, to which Adrian sent his brief, in which he observes, that he had heard with grief and indignation, that Martin Luther continued to teach the same errors, and to publish almost daily books full of heresies; that it appeared strange to him that so large and so religious a nation could be seduced by a wretched apostate friar; that nothing, however, could be more pernicious to Christendom, and that he therefore accordingly exhorts them to use their utmost endeavours to make Luther, and the authors of these tumults, return to their duty; or, if they refuse and continue obdurate, to proceed against them according to the laws of the empire.

The admonitions of his holiness produced no effect whatever, and the disciples of Luther advanced in their career with exultation and triumph. In 1523, Luther published several pieces; among these were some on the monastic life, which he attacked with great severity, and his exhortations, united with much strong satire, produced important effects, for soon after nine nuns, among whom was Catharine de Bore, whom he afterwards married, eloped from a nunnery and came to Wittenburg, an act that was as highly applauded by the reformer, as it was condemned by the devotees to the Roman church. Luther compares the deliverance of these nuns from the slavery of monastic life to that of the souls which Christ had delivered by his death. This year two of the followers of Luther were burnt at Brussels, and these were the first who suffered martyrdom for his cause: and about the same time that this tragical event was perpetrated, he wrote a consolatory letter to three noble ladies at Misnia, who were banished from the duke of Saxony's court at Eriburg, for reading his books.

On the death of Adrian VI., Clement VII. who succeeded him, sent a legate to the diet which was to be held at Nuremberg, to urge the necessity of a speedy execution of the edict of Worms: he was unsuccessful in the object of his mission, and found that the German princes, in general, were not at all inimical to the reformation; he accordingly retired to Ratisbon with the bishops, and those of the princes who adhered to the cause of Rome, where they engaged vigorously to execute the edict of Worms in their respective dominions. It was in the course of this year that the controversy between Erasmus and Luther on the doctrine of "free-will" commenced. Erasmus had been long urged to take up his pen against the reformer, though it was with the greatest reluctance that he yielded to the importunities of the pope and Catholic princes, suspecting that it would not be found the best mode of ending the differences, and establishing the peace of the church. At length he stood forward in defence of the doctrine of free-will, being desirous to clear himself from the suspicion of favouring a cause, which he would not wish to be thought in any way to favour. His book was entitled a "Conference concerning Free-will," which was written with much moderation, and without per-

sonal reflections. To soften the anger of Luther, he says in his preface, "That he ought not to take it ill that he differs from his opinions in particular points, as he had allowed himself the liberty of differing from the judgment of popes, universities, and doctors in the church." It was some time before Luther took up his pen in defence of his own positions, but his answer was extremely severe: he accused his opponent of "being careless about religion, and little solicitous what became of it, provided the world continued in peace, and that his notions were rather philosophical than dictated by Christian truth." Luther was next engaged in a controversy with Carlostadt, respecting the eucharist. Though Luther had renounced the doctrine of "transubstantiation," according to which the bread and wine were changed by consecration into the body and blood of Christ, yet he thought that the partakers of the Lord's supper received in some mystical way, with bread and wine, the real body and blood of Christ. This doctrine obtained the name of "consubstantiation." Carlostadt, who, as we have seen, was the disciple of Luther, maintained that the body of Christ was not actually present, but that the bread and wine were no more than external signs, or symbols, designed to excite in the minds of Christians the remembrance of the sufferings and death of Christ, and of the benefits which arise from them. This opinion was universally embraced by all the friends of the reformation in Switzerland, and by a considerable number of its votaries in Germany, but it was the commencement of a controversy that was carried on with much bitterness, which, notwithstanding the endeavours that were used to reconcile the contending parties, terminated at length in a fatal division between those who had embarked together in the sacred cause of religion and liberty, and which contributed to retard the progress of the reformation.

In the month of October 1524, Luther threw off the monastic habit, which, though not premeditated and designed, was regarded as a very proper introduction to a step which he took the following year, *viz.* his marriage to Catharine, the person already referred to, who had eloped from the nunnery of Nimptchen. This measure exposed him to much obloquy from his own friends, as well as from the Catholics. He was even ashamed of it himself, and acknowledged that it had made him so despicable, that he hoped his humiliation would give joy to angels, and be the source of vexation to devils. Melancthon found him so much afflicted with his past conduct, that he wrote some letters of consolation to him. It was not, it was said, so much the marriage, as the circumstances of the time, and the precipitation with which it was done, that occasioned the censures passed upon Luther. He married suddenly, and at a time when Germany was groaning under the miseries of a war which had been occasioned by the introduction of the new doctrines, and which will be noticed under the article REFORMATION. Luther soon recovered from the state of abasement into which he had for a season fallen, and then assumed his former air of intrepidity, and boldly supported what he had done. "I took," said he, "a wife, in obedience to my father's commands, and hastened the consummation, to prevent impediments, and stop the tongues of slanderers."

About this period Luther lost by death his friend, and the fast friend of the reformation, Frederic, elector of Saxony; but the blow was less sensibly felt, as he was succeeded by his brother John, a more avowed and zealous, but less able, patron of Luther and his doctrines. Frederic had been a kind of mediator between the Roman pontiff and the reformers of Wittenburg, and had always entertained the hope of restoring peace in the church, and of so recon-

ciling the contending parties, as to prevent a separation either in point of ecclesiastical jurisdiction or religious communion: hence, though rather favourable to the innovations of Luther, he took no pains to introduce any change into the churches of his own dominions, nor to subject them to his jurisdiction. But his successor acted very differently: he ordered a body of laws relating to the form of ecclesiastical government, the method of public worship, the rank, offices, and revenues of the priesthood, and other matters of that nature, to be drawn up by Luther and Melancthon, which he afterwards promulgated throughout his dominions. The example of this prince was followed by all the other princes and states of Germany, who renounced the papal supremacy and jurisdiction. The Lutherans were now threatened with a grievous persecution, which the public troubles of Europe only prevented from being carried into execution: they, on the other hand, were not negligent in taking effectual measures for defending themselves against the superstition and violence of their adversaries, and formed the plan of a confederacy for that prudent purpose.

In June 1526, a diet of the empire was held at Spire, at which Ferdinand, the emperor's brother, presided; Charles being fully occupied with the troubles in Spain and Italy. When the state of religion came before the assembly, the emperor's ambassadors used their utmost endeavours to obtain a resolution, that all disputes about religion should be suppressed, and that the sentence which had been pronounced at Worms against Luther and his followers should be put into rigorous execution; but it was agreed, that they could not execute that sentence, nor come to any determination with respect to the doctrines by which it had been occasioned, before the whole matter was submitted to the cognizance of a general council, lawfully assembled. An address to the emperor was unanimously agreed on, beseeching him to assemble, without delay, a free and general council; and it was also resolved, that, in the mean time, the princes and states of the empire should, in their respective dominions, be at liberty to manage ecclesiastical matters in the manner which they should think expedient; yet so as to be able to give an account of their administration to God and the emperor. This was a resolution the most favourable to the cause of Lutheranism; and several potentates, whom the dread of persecution had hitherto prevented from declaring for the reformation, being now delivered from their restraint, renounced publicly the superstition of Rome, and introduced among them the same form of religious worship, and the same system of doctrine, which had been received in Saxony. Luther and his fellow-labourers, in the mean time, by their writings, their instructions, their admonitions, and counsels, were carrying on their great cause with a spirit suitable to the importance and greatness of their undertaking. But this encouraging state of affairs was not of long duration: the emperor began to take measures for the recovery of those prerogatives which had been snatched from his predecessors, and which were necessary to the promotion of his ambitious schemes. For this purpose, he regarded it as necessary to suppress opinions, which might form new bonds of confederacy among the princes of the empire, and unite them by ties stronger and more sacred than any political connection. He accordingly resolved to employ all the means in his power for the full establishment of the religion, of which he was regarded the natural protector; considering this as the instrument by which he could extend his civil authority. He appointed, for this purpose, a diet of the empire to be held at Spire, in the spring of 1529, for the express purpose of taking into consideration the state of religion. In that diet the archduke Ferdinand presided, and

and had the address to procure a majority approving a decree, which declared it unlawful to introduce any change in the doctrine, discipline, or worship of the established religion, before the determinations of a general council were known. This decree was exceedingly revolting to the elector of Saxony, and other princes, as well as to the deputies of fourteen imperial cities, who, in a body, when they found their arguments and remonstrances of no avail, entered their solemn *protest* against it, on the 19th of April 1529, and appealed to the emperor and a future council. On this account they were distinguished by the name of PROTESTANTS, which, from this period, has been applied to all sects of whatever denomination which have separated themselves from the Roman church. The protesting princes sent embassies to the emperor, which were ill received; and in answer to one of them, they received an account that he was determined to come into Germany, with a view to terminate, in a diet to be held at Augsberg, in June 1530, the religious disputes which had produced so many and grievous divisions in the empire. Charles had many consultations with pope Clement VII. concerning the most effectual means for that purpose. In these interviews the emperor insisted, in the most urgent manner, on the necessity of assembling a general council: to this his holiness was a decided enemy, because he had learnt from history that general councils were factious, un governable, and slow in their operations; and he contended that the surest way was for the emperor to do his duty, in supporting the authority of the church, and in employing all his power in executing speedy vengeance on the obstinate heretical factions, who dared to call in question the authority of the holy Roman see. Charles was still for mild and conciliatory measures, but promised if these should prove ineffectual, that then he would employ the weight of his authority in reducing the rebellious to implicit obedience. In his journey to Augsberg he had full opportunity of knowing the sentiments of the people, and, from his own observation, he was satisfied that severity ought not to be attempted, until other measures proved ineffectual: he therefore called on the elector of Saxony to obtain from Luther, and other eminent divines, a written explication of their religious system, and an explicit avowal of the several points in which they differed from the church of Rome. Luther delivered to the elector at Torgaw seventeen articles, called "The articles of Torgaw," which were deemed by him a proper declaration of the sentiments of the reformed. By others they were not thought sufficiently open, and Melancthon was desired to give an account of the same, who, with a due respect to the sentiments of Luther, expressed his opinions, and set forth his doctrine, with the greatest elegance and perspicuity, and in terms as little offensive as possible to their opponents. Such was the origin of the creed, celebrated in history as "The confession of Augsberg." In June 1530, the diet was opened; and in a few days, the Protestants, who had adopted the opinions of Zuingli, delivered their confession, drawn up by Martin Bucer. A refutation of this was undertaken by Faber, Eckius, and Cochleus, which was read publicly in the diet; and the unlimited submission of the Protestants to the doctrines contained in it was required by the emperor. Instead, however, of yielding obedience to the imperial command, they demanded a copy of the paper, in order that they might have an opportunity of demonstrating more fully its extreme insufficiency and weakness. This request was refused, and there was now no prospect of a reconciliation. The emperor next attempted to bring over to his views the princes who had been sometime the patrons of the new doctrines: but however desirous

they might be of obliging the emperor, they would not make sacrifices to him of their integrity, and, in a firm tone, refused to abandon what they deemed the cause of God, for the sake of any earthly acquisition. The emperor, disappointed and exceedingly vexed, resolved to take vigorous measures for asserting the authority and doctrines of the established church, and enforcing the submission of heretics. He accordingly condemned the peculiar tenets held by the Protestants, forbidding any person to protect or even tolerate such as taught them, enjoining a strict observance of the established rites, and prohibiting any further innovation under severe penalties. This decree, which was regarded as a prelude to the most violent persecution, convinced the Protestants that the emperor was resolved on their destruction; and the dread of the calamities which were ready to fall on the church oppressed the spirit of Melancthon, who resigned himself to a settled melancholy. Luther, however, was not at all disheartened, and used his utmost efforts to keep up the spirits of those who were willing to give way; being assured that their personal safety, as well as success, depended wholly on union. In pursuance of this opinion, they assembled in 1530, first at Smalcald, and afterwards at Frankfort, where they formed a solemn alliance and confederacy, with the resolution of defending vigorously their religion and liberties against the dangers with which they were threatened by the edict of Augsberg. They invited the kings of England, France, and Denmark, to join in the confederacy; and, by their negotiations, secured powerful protection and assistance, in case of necessity. Luther was at first averse from this confederacy, dreading the calamities which it might produce. In this state of things, the elector palatine and the elector of Mentz offered their mediation, and endeavoured to reconcile the contending princes; and, in a short time, negotiations were carried on, that finally produced a pacification, the terms of which were agreed upon at Nuremberg, and solemnly ratified in the diet at Ratibon, August 3d, 1532. By this treaty, the Protestant princes engaged to assist the emperor with all their forces, in resisting the invasion of the Turks; and it was stipulated that universal peace should be established in Germany, until the meeting of a general council, the convocation of which the emperor was to endeavour to procure within six months; that no person should be molested on account of religion; that a stop should be put to all processes begun by the imperial chamber against the Protestants; and that the sentences already passed to their detriment should be declared void.

Luther now had the satisfaction and happiness of seeing one of the chief obstacles to the undisguised profession of his opinions removed; and henceforth he might sit down and contemplate the mighty work which he had accomplished: his disciples and followers, the Protestants of Germany, who had hitherto been regarded only as a religious sect, came to be considered as a political body of some consequence. The emperor, in conformity to the stipulations of the truce lately concluded, applied to the pope for a general council: but Clement threw a multitude of obstacles in the way to prevent it; and when he found that to be impossible, he insisted that the meeting should be held in Italy, but the Protestants contended for it in Germany. The latter insisted that all matters in dispute should be determined by the words of Scripture alone: the pope asserted that the decrees of the church and the opinions of the fathers were of equal authority. They required a free council, in which the divines, commissioned by different churches, should be allowed a voice; he aimed at modelling the council in such a manner as would render it entirely dependent on his pleasure.

Above

Above all, the Protestants thought it unreasonable that they should bind themselves to submit to the decrees of a council, before they knew on what principles those decrees were founded, by what persons they were to be pronounced, and what forms of proceeding they would observe. The pope maintained it would be unnecessary to call a council, unless those who demanded it previously declared their resolution to acquiesce in its decrees. The meeting was accordingly postponed during the pontificate of Clement VII.

In 1533 Luther wrote a consolatory epistle to some persons who had suffered hardships for adhering to the Augsburg confession of faith, in which he says, "The devil is the host, and the world is his inn; so that wherever you come, you will be sure to find this ugly host." He had also, about this time, a terrible controversy with George, duke of Saxony, who had such an aversion to the doctrines promulgated by Luther, that he obliged his subjects to take an oath that they would never embrace them. At Leipzig there were found sixty or seventy persons, who could not be restrained within the boundaries of the established creed, and it was discovered that they had consulted Luther about it; upon which the duke complained to the elector, that Luther had not only abused his person, but had preached up rebellion among his subjects. Luther refuted the accusation, by proving that he had been so far from stirring up his subjects against him, on the score of religion, that he had exhorted them rather to undergo the greatest hardships, and even suffer themselves to be banished. In the following year, the bible, translated by Luther into the German, was first printed, with the privilege of the elector; and it was published the year after. He likewise gave to the world a book against masses, and the consecration of priests, in which he relates a conference which he had with the devil upon those points: for it is a circumstance worthy of observation, that, in the whole history of this great man, he never had any conflicts of any kind, but the devil was always his antagonist. In 1535 the new pope Paul III. was applied to for a general council; and in the hope of preventing it, he appointed Mantua as the proper place. To this some of the Catholic sovereigns, and all the German Protestants, strongly objected; being fully persuaded that, in such a council, nothing would be concluded but what would be agreeable to the sentiments and ambition of the pontiff; and they demanded the performance of the emperor's promise, that they should have a council in Germany. At the same time, that they might not be taken by surprise, they desired Luther to draw up a summary of their doctrine, in order to present it to the assembled bishops, if it should be required of them. This summary, which was distinguished by the name of "The articles of Smalcalde," from the place at which they were assembled, is generally joined with the creeds and confessions of the Lutheran church. While our reformer was busily engaged in this work, he was seized with a grievous and very painful disease, a tit of the stone and obstruction of the urine, which continued so long as to give his friends serious apprehensions for his life. In the midst of his agonies, and after eleven days' torture, without the smallest relief, he set out, contrary to the advice of his friends, on his return home. The motion of the carriage, which it was expected would prove fatal to him, was the cause of removing the evil under which he was labouring. In the year 1538, as a general assembly seemed impracticable, the pope, that he might not seem to neglect that degree of reformation which was unquestionably within his power, deputed a certain number of cardinals and bishops, with full authority, to inquire into the abuses and corruptions of the Roman court, and to propose the most effectual

method of removing them. It was intended to do as little as possible: still a multitude of enormities were unveiled, an account of which was soon transmitted into Germany, much to the satisfaction of the Protestants there. This investigation, partial as it was, proved the necessity of a reformation in the head as well as the members of the church; and it even pointed out many of the corruptions, against which Luther had remonstrated with the greatest vehemence. It was, however, intended only as a farce, and as such Luther treated it; and to ridicule it more strongly, he caused a caricature to be drawn, in which was represented the pope seated on a high throne, some cardinals about him with foxes' tails, with which they were brushing off the dust on all sides. Luther published, about the same time, "A Confutation of the pretended Grant of Constantine to Sylvester, bishop of Rome; and also some Letters of John Hufs, written from his Prison at Constance, to the Bohemians." On the death of George, duke of Saxony, the succession devolved on his brother Henry, who was zealously attached to the Protestant religion, and who, notwithstanding a clause in his brother's will, by which he bequeathed all his territories to the emperor and the king of the Romans, should Henry make any attempt to introduce innovations, immediately invited Luther and some other Protestant divines to Leipzig. By their aid and advice he quickly overturned the whole system of Popish rites and doctrines, and established the full exercise of the reformed religion, with the universal applause of his subjects, who had long wished for this change. By this revolution, the whole of Saxony was brought within the Protestant pale.

Luther was incessantly employed, till his death, in promoting the cause of which he was the great founder. In the year 1546, he, in company with Melancthon, paid a visit to his own country, which he had not seen before for many years, and he returned in safety; but in a short time after, he was called thither by the earls of Mansfeldt, to compose some differences which had arisen about their boundaries. Though he had not been accustomed to such kind of business, yet he would not refuse the service which he might be able to render by his advice and authority. On this occasion he met with a splendid reception, used his best endeavours to settle the matters in dispute, and sometimes officiated in the church; but the state of his health was so precarious, that it was feared every great effort would prove fatal to him. His last public service was in the church, where he was seized with a violent inflammation in the stomach. His natural intrepidity did not forsake him; and his last conversation with his friends was concerning the happiness reserved for good men in a future life. On the morning of the 12th of February 1546, being awakened from a sound sleep by his disorder, and perceiving his end to be approaching, he commended his spirit into the hands of God, and quietly departed this life at the age of sixty-three. He did not forget his cause even in his dying moments, but admonished those about him to pray to God for the propagation of the gospel; "because," said he, "the council of Trent, which has sat once or twice, and the pope, will devise strange things against it." Immediately after his decease, the body was put into a leaden coffin, and carried with funeral pomp to the church at Eisleben, when Dr. Jonas preached a sermon on the occasion. The earls of Mansfeldt requested that his body might be interred in their territories; but the elector of Saxony insisted upon his being brought back to Wittenburg, which was accordingly done, and he was buried there with greater pomp than had been known to have accompanied the funeral of any private man. Princes, earls, nobles, and students without number, attended

tended the procession, and Melancthon delivered a funeral discourse. He left several children by his wife Catharine de Bore. Innumerable were the calumnies invented by his enemies respecting his death, his principles, and his conduct, which it is needless for us to repeat, as they have been amply refuted by the most respectable historians. The zeal and madness of the Papists against their formidable antagonist, who had shaken to the foundation the pillars of their faith, did not cease with his death. They urged the emperor Charles V., while with his army at Wittenburg, to cause the monument erected to his memory to be demolished, and his bones to be dug up and burnt with every indignity; but the mind of Charles was superior to such childish and malignant acts, and he instantly forbade that any insult should be offered to his tomb, or his remains, upon pain of death. "I have," said the emperor, "nothing farther to do with Luther: he is henceforth subject to another judge, whose jurisdiction it is not lawful for me to usurp. Know, that I make not war with the dead, but with the living, who are still in arms against me." We cannot bring this article to a close, without referring to the testimonies of the learned and the wise respecting the character of Luther, who introduced, not into Germany only, but into the world, a new and most important era, and whose name can never be forgotten while any thing of principle remains that is deserving of remembrance. It must not be overlooked, that the grand and leading doctrine of Lutheranism, and that on which the permanent foundation of the reformed religion was laid, is the right of private judgment in matters of religion. To this, as we have seen, he was at all times ready to devote his talents, his character, and his life; and says the biographer of Leo X., "the great and imperishable merit of the reformer consists in his having demonstrated it by such arguments, as neither the efforts of his adversaries, nor his own subsequent conduct, have been able either to confute or invalidate." In passing judgment upon the characters of men, says Robertson, we ought to try them by the principles and maxims of their own age, and not by those of another: for although virtue and vice are at all times the same, manners and customs are continually varying. Some parts of Luther's behaviour, which to us appear most culpable, gave no disgust to his contemporaries. It was even by some of those qualities, which we are now apt to blame, that he was fitted for accomplishing the great work in which he embarked.

Luther himself was sensible of defects, which he pathetically acknowledges in an address to the reader of his work: "I intreat you," says he "to read my writings with cool consideration, and even with much pity. I wish you to know that when I began the affair of indulgences, I was a monk, and a most mad papist. So intoxicated was I, and drenched in papal dogma, that I would have been most ready at all times to murder, or assist in murdering, any person who should utter a syllable against the pope. I was always earnest in defending doctrines I professed. I went seriously to work, as one who had a horrible dread of the day of judgment, and who from his inmost soul was anxious for salvation. You will find, therefore, in my earlier writings, with how much humility, on many occasions, I gave up considerable points to the pope, which I now detest as blasphemous and abominable in the highest degree. This error my followers may call inconsistency; but you, my pious readers, will have the kindness to make some allowance, on account of the time, and my own inexperience. I stood absolutely alone at first, and certainly was very unlearned, and very unfit to undertake matters of such vast importance. It was by accident, not willingly or by de-

sign, that I fell into those violent disputes. God is my witness."

"Martin Luther, resenting an affront put on his order, began to preach against abuses in the state of religion, and being naturally of a fiery temper, and provoked by opposition, he proceeded even to defy indulgence sellers, and was thence carried, by the heat of dispute, to question the authority of the pope. Still, as he enlarged his views, in order to support these tenets, he discovered faults, or abuse or error in the church of Rome, and finding his opinions greedily hearkened to, he promulgated them by writing, discourse, sermons, conference, and daily increased the number of his disciples. All Saxony, all Germany, all Europe, were in a little time filled with the voice of this daring innovator; and men, roused from that lethargy in which they had so long slept, began to call in question the most ancient and received opinions. The elector of Saxony, favourable to Luther's doctrine, protected him from the violence of the papal jurisdiction: the republic of Zurich even reformed their church according to the new model; many sovereigns of the empire, and the imperial edict itself, shewed a favourable disposition towards it: and Luther, a man naturally inflexible, vehement, and opinionative, was become incapable, either from promises of advancement or terrors of severity, to relinquish a sect of which he himself was the founder, and which brought him a glory superior to all others, the glory of dictating the religious faith and principles of multitudes."

Dr. Campbell, in his lectures on Ecclesiastical History, has rendered our reformer his testimony of respect and gratitude; but as this is conveyed in sentiments and language but little different from the observations of Dr. Robertson, we shall extract the account from the latter rather than the former: "As he was raised up by Providence to be the author of one of the greatest and most interesting revolutions in history, there is not any person, perhaps, whose character had been drawn with such opposite colours. In his own age, one party, struck with horror and inflamed with rage, when they saw with what a daring hand he overturned every thing which they held to be sacred, or valued as beneficial, imputed to him not only all the defects and vices of a man, but the qualities of a demon. The other, warmed with admiration and gratitude, which they thought he merited as the restorer of light and liberty to the Christian church, ascribed to him perfections above the condition of humanity, and viewed all his actions with a veneration, bordering on that which should be paid only to those who are guided by the immediate inspiration of heaven. It is his own conduct, not the undistinguishing censure, or the exaggerated praise of his contemporaries, that ought to regulate the opinions of the present age concerning him. Zeal for what he regarded as truth, undaunted intrepidity to maintain his own system, abilities, both natural and acquired, to defend his principles, and unwearied industry in propagating them, are virtues which shine conspicuously in every part of his behaviour, that even his enemies must allow him to have possessed them in an eminent degree. To these may be added, with equal justice, such purity, and even austerity of manners, as became one who assumed the character of a reformer; such sanctity of life as suited the doctrine which he delivered, and such perfect disinterestedness as affords no slight presumption of his sincerity. Superior to all selfish considerations, a stranger to all the elegancies of life, and despising its pleasures, he left the honours and emoluments of the church to his disciples, remaining satisfied himself in his original state of professor of the university, and pastor of the town of Wittenburg.

with

with the moderate appointments annexed to each. His extraordinary qualities were allayed with no inconsiderable mixture of human frailty, and human passions. These, however, were of a nature, that they cannot be imputed to malevolence or corruption of heart, but seem to have taken their rise from the same source with many of his virtues. Accustomed himself to consider every thing as subordinate to truth, he expected the same deference for it from other men; and, without making any allowances for their timidity or prejudices, he poured forth against such as disappointed him in this particular, a torrent of invective and abuse. Regardless of any distinction of rank or character when his doctrines were attacked, he chastised all his adversaries indiscriminately, with the same rough hand; neither the royal dignity of Henry VIII. nor the eminent learning and abilities of Erasmus, screened them from the same gross abuse with which he treated Tetzel or Eckius. To rouse mankind, when sunk in ignorance and superstition, and to encounter the rage of bigotry armed with power, required the utmost vehemence of zeal, as well as a temper daring to excess. A gentle call would neither have reached, nor have excited those to whom it must have been addressed. A spirit more amiable but less vigorous than Luther's would have shrunk back from dangers which he braved and surmounted. Towards the close of Luther's life, though without any perceptible diminution of his zeal and abilities, the infirmities of his temper increased upon him, so that he grew daily more peevish, more irascible, and more impatient of contradiction. Having lived to be a witness of his own amazing success; to see a great part of Europe embrace his doctrines, and to shake the foundation of papal Rome, before which the mightiest monarchs had trembled, he discovered, on some occasions, symptoms of vanity and self-applause. He must have been, indeed, more than man, if, upon contemplating all that he actually accomplished, he had never felt any sentiment of this kind rising in his breast." There is yet another testimony to the life and labours of this great man that we cannot omit:

"Martin Luther's life," says bishop Atterbury, "was a continual warfare; he was engaged against the united forces of the papal world, and he stood the shock of them bravely, both with courage and success. He was a man certainly of high endowments of mind and great virtues: he had a vast understanding which raised him up to a pitch of learning unknown to the age in which he lived; his knowledge in scripture was admirable, his elocution manly, and his way of reasoning with all the subtilty that these plain truths he delivered would bear, his thoughts were bent always on great designs, and he had a resolution fitted to go through with them, and the assurance of his mind was not to be shaken or surprised, and that *zeugnis* of his (for I know not what else to call it) before the diet of Worms, was such as might have become the days of the apostles. His life was holy, and, when he had leisure for retirement, severe; his virtues active chiefly, and hominical, and not those lazy sullen ones of the cloister. He had no ambition but in the service of God: for other things, neither his enjoyment nor wishes ever went higher than the bare conveniences of living. He was of a temper particularly averse to covetousness, or any base sin, and charitable even to a fault, without respect to his own occasions. If, among this crowd of virtues, a failing crept in, we must remember that an apostle himself had not been irreproachable; if, in the body of his doctrine, one flaw is to be seen, yet the greatest lights of the church, and in the purest times of it, were, we know, not exact in all their opinions. Upon

the whole, we have certainly great reason to break out in the phrase of the prophet and say, "How beautiful, upon the mountains, are the feet of him that bringeth glad tidings." Gibbon, speaking of the effects produced by the exertions of Luther and his contemporaries, says, "The philosopher must own his obligations to these fearless enthusiasts. 1. By their hands the lofty fabric of superstition, from the abuse of indulgences to the intercession of the Virgin, has been levelled with the ground. Myriads of both sexes of the monastic profession were restored to liberty and the labours of social life. 2. The chain of authority was broken which restrains the bigot from thinking as he pleases, and the slave from speaking as he thinks. The popes, fathers, and councils were no longer the supreme and infallible judges of the world; and each Christian was taught to acknowledge no law but the scriptures, no interpreter but his own conscience."

The works of Luther, in the Latin and German languages, were collected and published in an uniform edition, at Jena, in 1556, in four volumes folio; and in 1572 they were printed at Wittenburg, in seven volumes folio. Luther left behind him three sons and a widow. The latter survived him nearly seven years. When the war broke out Catharine wandered about in exile with her children, in difficulties and dangers: she experienced the ingratitude of many, from whom expecting kindnesses, on account of her husband's great merits towards the church, she was frequently disappointed. At length, the plague raging at Wittenburg, and the infection having reached her own house, she removed to Torgau, that she might preserve her children from the disorder. On her way thither the horses in the carriage took fright; to avoid, what she conceived, a greater danger, she leaped into the road, and falling into a pool of water, was dreadfully bruised, and contracted an illness, which in a few weeks terminated her life. Preface to Luther's works: MS. translation of Melchior Adams Life of Luther. Bayle. Robertson. Hume. Gibbon.

Martin Luther, with respect to ecclesiastical music, being himself a lover and judge of the art, was so far from banishing it from the church, that he augmented the occasion for its use. In 1521 he procured the abolition of the ancient mass at Wittenburg. In 1523 Lutheranism was established in Denmark and Sweden; and, in 1525, Saxony, Brunswick, Hesse, Strasburg, and Frankfort. But though he instituted a new liturgy, the ecclesiastical tones still regulated the music of his church at the time of the reformation, and most of the old melodies to the evangelical hymns are composed in some of them.

The Cantata, or anthems and services of the reformed church, in the German language, are, however, as elaborate and florid as the motets to Latin words, used in Italy during the celebration of the mass. But in the hymnologia, and metrical psalmody of this, as well as all other Protestant churches, there seems to have been one common principle, totally inimical to poetry, which is that of destroying all quantity and distinction of syllables, by making them all of the same length.

"These *equal syllables* alone admire,
Though oft the ear the open vowels tire."
Pope.

The modern Methodists, indeed, have introduced a light and ballad-like kind of melody into their tabernacles, which seems as much wanting in reverence and dignity, as the psalmody of other sects in poetry and good taste.

Music, in itself an innocent art, is so far from corrupting the mind, that, with its grave and decorous strains, it

can calm the passions, and render the heart more fit for spiritual and pious purposes; particularly when united with language, and the precepts of religion. It has been said, not improperly, that "Music, considered abstractedly, is in itself a language;" and we may add, that it is more universally understood by mankind in general, whose nerves vibrate in unison with its selected tones, than any other language among all the dialects of the earth. That articulation must be rough and violent indeed, which, without fingering, can easily be comprehended in buildings so vast as some of the Christian churches; in such, it is the *spirit*, not the *letter* of supplication or thanksgiving, which must employ the mind. St. Paul says, "I will sing with the *spirit*, and I will sing with the *understanding* also." As there never was a national religion without music of some kind or other, the dispute concerning that which is most fit for such solemnities, is reduced to one short question. If music be admitted into the service of the church, is that species of it which the most polished part of mankind regard as *good*, or that which they regard as *bad*, the most deserving of such an honour?

That metrical psalmody, in slow notes of equal length, had its origin in Germany, and was brought thence by reformers to other parts of Europe, is demonstrable: for the 128th Psalm, "Beati omnes qui timeant Dominum," had been translated into German verse, in order to be sung in this manner, by John Hufs, in the beginning of the fifteenth century; which translation was afterwards modernized in the same measure, and to the same tune, by Luther. And the same melody which we sing to the 100th psalm, is not only given to the 134th, in all the Lutheran psalm-books, but by Goudimel and Claude le Jeune, in those of the Calvinists; which nearly amounts to a proof that this favourite melody was not produced in England. It is said to have been the opinion of Handel, that Luther himself was its author; but of this we have been able to procure no authentic proof. Tradition, however, gives to this celebrated Heresiarch, as he is called by the Roman Catholics, several of the ancient melodies which are still used in Germany.

LUTHERANISM, in *Ecclesiastical History*, the sentiments of Dr. Martin Luther, and his followers, with regard to religion. See the biographical article **LUTHER**, under which article we have given an account of the life and labours of this eminent reformer; and of the commencement and foundation of that memorable rupture and Revolution in the church, which humbled the grandeur of the lordly pontiffs, and eclipsed so great a part of their glory. See **REFORMATION**.

It has been said indeed by F. Paul, in his History of the Council of Trent, p. 5, and after him by Mr. Hume, in his History of England, vol. i. p. 119, as well as by others, that the Austin friars had been usually employed in preaching indulgences in Saxony; but that Arcemboldi, a Genoese merchant, who was employed by Magdalen, the sister of Leo, to whom he had granted the profits arising from the sale of indulgences in Saxony, to collect the money which should be raised, and his deputies, hoping to gain more by committing this trust to the Dominicans, had bargained with Tetzel; and that Luther was prompted at first to oppose Tetzel and his associates, and to deny indulgences, by a desire of taking revenge for this injury offered to his order. Such was the representation of Bossuet; and other writers, misled by his authority, have circulated a similar opinion. It is proper, therefore, to observe, that the profits arising from indulgences in Saxony and the adjacent countries were granted, not to Magdalen,

the sister of Leo, but to Albert, archbishop of Mentz, who had the sole right of nominating those who published them; moreover, Arcemboldi never had any concern in the publication of indulgences in Saxony; because his district was Flanders and the Upper and Lower Rhine. Besides, the publication of indulgences in Germany was not usually committed to the Augustinians: from the year 1229, that lucrative commission was principally intrusted with the Dominicans; and they had been employed in the same office a short time before the present period: the promulgation of them, at three different periods under Julius II. was granted to the Franciscans, and the guardian of the Franciscans was joined in the trust with Albert on this occasion, though he refused to accept it: and it is remarkable, that for half a century before Luther, viz. from 1450 to 1517, the name of an Austin friar employed in this service occurs but once. To these facts it may be added, that it is far from being probable, that Luther would have been solicitous about obtaining for himself or his order, a commission of this kind, at a time when the preaching of indulgences was become very unpopular; inasmuch that all the princes of Europe, and many bishops, as well as other learned men, abhorred the traffic; and even the Franciscans and Dominicans, towards the conclusion of the fifteenth century, opposed it publicly, both in their discourses and writings: nor was this commission given to the Dominicans in general, but solely to Tetzel. Finally, Luther was never accused of opposing the publication of indulgences from resentment or envy, either in the edicts of the pontiffs of his time, or in the reproaches of his contemporary writers, who defended the cause of Rome from the year 1517 to 1546, and who were far from being sparing of their invectives and calumnies. The reader may find this matter fully stated by Dr. Maclean, the translator of Mosheim's Ecclesiastical History, in vol. iv. p. 31. note (p) 8vo. edit. 1790, and by Dr. Robertson in his Hist. of Ch. V. vol. ii. p. 125. note (*), 8vo. edit.

Lutheranism was formed in the manner stated under the article **LUTHER**; the adherents to which were called Lutherans, from Lutherus, a name which has a Greek turn, and which this great reformer assumed in lieu of his family name *Lotter*, or *Lauter*; it being the custom of those days for men of learning to give themselves Greek names; such were Erasmus, Melancthon, Bacon, &c.

For a full and accurate account of the rise and progress of Lutheranism, the reader may consult Mosheim and Robertson, *ubi supra*. See **PROTESTANTS** and **REFORMATION**.

Lutheranism has undergone some alteration since the time of its founder. Luther rejected the epistle of St. James, as inconsistent with the doctrine of St. Paul, in relation to justification; he also set aside the Apocalypse; both which are now received as canonical in the Lutheran church.

Luther reduced the number of sacraments to two, viz. baptism, and the eucharist; but he believed the impanation, or consubstantiation: that is, that the matter of the bread and wine remain with the body and blood of Christ; and it is in this article, that the main difference between the Lutheran and English churches consists.

Luther maintained the mass to be no sacrifice; he exploded the adoration of the host, auricular confession, meritorious works, indulgences, purgatories, the worship of images, &c. which had been introduced in the corrupt times of the Romish church. He also opposed the doctrine of free-will; maintained predestination; asserted that we are necessitated in all we do; that all our actions done in a state of sin, and even the virtues themselves of heathens, are

crimes; that we are only justified by the imputation of the merits and satisfaction of Christ. He also opposed the fustings in the Romish church, monastical vows, the celibacy of the clergy, &c.

Some authors reckon thirty-nine different sects, which at different times have sprung up among the Lutherans.

LUTHERANS, a sect of Protestants who profess Lutheranism, or adhere to the doctrine and tenets of Luther.

The Lutherans, of all Protestants, are those who differ least from the Romish church; as they affirm, that the body and blood of Christ are materially present in the sacrament of the Lord's supper, though in an incomprehensible manner; and likewise represent some religious rites and institutions, as the use of images in churches, the distinguishing vestments of the clergy, the private confession of sins, the use of wafers in the administration of the Lord's supper, the form of exorcism in the celebration of baptism, and other ceremonies of the like nature, as tolerable, and some of them as useful. The Lutherans maintain, with regard to the divine decrees, that they respect the salvation or misery of men, in consequence of a previous knowledge of their sentiments and characters, and not as free and unconditional, and as founded on the mere will of God. Towards the close of the last century, the Lutherans began to entertain a greater liberality of sentiment than they had before adopted; though in many places they persevered longer in severe and despotic principles than other Protestant churches. Their public teachers now enjoy an unbounded liberty of dissenting from the decisions of those symbols or creed, which were once deemed almost infallible rules of faith and practice, and of declaring their dissent in the manner they judge the most expedient. Mosheim attributes this change in their sentiments to the maxim, which they generally adopted, that Christians were accountable to God alone for their religious opinions; and that no individual could be justly punished by the magistrate for his erroneous opinions, while he conducted himself like a virtuous and obedient subject, and made no attempts to disturb the peace and order of civil society. *Ecl. Hist.* vol. iv. p. 440. Eng. ed. 8vo.

LUTHERN, from the French *lucarne*, of the Latin *lucerna*, *light*, or *lantern*, a kind of window over the cornice, in the roof of a building; standing perpendicularly over the naked of the wall; and serving to illuminate the upper story.

The French architects distinguish these into various kinds, according to their various forms; as *square*, *semicircular*, *bulls' eyes*, *flat arches*, *Flemish lutherns*, &c.

LUTHIER, *Fr.* implies not only a lute maker, but a maker of all stringed and bowed instruments.

LUTI, **BENEDETTO**, in *Biography*, a Florentine, was the disciple of Gabbiani, and from him went to Rome, to put himself under the direction of Ciro Ferri; but being disappointed by his death, formed a style of his own, the result of various imitations; select in design, amene and lucid in colour, well contrasted by masses of light and shade, and harmonious to the eye.

He painted not without merit in fresco, and with greater merit in oil. "Cain flying from his murdered Brother," has something of the sublimity and the pathos that strike in the Pietro Martyre of Titian, and his Psyche in the gallery of the Capitol, breathing refinement of taste and elegance. He died in 1724, at the age of 58. Fufen's Pilkington.

LUTKENBURG, in *Geography*, a town of the duchy of Holstein; 30 miles N. of Lubeck.

LUTOMIRSK, a town of the duchy of Warsaw; 18 miles S.S.E. of Lencicz.

LUTON, a considerable market-town and parish in the

hundred of Flitt, Bedfordshire, England, is situated among some hills on the banks of the river Lea, three miles from Dunstable, and 31 from London. The town is long and irregular, shaped something like the Roman Y, the angles branching off from the market-house, which is an extensive building. The population of the parish, according to the return in the year 1801, was 3095, inhabiting 612 houses, which are but indifferently built. The only structure in the town deserving attention is the church, which consists of a choir, a nave and two aisles, supported by ten pointed arches, two transepts, and a handsome embattled tower at the west end, chequered with flint and free-stone; at the corners are hexangular turrets, similar to that at Dunstable. The arch of the west door is ornamented with mouldings of various flowers, &c. Within the church is a singular piece of ancient architecture, an octagonal stone font, inclosed in a lofty wooden frame of pointed arches, terminated with elegant tabernacle work. The consecrated water, during the prevalence of the Roman ceremonies, was kept in a large basin at the top, whence it was let down by the priest, through a pipe into the font. On the inside of the roof a vine is represented, guarded by a lamb from the assaults of a dragon: emblematical of the defence which baptism affords to the church from the attempts of the devil. On the north side of the choir is an elegant chapel, founded by John lord Wenlock, who bore a distinguished part in the contest between the houses of York and Lancaster. The principal manufacture carried on in Luton is that of straw hats: a weekly market, noted for its abundant supply of corn, is held on Mondays; it is of great antiquity, being mentioned in the Domesday Survey, where the tolls are valued at 100s. *per annum*: and here are two annual fairs. John Pomfret, the poet, was a native of this town: his father was first curate and then vicar of the parish.

About three miles from the town, on an elevated situation at the border of the Bedfordshire downs, in the midst of a well wooded park, stands Luton-Hoo house, the seat of the marquis of Bute. The old park, which consisted of about 300 acres, inclosed by sir Robert Napier, was enlarged to 1200, by the late earl of Bute, and now contains about 1500 acres. The mansion was in a great measure rebuilt by the late earl, who employed Mr. Adam the architect. The principal rooms, particularly the library, drawing-room, and saloon, are on a magnificent scale. The library, which is 146 feet in length, is esteemed but little inferior to that of Blenheim. The collection of pictures is very large and valuable, chiefly of the Italian and Flemish schools. The chapel is fitted up with carving in wood, which was originally executed for sir Thomas Pope at Tottenhanger, Herts. in 1548, and removed to Luton in perfect preservation by sir Robert Napier. In the adjoining wood is a portico, a beautiful piece of brick building, designed for a mansion intended to have been built by lord Wenlock, but which was never completed: and in the park is a stone tower of great antiquity. *Beauties of England and Wales*, vol. i. Lysons's *Magna Britannia*, vol. i.

LUTRA, in *Zoology*, a species of *Muscula*. See *MUSCULA Lutra*, and *OTTER*.

LUIRY, in *Geography*, a pleasant little town of Switzerland, in a district of the Pays de Vaud between Lausanne and Vevey, called "La Vaux," on the N. coast of the lake of Geneva; three miles E. of Lausanne.

LUTTENBERG, a town of the duchy of Stiria, on the river Sava; 12 miles E. of Pettau. N. lat. 46° 35'. E. long. 16° 8'.

LUTTER, a town of Westphalia, in the duchy of Brunswick; 11 miles N.W. of Goslar.

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LUTTERBERG, a town of Westphalia, in the principality of Grubenhagen, formerly a county; 15 miles S. of Göttinge.

LUTTERHAUSEN, a town of the duchy of Holstein; eight miles from Hamburgh.

LUTTERLOCK, a township of America, in Orleans county, Vermont, N. of Craftsborough.

LUTTERWORTH, the only market town in the hundred of Guthlaxton, Leicestershire, England, is situated on the bank of the river Swift; about two miles from the Watling-street road, 13 miles from Leicester, and 83 from London. Leland describes this "towne as scant half so bigge as Loughborow; but in it there is an hospital of the foundation of two or three of the Verdunes, that were lords of ancient tyme of the town." This hospital was founded, in the reign of king John, by Roife de Verdon and Nicholas her son, for a priest and six poor men, and to "keep hospitallity for poor men travelling that way." The parish church of Lutterworth is a spacious structure, with a nave, two aisles, a chancel, and a tower with four turrets. The chancel, which is separated from the nave by a beautiful screen, is supposed by Burton to have been built by lord Ferrers of Groby, as his arms are cut on the outside over the great window. By a storm, in the year 1703, the spire, which was 50 feet higher than the present turrets, was blown down, and, falling on the roof of the church, did great damage to the body, pews, &c. About the year 1740, the whole was repaired, a pavement of chequered stone laid, and all the interior made new, except the pulpit, which is of thick oak planks, of an hexagonal shape, and has a seam of carved work in the joints; this pulpit is preserved with great veneration, in memory of the distinguished reformer, John Wickliffe, who was rector of this parish, and died suddenly while hearing mass December 31st, 1387. The chair in which he breathed his last is also preserved with great care; as is likewise another relic used by him, the communion cloth of purple velvet trimmed with gold. His body was buried in this church; but his doctrines having been condemned, his remains were taken up and burned, by order of the council of Sienna, in 1428, and his ashes cast into the river. His portrait, by S. Fielding, hangs over the gallery at the west end of the church. A meeting-house for dissenters was built here in 1777, and is numerously attended. Here are also a school-house and alms-house, built by the bequest of Mr. Edward Sherrier. Among other benefactions to this town, Mr. Richard Elkington, by his will, dated May 20th, 1697, left in trust to the mayor, bailiff, and burgesses of Leicester 50*l.* to be lent in sums of 1*l.* each to five tradesmen of Lutterworth for one year at five *per cent.*; the interest to be distributed among certain poor persons. In the return to the population act in 1801, this town was stated to contain 277 houses and 1652 inhabitants. The cotton manufacture is carried on here to considerable extent; and some large buildings have been lately erected as factories and workshops. Many hands are also employed in making stockings. A weekly market is held on Thursdays, granted, with an annual fair, by king Henry V. in the second year of his reign; three other fairs have since been obtained.

About a mile to the east of Lutterworth is Milterton Hall, the seat of Jacob Henry Franks, esq. who possesses a collection of pictures. Nichols's History of Leicestershire. Beauties of England and Wales, vol. ix.

LUTUM, in *Botany*, a name given by the ancient Roman authors to a plant since called *luteola*, or dyer's-weed, and by authors of later date *carniola*, and *cymene*. It is used at this time to dye things yellow, and was so by the

ancient Greeks, who expressly mention the dyeing woollen cloth with it. The Roman courtizans had also a way of dyeing their hair yellow with it. See *RESEDA*.

LUTUM *Supientia* is the hermetical seal; made by melting the end of a glass vessel by a lamp, and twirling it up with a pair of pliers.

LUTZELSTEIN, in *Geography*. See *La Platte Pierre*.

LÜTZEN, a town of Saxony, in the territory of Merseburg, with a citadel. Near this town was fought a bloody battle in 1632, between the Imperialists and Swedes, in which the latter lost their king Gustavus Adolphus; nine miles E.S.E. of Merseburg. N. lat. 51 16'. E. long. 12 8'.

LUVINO, a town of Italy, in the department of the Verbano, on the E. bank of the lake Maggiore; 20 miles N.W. of Como.

LUVINO, *Valley of*, one of the five districts into which the county of Bormio is divided. (See *BORMIO*.) The inhabitants of the Luvino possessed certain privileges, particularly the power of judging civil causes within a certain value; but they did not appoint any of the magistrates, who were all chosen from the other four districts.

LUVIO, a town of Sweden, in the government of Abo; nine miles S.S.W. of Biorneborg.

LUXATION, or **DISLOCATION**, in *Surgery*, denotes any case where the articular extremities of bones abandon their natural relations, whether the head of a bone escapes from a cavity destined for its reception, or whether the surfaces of the joint cease to correspond properly one to the other. A luxation is termed *complete*, when the surfaces of the joint are totally separated; *incomplete*, when they remain partially in contact, though in a state of displacement, with respect to each other. Like fractures, dislocations are also divided into *simple* and *compound*; simple, when there is no external wound communicating with the joint; compound, when the case is conjoined with such an accident.

Other general differences of luxations depend upon the articulation in which they take place; the direction in which the bone is displaced; the length of time the accident has continued; and the cause that has produced it.

The greater the extent and variety of motion of joints, the more subject they are in general to be dislocated. Thus, the orbicular articulations, such as that of the humerus with the scapula, are these in which luxations are most frequent. In the ginglymoidal articulations, on the contrary, which admit only of motion in two opposite directions, the accident is far less common; and in such joints as only allow a slight yielding motion of the bones on each other, a dislocation still more rarely occurs. The frequency of luxation, however, in the orbicular articulations, and the comparative unfrequency of them in the ginglymoidal, as Boyer rightly observes, may be explained from many circumstances, independent of the quantity and variety of motion which such joints admit of. In the ginglymoidal, the bony surfaces, which come into contact, and are adapted to one another, are of considerable extent; the ligaments which bind them together are very numerous and strong; and the muscles are so arranged, as to have a share in strengthening such articulations.

We have mentioned, that luxations are distinguished into *complete* and *incomplete*, the latter term being used, when the surfaces of the joint are yet partially in contact, though displaced and not exactly corresponding. Incomplete luxations only happen in the ginglymoidal articulations, as those of the foot, the knee, and the elbow. In these joints, indeed, the dislocation is almost always incomplete; as it could

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only be made complete by the operation of a vast force. With respect to the orbicular joints, it is very different, as few of them are subject to any dislocation, that is not complete. If the head of the humerus, or thigh-bone, is forced on the cartilaginous brim, surrounding the cavity defined for its reception, the round slippery ball only touches the part on which it rests by a few points, and, therefore, either re-enters its natural socket again, or slips entirely from it; in the latter event, of course the luxation is complete.

But as M. Boyer has noticed, there are some articulations which, though truly orbicular, are yet liable to incomplete luxations. For instance, the head of the astragalus may be so displaced, as only to abandon, in a partial manner, the cavity in the posterior surface of the os naviculare. However, in this example, the orbicular ligament is tight, very strong, and the motion inconsiderable. Lastly, it may be observed, with regard to the extent of dislocations, that when the head of a bone is entirely thrown out of the cavity, in which it is naturally placed, it may be forced to a greater or less distance between the interstices of the muscles.

On the subject of the different directions, in which a bone may be displaced, we have to state, that, in the round articulations, it may be luxated in the direction of all the radii, which pass from the centre of the circle formed by the circumference of the articular cavity. In fact, there is not a point of the edge of the glenoid cavity where the humerus may not escape. However, owing to particular circumstances of conformation, a luxation mostly takes place in certain directions, well ascertained by experience, so that the varieties of dislocations, distinguished by the course of the displaced bone, are, as Boyer well explains, much less numerous than might at first be supposed. The terms *upwards, downwards, forwards, backwards, inwards, and outwards*, are frequently applied to luxations, as denoting the direction in which the head of a bone is displaced. Ginglymoid joints are generally susceptible of being dislocated only in the direction of two lines, namely, a transverse one, and one extending from the front to the back of the articulation.

The length of time a dislocation has existed makes a difference of the highest importance, the difficulty of cure increasing in proportion to the time the accident has been left unreduced; and, indeed, after a certain time, the reduction becomes impracticable.

The soft parts and the bone itself have acquired a certain position, and the ligaments and muscles surrounding the diseased joint become stiff, and yield with difficulty to the efforts made to reduce the bone. If a certain number of days have elapsed, the laceration in the ligaments may have become so far closed as to render the reduction impossible. Lastly, the head of the bone may have become firmly adherent to the parts, amongst which it has been forced.

Luxations, in general, may be complicated with a greater or less degree of contusion, with a wound or fracture, with a rupture of a blood-vessel and consequent effusion of blood in the cellular substance, with contusion of an important nerve, and a paralysis of the organs to which it is distributed, &c.

The following general account of the causes, symptoms, prognosis, and treatment of luxations, is chiefly from Boyer's lectures on the diseases of the bones.

The causes are divided into external and internal; both are predisposing or occasional.

The predisposition to luxation may depend on circumstances natural or accidental. The natural are, the joint admitting of great latitude of motion, the small extent of

surfaces by which the bones are in contact, the laxity and small number of the ligaments uniting them, the weakness of one side of an articulation arising, for instance, from a great notch on one side, as is observed at the interior and inferior part of the acetabulum, disease, such as a paralysis of the muscles, which surround an articulation, and a weakness and relaxation of its ligaments, may also occasion a predisposition to dislocations. In a paralysis of the deltoid muscle, the weight of the arm alone has been known to produce an elongation and gradual relaxation of the capsular ligament of the shoulder joint, and to remove the head of the humerus two or three inches from the glenoid cavity of the scapula. Boyer has observed in a child that laboured under an atrophy of the muscles of the arm, an empty space of nearly an inch between the head of the bone and the surface of the glenoid cavity, which could be distinctly felt through the emaciated deltoid muscle.

Sometimes the relaxation of the ligaments appears without any evident cause, and gives such a disposition to luxations, that they take place from the slightest causes; such was the case of a woman who could not yawn even moderately, without luxating the lower jaw. It may not be amiss to observe that these luxations, depending on excessive looseness of the ligaments, are, by reason of such looseness, in general very easily reduced. A diseased state of joints may also dispose to luxations, by destroying the ligaments and articular surfaces. What surgeon of any experience at all has not frequently seen examples in which the head of the thigh-bone has been dislocated, in consequence of disease in the hip? Even the knee, which is a ginglymoidal joint, sometimes becomes partially luxated in cases of white swelling.

In order that external violence, a blow, a fall, or even the action of the muscles, produce luxation in a ball and socket articulation, the axis of the bone must be placed in a direction, more or less oblique, with respect to the surface with which it is articulated. If, for example, the os humeri hangs exactly along the side of the body, or perpendicularly with respect to the glenoid cavity of the scapula, no force can produce a luxation. If a person falls on the elbow, while the fore-arm is in this position, the head of the humerus will be forced against the cavity formed for its reception; but if the arm is lifted more or less from the body, the axis of the humerus will fall obliquely on the surface of the glenoid cavity, and the escape of the head of the bone from such cavity will be facilitated. This tendency to a dislocation will be increased in proportion as the angle formed by the axis of the bone with the surface of the glenoid cavity deviates from a right angle. In the ginglymoidal articulations luxations may be caused by a fall, or other kinds of external violence, and they are mostly incomplete. In the orbicular joints the action of the muscles has constantly a share in the production of the accident. Thus, for instance, if a person falls on the elbow, whilst the arm is raised from the body, and carried directly outwards, the shock which this part receives will certainly tend very much to force the head of the humerus out of the glenoid cavity on the lower and internal side; but the action of the pectoralis major, latissimus dorsi, and teres major, contributes also very much to throw the bone out of its place. In fact the elbow, resting on the ground, becomes the fulcrum, or centre of motion of the humerus; in this state, we obey a mechanical instinct, which leads us suddenly to bring the arm close to the body, and as the resistance made by the ground prevents this, the violent and instantaneous contraction of the pectoralis major, latissimus dorsi, and teres major, draws downwards and inwards the head of the humerus; the luxation being

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being thus partly the effect of the fall, and partly the effect of such muscular action. Whatever may be the manner in which the causes act, luxations are always accompanied with more or less laceration of the ligaments, and injury of the other soft parts about the joint; and in the orbicular articulations, like those of the shoulder and hip, the capsular ligaments are always torn.

With respect to the general symptoms of luxations we need not dwell much upon pain and inability of moving the limb, as, at most, they are only equivocal, and common to dislocations, fractures, and simple bruises. They are not, however, to be entirely overlooked, but still in forming a diagnosis we should endeavour to find it on the existence of symptoms manifest to the senses, such as an elongation or shortening of the limb; a change in its shape and direction; and lastly, the absolute impossibility of performing certain motions.

A luxation cannot possibly exist, unless the affected limb is either lengthened, as happens in the lower extremity, when the head of the femur passes out of the acetabulum, in the direction downwards and inwards, and rests on the foramen ovale; or shortened, as takes place when the same bone is luxated upwards and backwards, and has its head thrown towards the external depression in the ilium. But it is to be remarked, that the shortening and elongation are rarely produced, except by luxations of orbicular joints. However, the absence of these symptoms in dislocations of the ginglymoidal articulations is amply compensated by the superficial situation of the bone; a circumstance which renders it easy to ascertain their relative positions.

The direction of the bone is changed, for the luxated end cannot leave its natural place, without the other being thrown into a contrary direction. Thus, in the luxation of the humerus downwards and inwards, the position of the arm is obliquely downwards and outwards, instead of being straight along the side. This mode of judging of the occurrence of a dislocation by the change in the direction of the limb, is much easier in recent cases, than in those which have continued for a considerable time.

As the situation and direction of a dislocated bone are altered, it necessarily follows that some muscles must be preternaturally relaxed, while others are overstretched and strained, as may be seen with respect to the deltoid muscle, in cases of luxations of the humerus, which are the most frequent of all. This unequal tension and relaxation of muscles may also afford some assistance in forming the diagnosis.

Time seems, however, something to remove, in a great measure, the alteration produced in the contour of a limb, by certain luxations; and it is observed that in old dislocations of the humerus, the fulness of the shoulder, just below the acromion, is in some degree restored.

In these alterations of the natural shape of the limbs, we are to comprehend the changed relations of the eminences of a joint with respect to each other; the existence of projections in places, where there ought to be depressions; and of depressions where there ought to be eminences. Thus, in the luxation of the humerus inwards and downwards, a hard tumour caused by the head of the bone itself, may be distinctly felt in the hollow of the axilla, while an unnatural depression may be perceived just under the acromion.

Our limbs, even when fractured, as Boyer has observed, may be made to perform several motions, and may be put into various attitudes. In a case of a broken thigh, the surgeon (not, in truth, without causing severe pain,) may, by taking hold of the leg, move it round in a circular direction, and may point the foot inwards and outwards.

But in luxations of the thigh, such motions are altogether impossible, before the bone is reduced.

By a consideration of all these symptoms, dislocations may always be detected. When the case is not ascertained within a moderate time, either through negligence or ignorance, it is a serious affair for the patient; because the inability of using the limb is imputed to the contusion, and the treatment is regulated accordingly; the bone, after a time, becomes incapable of reduction, and the lameness and deformity are then irremediable. Such surgeons as are grossly deficient in anatomical knowledge, are the most liable to deliver wrong opinions concerning dislocations; for, not being able to judge of the due relative distances which ought to exist between certain processes of the bones, they are not at all qualified to decide whether many cases are mere contusions, or whether they are fractures or dislocations.

On the subject of prognosis in cases of dislocation, it is remarked that luxations of the orbicular joints are much less dangerous than those of the ginglymoidal articulations. As the action of the muscles has a great share in producing the first description of cases, there is less violence done to the external parts, and the soft parts are less lacerated.

In all cases the extent of the evil is in proportion to the largeness of the surfaces of the joint, the number and strength of the surrounding muscles, and the thickness and number of the ligaments. Hence, luxations of the foot and knee are more dangerous than those of the elbow and wrist; the former require a much greater degree of external violence to produce them, and consequently the soft parts are more injured.

Luxations of the orbicular joints are more difficult of reduction than those of the ginglymoidal articulations, and dislocations of the hip are more troublesome to reduce than luxations of the shoulder. These circumstances are explicable by the power and action of the muscles, in resisting the endeavours of the surgeon to bring the head of the bone into its place again.

But, perhaps, the thing which, of all others, tends most to increase the danger of a dislocation, is the accident being, what is termed *compound*, that is, attended with an external wound, communicating with the cavity of the luxated joint. Many such cases require immediate amputation. The propriety of the operation depends, however, in a great measure on the extent of injury done to the soft parts. When these have not been largely lacerated, torn, and contused, the surgeon should endeavour to save the limb. Even the hazard of a compound dislocation very much depends on the kind of joint affected. Such injuries of the articulations of the fingers or toes cannot be compared, in point of danger, with similar accidents intersting the ankle, the knee, or the elbow.

Luxations arising from disease of a joint, cannot in general be reduced and cured like dislocations from external violence; for the ligaments and articular surfaces are, in fact, always more or less destroyed. This observation, however, is not to be extended to luxations, induced by a mere looseness of the ligaments. These cases indeed are very subject to recur; but they can easily be reduced. Many dislocations of the jaw are connected with a lax state of the ligaments, and afford an illustration of the preceding remark.

Lastly, the danger of dislocations in general is much influenced by the degree of contusion present, and by the injury done to blood-vessels, or large nerves. The latter violence sometimes occasions a paralysis of the muscles, to which the injured nerves send its filaments. Boyer has seen a paralysis of the deltoid muscle brought on by a violent contusion

tusion of the circumflex nerve, in a luxation of the humerus downwards and inwards.

We have now to consider the general treatment of luxations.

To reduce the dislocated bone, keep it in its place, and prevent or remove the symptoms with which the luxation may be complicated, form the three indications which are to be fulfilled in the treatment of luxations. The reduction is accomplished, as in cases of fracture, by three means, opposite in their action, but tending to the same end, *viz.* extension, counter-extension, and coaptation.

In the article FRACTURE we have expatiated a good deal on relaxing the muscles connected with the broken bone, in order to facilitate the reduction of the fracture. This great principle, which was so much and so justly urged by Mr. Pott, holds equally good in cases of dislocation. From the action of the muscles principally arise all the trouble and difficulty which attend the reduction of luxated joints. The mere bones, composing the articulations, or the mere connecting ligaments, would in general afford very little opposition. It is the muscles that chiefly oppose the reduction, and their resistance must either be eluded or overcome; terms, says Mr. Pott, of very different import, and which every practitioner ought to be well apprized of. We scarcely need add, that this eminent surgeon was a strong advocate for relaxing the muscles belonging to the dislocated joint, at the time of attempting to reduce the bone. Now, although this precept is, generally speaking, most excellent as far as it is practicable; we are not to run away with the idea that things are precisely as Mr. Pott has represented them to be, in his general remarks on fractures and dislocation. No surgeon, of the present time, is so absurd as to imagine that merely bending the elbow, or the knee, will relax all the muscles which have the power of resisting the reduction of a dislocated shoulder or hip. Neither will the most advantageous position for extension always allow the posture to be entirely regulated with a view towards the relaxation of the muscles. While, however, we profess these sentiments, we feel a thorough conviction that attending to the relaxation of such muscles as have the greatest power of opposing the reduction of a dislocation, is an unobjectionable maxim, as far as it can be received in actual practice, consistently with some other equally important objects. When Mr. Pott wrote so strenuously in favour of relaxing the muscles, or, as we should rather say, of bending joints, in cases of dislocation, it was also necessary for him to lay much stress on the advantage of applying the extension to the end of the dislocated bone itself; because, were it applied in a better situation, the bent position would become inadmissible. The reason which is assigned for this practice, however, is, as might be expected, most weak. Mr. Pott talks a great deal about the *dilatibility*, or *distensible power* of the ligaments, and their capacity of giving way when stretched or pulled, much more, we think, than facts justify, since it is the general nature of ligaments, we mean such as actually hold the bones together, to be very strong and unyielding. The capsular ligaments, we think, are generally to be regarded rather as bags for the synovia, than as a means of strengthening the articulations. The yielding nature of such ligaments, therefore, can have little to do with the subject of dislocations. Now it appears to us that Mr. Pott was anxious to make the ligaments appear more elastic than they really are, in order that he might represent all the extending force applied to the bone below the dislocated one, as being lost in the intervening unluxated articulation. Even were the ligaments of the knee, for instance, to yield in the manner

insinuated by Pott, when the extension is applied to the lower part of the leg, the extending force would still not be lost, but would operate with full effect on the thigh. Where is it lost? The very circumstance of the ligaments being on the stretch, proves that the force operates on them, and they being attached to the os femoris, this bone cannot fail to receive the extension in a degree precisely equal to that with which the ligaments themselves receive it. It is extraordinary that reasoning so absurd should have imposed upon the generality of surgeons in this country; especially as on the continent, its fallacy has long since been exposed in the writings of Fabre, Dupony, Desault, Boyer, and Richerand. The doctrine of Pott is the most ancient; but the antiquity of any practice should cease to be a reason for a perseverance in it, the moment the principles, on which it is founded, are proved to be erroneous.

We differ then from Pott, and believe with the most consummate surgeons on the continent, that the extending force should be applied, not on the luxated bone, but on that with which it is articulated, and as far as possible from it.

All the ancient authors, as Boyer remarks, advised applying the extending force on the luxated bone, for instance applying it above the knee in luxations of the thigh-bone, and above the elbow in those of the humerus. Many of the moderns have followed their instructions; and this mode is found recommended by J. L. Petit and Duverney in their treatises on the diseases of the bones. Two members of the Academy of Surgery in France, Fabre and Dupony, saw the inconvenience of this practice, and substituted for it a mode of treatment now generally adopted on the continent. Their practice, which consists in applying the extending force to the bone that articulates with the luxated one, has two most important advantages; first, the muscles which surround the luxated bone are not compressed nor stimulated to spasmodic contractions, which would prevent the reduction, not only by opposing a force superior to that employed for the purpose of reduction, but also by retaining the head of the bone engaged in the interstices of the contracted muscles. Secondly, the extending force is much more considerable than it is in the other method, for, as Dupony has observed, by elongating thus the arm of the lever, we acquire a degree of power which the difficulties presented in a great number of cases force us to have recourse to. It is true, says Boyer, an apprehension has prevailed that the extending force applied at a distance from the luxated bone, would lose in the articulations of the limb a part of its effect. Thus it has been alleged, that a part of the extending force applied at the wrist, in a luxation of the humerus, is employed in elongating the ligaments of the elbow joint. But this objection is ill founded; all the muscles which go from the humerus to the bones of the fore-arm, by strengthening the elbow, make it answer as a continued lever, along which the force is communicated without any loss.

Force, applied by the hands of intelligent and strong assistants, is generally considered preferable to any mechanical means in the reduction of dislocations. The number of assistants may be increased at will, and force proportioned to the resistance that is experienced. Should there not be room for a sufficient number to take hold of the limb, they may make the extension by means of a napkin, or sheet, folded longitudinally and tied on the limb. It is said that the force employed can be better judged of when the extension is made by a certain number of assistants, than when a multiplied pulley is used, which may act with such force, without our being aware that the muscles, ligaments, and

and even the skin which covers the articulation, may be lacerated, and the most direful sufferings occasioned.

Although the writer of this article fully assents to the general superiority of making the extension by the assistants, he cannot refrain from expressing a favourable opinion of the convenience and efficiency of a pulley, in cases where intelligent assistants are not at hand, and where much force is required for the reduction, as, for instance, when the thigh-bone, or humerus, has been out of its place some time; or when the patient is very muscular and strong. At the same time, the dangerous consequences which may happen, when a rough, unskilful, or impatient practitioner dares to employ a pulley, cannot be too deeply impressed upon a surgeon's mind. Whether extension is made in the ordinary way, or with a pulley, it should be made with moderation, as the muscles are more sure of being safely overcome by length of resistance than by the exertion of violence.

It is impossible to assign the precise degree of force to be employed; it is to be varied and proportioned, according to the strength of the patient, and the number and force of the muscles surrounding the articulation. It has been said, that, in reducing a luxation, there is occasion for more address than force; it would be true, observes Boyer, to say, that the union of both is necessary. Often six assistants accomplish that which three cannot do, and nine or ten perform that which cannot be done by six.

With regard to the direction in which the extension should be made, Boyer recommends it to be at first the same as that which the luxation has given the dislocated bone. Suppose the head of the humerus to be luxated inward, and forced into the fossa subscapularis, between the subscapularis muscle and the scapula: in this case, the elbow is not only moved out from the trunk, but even carried backwards. Now, if we were to commence the reduction, by pulling in the natural direction of the humerus, that is, directly outwards, the head of the bone would be pressed against the fossa subscapularis, it would not easily slide along, the force would be spent in pushing the scapula backwards, and the irritation would excite the contraction of the muscles situated near the luxated head of the bone.

Extension, then, is generally to be made at first in the direction which the luxated bone has taken; but in proportion as the muscles become elongated, and yield to the force acting on them, the bone is to be gradually brought back into its natural position. In this manner the head of the bone is disengaged from the parts in which it has been placed, and is brought back to the cavity which it has left, by making it describe the same course that it took in making its escape.

We are now to consider what is termed *counter-extension*.

As Boyer has justly remarked, the best directed extension will be useless, if the bone with which the luxated one has been articulated, is not kept motionless by counter-extension, a force equal to the other, but made in a contrary direction. The counter-extending power, applied to the luxated bone itself, would be attended, in almost every case, with the double inconvenience of producing a spasmodic contraction of the muscles, and preventing the elongation of them necessary for reduction. Let us suppose, says Boyer, that in a luxation of the thigh, the counter-extending bandage were in the fold of the groin of the affected side, the consequence would be, that the triceps and gracilis, which are in a state of tension between the pelvis and thigh, would be pushed upwards, and, consequently, shortened, when their elongation is absolutely necessary. Besides, the counter-extension made on them would also increase their contraction. The counter-extending force ought, therefore,

to be applied immediately above the luxated bone. Sometimes the counter-extension is made by assistants, who take hold of the bandage necessary for the purpose; sometimes it is executed by fastening the bandage to a fixed point. The latter mode, when practicable, is to be preferred. The counter-extension should always be made in a perpendicular direction with respect to the surface of the luxated joint. In a luxation of the elbow, for instance, the counter-extension should be made in a line parallel to the os humeri; and in a dislocation of the thigh-bone, the counter-extension, applied to the pelvis, should be made perpendicularly to the surface of the acetabulum. The same rule is to be observed with regard to the shoulder in luxations of the humerus.

In general, when the extension is sufficient, coaptation is easily performed. In a luxation of the humerus, as the head of the bone is disengaged, and the assistants have brought the bone into its natural direction, the surgeon is to seize the opportunity, and with one hand press on the superior and inner part of the arm, whilst, at the same time, he supports the elbow with the other, and thus conducts the head of the bone into the glenoid cavity.

It is an excellent maxim, whenever practicable, to use a dislocated bone as a sort of lever, in making the reduction. Thus, after the head of the humerus has been disengaged by the extension, if, while pressure is made at the upper and inner part of the arm, the elbow is depressed, the head of the bone moves upwards in proportion towards the glenoid cavity of the scapula. The recollection of this principle will materially aid in reducing dislocations of the jaw, thigh bone, &c. Common sense points out, in almost every case, how and where the fulcrum should be made.

Luxations of ginglymoidal articulations being seldom complete, the extension and counter-extension are generally made, in such instances, only with a view of diminishing the friction of the surfaces of the joint, necessarily occasioned by the opposite motions given them, with a view of replacing them in their natural situation.

When extraordinary difficulty is encountered in reducing a dislocation, the surgeon should endeavour to ascertain the cause. Sometimes want of success is owing to the insufficiency of the means employed, in which circumstance, we must either increase the extending power, or diminish the muscular force of the patient.

The latter object may be fulfilled in various ways. Change of posture often produces the effect. In Boyer's work instances are mentioned in which patients, while seated on a chair, and supporting themselves with their feet against the ground, could not have their luxations reduced with the greatest efforts; and yet afterwards had their dislocations reduced with unexpected facility, on being laid horizontally on a long fixed table, where their muscles were deprived of a centre of motion. In general, however, the benefits of posture may, with more reason, be imputed to its relaxing the most powerful muscles opposing the endeavours of the surgeon.

When every attempt, conducted on the foregoing principles, proves ineffectual, the patient is to be warmly and repeatedly bled, be put into the warm bath, and confined to a very low diet. As soon as he appears to be considerably weakened by this plan, the dislocation, which was previously irreducible, may frequently be reduced with the utmost ease. We do not coincide with Boyer, when he advises us to use twenty-four hours in lowering the patient, before renewing the attempts at reduction. On the contrary, to truly are we convinced of the delicacy of reduction, always proceeding from delay, that we earnestly recommend the efforts to reduce the bone to be renewed immediately after the patient

has been weakened by the first copious bleeding, and to be tried again as soon as he has been a certain time in the bath. The faintness and debility following such means, afford the most favourable opportunity for reducing a dislocation. The state of intoxication, induced by spirits or opium, is also well known to facilitate the reduction of luxated bones, by incapacitating the muscles to make resistance, and putting them into a condition in which they yield and become elongated by a very moderate force. Thus Boyer, by himself, and at the first attempt, reduced a luxation of the arm of an intoxicated postillion, while the assistants were preparing the apparatus for the reduction. The plan of purposely intoxicating patients, whose dislocations cannot be reduced by ordinary means, has even received the recommendation of some surgical authors.

But, perhaps, of all the plans proposed for overcoming the resistance of the muscles to the reduction of dislocations, fatiguing those organs by long continued unremitting extension is, when combined with due attention to the choice of such a position as will relax the most powerful ones, the most effectual that can be adopted. The strongest muscles may always be overcome by keeping up, for a certain time, even a very moderate degree of extension. The thing is not to remit or discontinue for a moment the operation of the extending power. This principle is said to have been first applied to practice by Lebat, who, in a case where the levatores of the lower jaw were spasmodically contracted, in a dislocation of that bone, and would not allow the part to be brought down, introduced a small stick between the teeth, and making use of it as a lever, opposed the action of the muscles until they were incapable of further resistance, and the reduction was accomplished. M. David is also stated to have derived similar advantages from the same practice, in luxations of the thigh and arm.

When luxations have been left unreduced several days, the reduction frequently becomes exceedingly difficult, and sometimes quite impracticable. The lacerated opening in the capsular ligament, after a time, becomes closed, and thus a material impediment to the reduction is occasioned. When a dislocation has existed for weeks and months, many circumstances take place to prevent the possibility of reduction: the head of the bone acquires connections in its new and unnatural situation; the muscles become incapable of sufficient elongation again; and, what is worse, the articular cavity suffers more or less obliteration. In the ginglimoidal joints, an anchylosis is soon produced, and the reduction rendered impracticable. We have seen many attempts made with multiplied pulleys to reduce old dislocations. In a few instances, a degree of benefit was thought to have been the result; but in no instance was the success complete. These luxations, however, might have existed an unreasonable length of time. It is difficult to pronounce exactly how long a dislocation of the arm or thigh must have happened, to justify the abandonment of all attempts at reduction. The celebrated French surgeon Delault succeeded by the prudent employment of force in reducing many cases which had existed for several months; and such facts call upon the practitioner not to give up at once every old dislocation as past relief. A patient's means of subsistence, for himself and his family, will often entirely depend upon his luxation being reduced. In the ginglimoidal joints, as we have already observed, luxations sooner become irreducible: according to Boyer, after twenty, or four-and-twenty days, they, in general, cannot be replaced, owing to an anchylosis having occurred.

The surgeon knows, that a luxation is reduced by the limb having recovered its natural length, shape, and direction, and

by its having regained the power of performing certain motions impossible during the dislocation. For some time after the reduction the limb should not be moved, except with the utmost caution: a recurrence of a dislocated shoulder has been known to arise from carrying the hand inadvertently to the forehead, by a semicircular motion.

The cessation of pain has been considered as a sign of the reduction being effected; but, as Boyer has justly remarked, by cessation, we are to understand a considerable diminution, rather than a total discontinuance of pain.

Lastly; one of the most unequivocal and satisfactory indications of the reduction being accomplished, is the particular noise made by the head of the bone when it slips into the articular cavity again.

After a dislocation has been reduced, the grand object that now presents itself, is to keep the joint motionless, so as to hinder a relapse, and give the torn ligaments an opportunity of growing together again. All motion of the limb is, therefore, to be prevented. As the humerus cannot be luxated, except when it is at some distance from the body, a return of its dislocation will be effectually prevented by tying the elbow to the side of the body. The bandage employed for keeping the limb motionless, should always be made to operate principally on the end of the bone most remote from the joint affected. Thus, after a luxation of the arm, when we apply to the elbow the means for keeping the bone in its place, we act on that point of the humerus the most distant from its articulation with the scapula, and the force thus applied to the extremity of the lever, acts with much more effect. The same rule should be observed in the application of a bandage to the chin, after a luxation of the jaw. Indeed, in this last case, such practice has been recommended by all surgical writers; but in dislocations of the shoulder and hip, they seem to have forgot the utility of the principle, and have generally advised that most inert bandage termed the spica, which only acts on the centre of motion, and, consequently, can have little or no effect in keeping the bone fixed.

When a luxation arises from an internal cause, such as paralysis of the muscles, a looseness of the ligaments, or general debility, the duty of the surgeon is to endeavour to obviate the cause by suitable remedies, as well as replace the bone. We confess, however, that we know of no medicine nor application that seems to be calculated to remove a lax state of the ligaments.

Luxations, in general, are particularly liable to be accompanied by more or less contusion of the soft parts; and they are sometimes complicated with inflammation, rupture of blood-vessels, injury of nerves, and even a fracture. The latter complication is not frequent, but when it does occur, the bone has always been luxated first, and afterwards broken by the violence. The paralysis arising from a contusion of the nerves is not an uncommon consequence of dislocation of the shoulder; and when we consider the relation between the head of the humerus and the brachial plexus, the occurrence is by no means surprising.

Boyer observes, that when a luxated bone is not reduced, sometimes it remains in the place into which it has been forced; but much more frequently it changes its situation, and is carried still further from the cavity of the joint by the action of the muscles. Thus, in luxations of the thigh upwards and outwards, the glutei muscles continue to draw the head of the thigh-bone up along the dorsum of the ilium, until the limb is shortened as much as the parts will allow.

But, as the same surgeon has explained, whether the head of the luxated bone preserves its first position, or takes another,

it becomes flattened on that surface, by which it is in contact with a subjacent bone, while this last has a kind of depression gradually made in it. In some instances the original cavity of the joint diminishes in depth, especially when the head of the bone remains near its circumference. The muscles, impeded in their action, lose their consistence, assume a ligamentous appearance, and even become attached to the ligaments by a deposition of ossific matter, and, in this manner, a bony case is formed, which constitutes, with the displaced bone, a new articulation.

When a bone is not reduced, the limb remains deformed, and scarcely any use can be made of it for some months; but in time it approaches rather more to its natural direction, and when a new joint is formed, is yet capable of a considerable latitude of motion. In general, however, in consequence of the motion of the limb being more or less obstructed, the muscles fall away, and the limb has a weak and less bulky appearance than that of its fellow. When a dislocation in a child is left unredressed, this difference between the size of the luxated limb and that of the sound one, becomes very remarkable as the patient grows up to the adult state.

We shall now treat of particular dislocations, and afterwards conclude with some observations on compound luxations.

Luxations of the lower Jaw-bone.—When the mouth is widely opened, the condyles of the lower jaw advance forwards upon the eminentie articulares, and in this state may be made to slip under the zygomatic processes by very slight causes. This bone is only liable to be luxated in this one direction, whether one or both condyles escape from the glenoid cavities of the temporal bones. Every luxation, except that forwards, is rendered impossible by the natural conformation of the parts. A dislocation backwards is opposed by the ossific portion of the auditory canal; and luxations laterally, to the right or left, are prevented by the resistance arising from the spinous processes of the sphenoid bone and the ligaments of the joint. But it must be confessed, that the principal strength of the articulation of the lower jaw does not depend upon these ligaments; but rather on the muscles, and the particular conformation of the bones. The very shape of the lower jaw at once informs us, that a blow on its sides must be more likely to break it, by increasing its curvature, than dislocate it.

According to Boyer, luxations of the lower jaw cannot happen in very young infants, on account of the body and rami of this bone meeting at an obtuse angle, and, consequently, the condyles and necks having nearly the same direction as the rest of the bone, so that a luxation cannot be caused by any possible depression of the chin. Dislocations of the jaw are seldom caused by external violence; almost always by excessive yawning, or laughing.

The condyles of the maxilla inferior, being thrown before the transverse roots of the zygomatic processes, compress the deep-seated temporal nerves, and those going to the masseters. This fact affords a better explanation of the pains attending a luxation of the jaw, than the tension and elongation of the masseter and other muscles.

Besides great pain, a more instructive symptom of this accident is the mouth being much open, and incapable of being shut. These circumstances are more evident in recent than old luxations of the jaw. An empty space may be felt before the ears in the natural situation of the condyles. The coronoid process forms under the cheek bone an eminence, which is perceptible through the cheek, or by introducing a finger into the mouth. The cheeks and temples are flattened by the lengthening of the temporal, masseter,

and buccinator muscles. The saliva flows in large quantities from the mouth, the secretion being augmented in consequence of the exciting irritation. The arch formed by the teeth of the lower jaw is placed anteriorly to that made by those of the upper jaw. Lastly; during the first days of the luxation, the patient can neither speak nor swallow.

We have already adverted to one condyle being sometimes dislocated, while the other remains in its proper place. According to Mr. Hey, it is not always easy to know when this is the case. "One would expect," says this practical writer, "from a consideration of the structure of the parts, and from the description given in systems of surgery, that the chin should be evidently turned towards the opposite side; but I have repeatedly seen the defeat, when I could discern no alteration in the position of the chin. The symptom which I have found to be the best guide in this case, is a small hollow, which may be felt just behind the condyle that is dislocated, which does not subsist on the sound side." *Pract. Observ. in Surgery*, p. 325, edit. 2.

When the luxation is recent, the above symptoms enable us to ascertain the nature of the accident with sufficient ease; but when the dislocation has existed several days or weeks, the case becomes less strongly marked. The lower jaw has insensibly approached the upper one; and the patient gradually recovers the faculty of speech and deglutition; but he still stammers, and drivels.

Hippocrates pronounced luxations of the jaw to be fatal, unless reduced before the tenth day; but surgeons have now found, that this sentiment is not well founded, and it is even suspected, that Hippocrates might confound cases of locked jaw with those of dislocations.

When the jaw has once been dislocated, the accident is more prone to be produced again by slight causes. Mr. Hey mentions his having known two persons in whom this dislocation frequently happened. Not only yawning, but even opening the mouth incautiously in eating, would cause the accident. P. 326, edit. 2.

When a luxation of the jaw is to be reduced, the patient should sit on a low stool, with his head resting on the breast of an assistant. In this position of the patient, the surgeon's hands are on a level with the mouth, which is advantageous, because he is not obliged to elevate them, and consequently can act with greater force on the jaw. The surgeon, after guarding his thumbs with linen, or a thick pair of gloves, is to introduce them into the mouth, and place them as far back as possible, on the great molars, at the same time bending under the chin the four fingers of each hand. The jaw, being thus grasped, is to be moved in the manner of a lever, the grinders being pushed downwards and the chin upwards. No sooner are the condyles thus extricated from under the zygomatic processes, than the muscles draw them up into their proper places again, with considerable force and suddenness. This takes place so rapidly, that the surgeon's thumbs would be in danger of injury, if he were to neglect to move them quickly outwards, and place them between the cheek and the jaws.

After the reduction, the four-tailed bandage for the lower jaw is to be applied, as in cases in which this bone is broken. (See *Plate V.*) In the plate just referred to, however, it is proper to mention, that the centre of the bandage should have been placed exactly on the chin, an essential circumstance, as this is the point farthest from the centre of motion, and consequently that where the bandage can operate with the most power in keeping the bone motionless. During the first days, the patient should only be allowed liquid food, or such as requires no mastication.

When unusual difficulty occurs in disengaging the condyles from under the zygomatic processes, owing to the resistance of the muscles, Le Cat's plan for overcoming and fatiguing these powers may be pursued; it consisted in introducing a small stick between the teeth, and using it as a lever for combating the action of the muscles, until they were quite exhausted. Here the surgeon is not required to use violence, which might break the teeth, but only to keep up a moderate and unremitting extension of the resisting muscles.

According to Mr. Hey, if both sides of the lower jaw are depressed, while one side only is dislocated, the reduction of the luxated condyle is rather prevented. The force should be applied to the affected side alone. See *Pract. Observ. in Surgery*, p. 326, edit. 2.

Luxations of the Vertebrae.—The large surfaces by which these bones touch each other; the number and thickness of their ligaments; the strength of the muscles lying on the column formed by them; the small motion of which each vertebra is capable; and, lastly, the vertical direction of their articulating processes (says Boyer), render a luxation of them in the dorsal and lumbar part of the column entirely impossible. A violence, though ever so considerable, cannot displace them, without first fracturing them. But this is not the case with the cervical vertebrae; the extent of their articulating surfaces is less; the ligamento-cartilaginous substance which unites their bodies has more pliability; the motion of their articulations is greater; and their articulating surfaces have an oblique direction, which allows them to have an obscure rotatory motion. Hence luxations of the cervical vertebrae sometimes present themselves in practice. Boyer has seen a luxation of the middle cervical vertebrae caused by a violent rotatory motion of these bones.

Luxations of the Head from the first Vertebra.—The joints between the occipital bone and first vertebra of the neck, or atlas, are strengthened with numerous ligaments, and only admit of very limited motion. We have no instance of luxation of the head from the first vertebra by an external cause, and such a dislocation, were it ever to happen, would instantly destroy the patient, by compressing and injuring the spinal marrow. But, as Boyer has remarked, nature, which cannot bear so sudden a change, is habituated to it, when it takes place gradually, and the spinal marrow which would be fatally hurt by a sudden dislocation of the head from the atlas, is capable of bearing the same kind of luxation that is insensibly and slowly produced by disease.

Luxations of the first cervical Vertebra from the Second.—The motion of the head to the right and left is principally executed by the first vertebra turning on the second. The laxity and weakness of the ligaments between these bones, and the direction of their articular processes, tend to facilitate this kind of rotation, which motion, indeed, would frequently be carried beyond due bounds, and a dislocation happen every time that we turn our heads, were not the motion confined by the very thick ligaments which go from the sides and summit of the process dentatus of the second vertebra to the edges of the great occipital hole. As Boyer observes, when this motion is forced beyond its proper limits, the ligaments are torn, and the lateral parts of the body of the first vertebra glide along on the articulating horizontal processes of the second. If the head is turned from the left to the right, the left side of the body of the vertebra is carried before its corresponding articulating surface, whilst the right side falls behind its corresponding surface. In this luxation, sometimes the process dentatus, the ligaments of which are broken, leaves the ring, formed for it by the transverse ligament and the anterior arch of the first vertebra, and presses on the spinal marrow.

In other examples, it does not quit the ring; but the diameter of the vertebral canal is always diminished at the place of the dislocation, and the spinal marrow injured or lacerated. It is readily conceivable, that the patient cannot survive an accident of this nature, every wound of the spinal marrow, in so high a situation, being quickly fatal.

The celebrated M. Louis found, that the criminals who were in his time hanged at Lyons, perished by the luxation of the first vertebra from the second; whilst those hanged at Paris were suffocated by strangulation. He discovered that the cause of this difference was owing to a rotatory motion which was given to the body of the culprit by the executioner at Lyons, the moment it was suspended. J. L. Petit mentions an instance in which a boy, between six and seven years of age, was killed in an instant by a luxation of the first from the second vertebra, brought on by the boy struggling, whilst a person was rashly lifting him up by the head. This last trick cannot be too severely condemned as a most dangerous experiment.

There are other luxations of the neck not followed by death; but in these cases, the dislocation takes place in the third, fourth, fifth, or sixth vertebra, and only one articulating process is luxated. Some examples are quoted by Boyer, which were considered as cases of this last description, being attended with a distortion of the head to the right or left, without any spasm or rigidity of the sterno-cleido-mastoideus muscle.

When luxations of the cervical vertebrae produce no symptoms indicating a dangerous degree of pressure on the spinal marrow, it is prudent not to attempt the reduction, as the patient may be killed in a moment by the endeavour, in consequence of the spinal marrow becoming suddenly compressed and injured. If the symptoms, however, make it probable that the patient's only chance of life depends on altering the position of the luxated bones, the surgeon ought cautiously to attempt the reduction. Fortunately, these cases are as unfrequent as they are perplexing, and we shall omit, as uninteresting to the practical surgeon, the usual directions respecting the mode of reducing such accidents. It is enough for the surgeon to be duly aware of the peril that accompanies the attempt.

Luxations of the Bones of the Pelvis.—These bones are scarcely susceptible of luxations. The os sacrum, firmly fixed between the two ossa innominata, cannot possibly be dislocated. The os coccygis is more easily fractured than luxated. The latter accident, however, has sometimes been observed. Boyer has seen it induced by sloughing and disease, which denuded the bone, and evinced that there was a space of nearly two inches between the extremity of the sacrum and the base of the os coccygis. But, in the end, the two bones grew together again. Much has been written by authors concerning a relaxation and yielding of the symphysis pubis and sacro-iliac articulations in the advanced stages of pregnancy. We leave to the accoucheur the determination of this matter, as it is only indirectly connected with the subject of luxations.

When we stated that the bones of the pelvis were hardly susceptible of luxations, our meaning was of course confined to the effect of ordinary causes. Great external violence, acting directly on any part, will make every thing yield. Thus, in the fourth volume of the *Memoirs of the French Academy of Surgery*, an instance is recorded, where the right os ilium was dislocated from the sacrum, three inches backwards, by a sack of wheat, weighing three hundred and fifty pounds, falling on the back of a labourer. The patient died on the twentieth day, and the luxation was proved by dissection. The pelvic viscera were found in a

Rate of inflammation, with matter in the lower region of the abdomen.

Were a similar accident to present itself to the practitioner, he ought to have recourse to antiphlogistic means; for the danger chiefly depends on the pelvic viscera becoming inflamed. Copious and repeated bleedings, the warm-bath, fomentations, and low diet, would be particularly indicated.

Luxations of the Ribs.—The ancient writers on surgery have furnished us with no observations concerning dislocations of the ribs, and observers, who have published numerous facts relative to other cases, make no mention of these accidents. Even J. L. Petit and Duverney, authors of more recent date, are silent on the subject; and as Paré, long before them, had distinctly treated of luxations of the ribs, we must ascribe their silence to their disbelief in the possibility of such cases.

Whether the ribs are susceptible of dislocation or not, is yet an unsettled question.

Ambrose Paré, Barbette, Junker, Platner, and Heister, describe the accident as possible. Platner has observed: "*Costæ longè frequentius franguntur, quàm à suâ fede moventur. Non possunt in anteriorem partem excidere, cum oppositi processus transversii vertebrarum summam illarum partem continent, nec facile sursum vel deorsum versus promoveri possunt. Igitur si moventur in anteriorem partem propelluntur.*" *Instit. Chir.* § 1149. Platner actually enters into a detail of the symptoms to be apprehended in such case: "*cùm pleura prematur, gravis inflammatio et spirandi difficultas sequitur.*" In a memoir inserted amongst those of the Royal Academy of Surgery in France, M. Buttet is yet more positive than Platner, in only admitting the luxation forwards; but he does not conceive that the accident can happen to all the ribs with equal facility. The upper ones are protected by the scapula, and the lower, which are unfixed and very moveable, can only be luxated with great difficulty. He thinks that dislocations can hardly occur to any of these bones, except the four or five lower true ribs, and two or three of the upper false ones, which last are more susceptible of displacement, in consequence of not being supported by the sternum. On the other hand, Boyer, a late writer on dislocations, is very positive that the ribs are exempt from these accidents. He tells us, that he should have observed the same silence on the subject as J. L. Petit, did not a case, published in the *Memoirs of the Academy of Surgery*, after the death of that celebrated practitioner, seem to establish the possibility of such cases. But Boyer contends, that, in reading this example, it is obvious the surgeon has mistaken a fracture of the posterior end of the ribs for a dislocation. If, says Boyer, we attend to the number and force of the ligaments, which attach the ribs to the vertebræ and sternum, and also to the manner in which the intercostal muscles confine them, we shall not easily conceive how external violence, whether it acts on their middle or extremities, can luxate them. They are so firmly attached to the surrounding parts, that it is very difficult to separate them from the body in the dead subject; and, in preparing skeletons, we often break those bones, if we are not careful to cut all their bonds of union, before we attempt to detach them from the parts with which they are articulated. All the symptoms accompanying M. Buttet's case indicate a fracture of the neck, or posterior extremity of the rib, as the pain, crepitation, and motion of the bone. No conclusion could be drawn from the motion, in proof of a luxation, since the fracture (if it were such) was situated very near the back end of the rib,

and, of course, the whole length of the bone would seem to move at once.

Boyer excludes from consideration cases, called by Lieutaud and others dislocations of the ribs, which, in fact, are only separations of the ribs and dorsal vertebræ from each other, in consequence of the destruction of their ligaments, &c. by disease.

Luxations of the Clavicle, or Collar-Bone.—Luxations of the clavicle are much less frequent than fractures; and it was estimated by Default that the latter accidents are to the former as six to one. As far as our own experience enables us to judge, dislocations are even more uncommon than this calculation represents.

The clavicle, however, may be luxated either from the sternum, or the acromion.

Luxations of the sternal End.—The sternal end of the clavicle may be dislocated forwards, backwards, or upwards, but never downwards, in which last direction a luxation is prevented by the cartilage of the first rib. The dislocation forwards is by far the most frequent, and may be caused by excessive motion of the scapular end of the clavicle backwards. Luxations upwards and backwards are very rare. The former can only be occasioned by the shoulder being pushed violently forwards and downwards, which sometimes happens in falls. The dislocation backwards is the most unusual case of all.

If the shoulder is pushed violently backwards, the sternal end of the clavicle is propelled forwards, tearing the capsule of the articulation, the anterior ligament, and the tendon of the sterno-cleido-mastoideus muscle. Quitting the surface with which it is articulated, it slips in front of the upper part of the sternum, and produces under the skin in this situation, a hard prominence, which follows the motion of the shoulder.

When the shoulder is suddenly depressed, the sternal end of the clavicle is easily luxated upwards, as there is nothing to limit its motion in this direction, except the inter-clavicular ligament, which, being relaxed by the greater contiguity of the two bones, is not capable of making effectual resistance.

In the luxation backwards, the extremity of the clavicle is carried behind the superior part of the sternum.

The superficial situation of the clavicle renders easy the diagnosis of all luxations of its sternal end. When the dislocation happens forwards, a hard projection is felt, or even seen on the anterior and superior part of the sternum. Such projection may be made to disappear by carrying the shoulder forwards and outwards. In the place which the head of the clavicle ought to occupy, an empty space is perceptible.

In the luxation upwards, the distance between the sternal ends of the two clavicles is lessened.

If the luxation is backwards, the head of the bone forms a tumour at the interior and inferior part of the neck, and a depression may be felt in the place which it ought to occupy. The head of the bone thus displaced, may, as Monsieur J. L. Petit has observed, compress the trachea, œsophagus, jugular vein, carotid artery, par vagum, &c. so as to cause dangerous symptoms. It is also to be noticed, that, in dislocations of the sternal and of the clavicle backwards, the head is inclined towards the affected shoulder.

Luxations of the sternal extremity of the clavicle may be reduced by making a lever of the arm, by means of which the shoulder is first to be brought outwards, and then pushed forwards, supposing the dislocation to have happened in that direction. But if the luxation is backwards, the

shoulder, after being drawn outwards, must be carried backwards; or upwards, when the dislocation is in the same direction. By observing these rules, the head of the bone may be replaced, with the aid of a little pressure of the thumb. But though the reduction may be easy, it is difficult to maintain it, all the ligaments being torn, and the articular surfaces disposed to slide away from each other, on the slightest motion of the shoulder.

The apparatus used by Default for fractures of the clavicle is to be employed in luxations of the sternal end of the bone. (See *Fractures of the Clavicle*, and *Surgical Plate IV.*) The shoulder continues to be kept outwards by means of the cushion placed in the axilla: but notwithstanding the utmost attention on the part of the surgeon, the head of the clavicle cannot be prevented from being somewhat more prominent than that of the opposite side. Bradon proposed a tourniquet for making pressure on the luxated extremity of the bone, with a view of hindering such deformity, though, according to Boyer, it will not answer the purpose.

Luxations of the Scapulary End of the Clavicle.—These cases are much less frequent than the former, owing to the very great strength of the ligaments binding the clavicle to the scapula. The scapulary end of the clavicle is seldom luxated in any direction except upwards. Boyer admits the possibility of the accident taking place downwards, and we think we have seen an instance, in which it was caused by a heavy brick falling on the shoulder from a considerable height. There was no crepitus, and the end of the bone, which was moveable, was obviously depressed below the acromion.

The dislocation upwards is that, which principally demands the attention of the practitioner. It may be caused by falls, in which the violence operates on the extremity of the shoulder. The scapulary end of the bone slips upwards over the acromion, which last process is itself a little drawn under the luxated part of the clavicle, when the shoulder is pulled inwards by such muscles, as have the effect of bringing the arm towards the trunk. The writer of this article was lately consulted in a very manifest case of dislocation of the scapulary end of the clavicle. The patient was a young gentleman out of Yorkshire, where the accident had happened, and, not being understood, was left unredressed. When the case was brought to us, it was too late for any assistance to be rendered. Fortunately, the inconveniences suffered were not very great. The patient generally inclined his head towards the affected shoulder, and experienced a degree of weakness in raising his arm to his head; but even these infirmities were gradually becoming less.

Boyer conceives, that a violent action of the trapezius muscle, which we know is attached to the outer half of the clavicle, may have a share in producing this kind of dislocation, especially if the muscle should forcibly contract just at the moment when the acromion is fixed on the ground or body, against which it falls.

The diagnosis of the accident cannot be very difficult, since the end of the clavicle may always be distinctly felt, forming a projection under the skin that covers the acromion. The head is inclined to the affected side, and the patient avoids moving the arm, in consequence of such action occasioning pain.

The dislocation is to be reduced by drawing the arm and shoulder outwards, and pushing the displaced end of the clavicle downwards. Default's apparatus for broken collar bones is then to be applied. (See *Fracture of the Clavicle*, and *Plate IV.*) The cushion in the arm-pit, when

the elbow is confined near the side with the roller, here acts very usefully in keeping the shoulder outwards. The turns of the bandage, which go from the elbow to the shoulder, should also be made to act especially on the outer end of the clavicle, so as to press it downwards.

Luxations of the Shoulder; or of the Humerus, or Os Brachii, from the Scapula.—The shoulder joint allows the arm to be moved in every possible direction, and as the structure, essential to so great a latitude of motion, hinders the articulation from being endued with the strength and stability of other less moveable joint, it becomes, of course, a very pre-disposing cause of dislocations. In fact, no joint is so frequently luxated as the shoulder. And it appears from a comparative register, kept at the Hôtel Dieu at Paris, that, during several years dislocations of this articulation equalled in number the luxations of all the other joints together. *Cœuvres de Default par Bichat*, tom. i. p. 341.

Every thing, says the author of the preceding work, appears to facilitate the escape of the bone from its natural cavity. 1. In the articular surfaces, a shallow oval cavity, which receives a semi-spherical head twice as extensive as itself in the perpendicular direction and thrice as broad from before backwards. 2. The only ligament, strengthening this joint, is a mere capsule, which is thin below, the very direction in which there is nothing to oppose a luxation, and thicker above, where the acromion and coracoid processes, together with the triangular ligament, form an almost insurmountable obstacle to such an accident. 3. With respect to the muscles and motions of the shoulder, we have to notice numerous and strong fasciculi around the joint, communicating to it movements easily performed in every direction; propelling the head of the humerus against different points of the capsule; and rupturing the latter part, when their power is superior to its resistance. 4. As for external force, what bone is more exposed to its effects, particularly in the labouring classes of society?

Affected by so many different pre-disposing causes, the humerus would be incessantly subjected to dislocations, did not the scapula, which is equally moveable, follow all its motions, and afford it a point of support differently disposed, according to the different position of its upper end. In short, much of the strength of the joint depends upon the double moveableness of the two articular surfaces.

Of the different Kinds of Luxations of the Shoulder.—Though this joint is generally much disposed to luxations, it is not equally so at every point. There are some points at which the accident cannot happen at all; while there are others at which, though it seems possible, it has never been observed. Hence, before examining the mechanism of dislocations of the shoulder, Default endeavours to determine with precision the directions in which the accident is possible. He adverts to the confusion existing among writers on this subject; some of whom employ different terms to express the same thing; while others have affixed similar names to things which are essentially different and distinct from each other. With regard to some kinds of luxations they all coincide; concerning others, they disagree! Default first divides Luxations of the humerus into two kinds; *viz. primitive*, which are the sudden effect of external violence, and *conjective*, which succeed the former from causes hereafter to be explained.

The same eminent surgeon then directs us to suppose the oval surface of the glenoid cavity to have four straight lines drawn at its sides, in the form of a parallelogram; one representing the upper edge of that cavity; another, the

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the inferior; a third, the internal; and a fourth, the external.

It is manifest, that the head of the humerus cannot be displaced towards the upper edge of the glenoid cavity. In that direction the acromion and coracoid processes, the triangular ligament stretched between them, the tendons of the biceps and supra-spinatus, and the fleshy part of the deltoid muscle, form an effectual resistance to any force propelling upwards the head of the bone. Supposing a luxation in this direction were to happen, the head of the bone must also be pushed outwards, a thing which is impossible, because the trunk hinders the elbow from being inclined far enough inwards for that purpose.

On the other hand, the three remaining edges present but little resistance. At the lower one, the long portion of the triceps; at the internal one, the tendon of the subscapularis; and at the external, the tendons of the infra-spinatus and teres minor; easily yield to a force directed against them, and admit of primitive luxations taking place, either downwards, inwards, or outwards; downwards, between the tendon of the subscapularis and that of the long head of the triceps; inwards, between the subscapular muscle and fossa; and outwards, between the infra-spinatus muscle and subjacent part of the scapula. All these modes of displacement do not occur with equal frequency, as will be presently considered.

After the head of the humerus has quitted the glenoid cavity, and slipped in one of these three directions, it often changes its situation again; and, in this event, a consecutive luxation may follow a primitive one, either downwards, or inwards; but never that outwards, were such a case to occur, because the spine of the scapula would prevent it.

According to Default, a consecutive luxation inwards may succeed a primitive one downwards, as there is nothing to hinder the head of the bone from passing between the subscapular muscle and fossa. On the contrary, should it tend outwards, the tendon of the triceps resists, and, notwithstanding the statement of Petit, a consecutive luxation in this last direction never happens.

Sometimes, when the head of the humerus has escaped at the internal or inferior part of the capsule, it is carried behind the clavicle, so as to form a consecutive luxation upwards, a case which was noticed by Paré, perhaps by Galen, and a specimen of which was preserved in Default's museum. Here the secondary displacement only takes place slowly, and after it has happened, art can seldom correct it, on account of the firm adhesions contracted by the surfaces of the bone. Thus, in the example referred to, a new cavity was formed behind the clavicle, and the humerus was connected with the surrounding part by a kind of new ligaments.

From this statement, derived from Default, it follows that the humerus is subject to four sorts of displacement: 1, downwards; 2, outwards. In these directions the dislocation is always primitive. 3, Inwards, which may be either primitive or consecutive. 4, Upwards, in which direction the accident can only happen consecutively. As Default observes, the second and the fourth cases are exceedingly rare, compared with the rest.

Primitive Luxations.—These are caused by falls or blows on the arm, and the kind of dislocation appears to be determined by the position in which the limb happens to be at the moment of the accident.

If the arm is more or less raised from the trunk, without being inclined either forwards or backwards, and the patient falls laterally, the weight of the body, being almost entirely supported by the humerus, forces downwards its upper end,

which lacerates the capsular ligaments, and is dislocated downwards. The occurrence is also in part facilitated by the united action of the latissimus dorsi, pectoralis major, and teres major muscles. These are in a state of involuntary action, and tend to draw downwards the head of the humerus, while the elbow remains fixed on the ground or surface against which it has fallen. Some authors believe, that a violent contraction of the deltoid muscle may also have a share in luxating the shoulder downwards, as it may tend to force the head of the humerus through the capsular ligament towards the axilla. Default thinks the truth of this statement is confirmed by many observations, and quotes the case of a notary whose shoulder was dislocated downwards, in lifting up a heavy register book.

The manner in which a primitive luxation inwards is produced, is little different from that of the foregoing case. The elbow, at the moment of the fall or blow, is both separated from the trunk and carried backwards. The weight of the body acts upon the humerus, the anterior portion of the capsular ligament gives way, and the head of the bone is dislocated forwards.

The luxation outwards can only be occasional when the elbow is inclined forwards, towards the opposite shoulder. If the force is sufficient, the great, the outer part of the capsular ligament is lacerated, and the head of the humerus displaced. But, says Default, what can such power be? In a fall, when the arm is forced against the side, it cannot be moved far enough to cause a laceration of the capsule. Hence this eminent surgeon concluded, that luxations of the head of the humerus outwards must be very uncommon cases. None are recorded by surgical writers, and Default himself had never observed such an accident. Besides, it is worthy of attention, that when in falls, the arm separated from the side is inclined either forwards or backwards, the weight of the body only operates upon it obliquely, and it is little acted upon by the latissimus dorsi, pectoralis major, and teres major muscles. Hence no dislocations of the shoulder are so frequent as those downwards, in the production of which cases the influence of the weight of the body, and of the action of the muscles is direct. However, the luxation inwards is not uncommon, and many of Default's cases prove the possibility of a primitive dislocation of this kind, notwithstanding several modern authors have doubted it, by believing with Hippocrates, that originally all luxations of the shoulder happen downwards.

It sometimes happens, that the lacerated opening in the capsular ligament suffices for the passage of the head of the bone from the glenoid cavity, but immediately afterwards contracting, is not large enough to admit of its return. This practical fact was first noticed by Default, who has published two examples of it in his journal. Such cases have since been very frequent at the Hôtel Dieu, at Paris.

Consecutive Luxations.—When a consecutive luxation succeeds a primitive one, many causes may concur in producing this change. If a second fall should happen, the elbow being separated from the side, the head of the bone may easily be forced out of the place into which it was first thrown. A case illustrating this observation is related in Les Œuvres Chir. de Default par Bichat, tom. i. p. 350.

The action of the muscles is a permanent cause of a new displacement. When the humerus is dislocated downwards, the pectoralis major, and the inner portion of the deltoid, pull its upper portion inwards and upwards.

Various movements communicated to the arm may also produce a change in the position of the luxated head of the bone, according to their direction. Thus a luxation in-

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wards has frequently succeeded one downwards, in consequence of awkward efforts to reduce the bone.

Symptoms of Luxations of the Shoulder.—In general, the diagnosis of luxations of the shoulder is not attended with much difficulty. As Hippocrates has observed, whatever may be the mode and situation of the displacement, a manifest depression may always be perceived under the acromion, which process seems to project more than in the natural state. Moving the humerus is very painful, and indeed most of its motions are either impeded, or very much limited. The arm cannot be moved without the shoulder being also moved, because, the functions of the joint being prevented, both these parts form as it were only one.

To such symptoms, common to all dislocations of the shoulder, are to be added those which belong to particular cases. If the luxation is downwards, the arm is somewhat longer than in the natural state; it may be moved a little way outwards; but every attempt to carry it forwards or backwards inevitably occasions acute pain. The elbow is more or less raised from the axis of the body by the action of the deltoid, the long portion of the biceps, and the supraspinatus muscles, which, being on the stretch, contract and incline the bone outwards. In order to avoid the pain arising from this position, the patient leans towards the affected side, keeps his fore-arm half-bent, and rests his elbow on his hip, so that the arm may have a fixed point to hinder all painful motions of the limb. By this attitude alone, Default was accustomed to recognize a luxation downwards, and he was seldom deceived. Besides these circumstances, we have to mention, that the dislocated head of the bone always produces a hard and more or less evident prominence in the hollow of the axilla.

In addition to the symptoms common to all luxations of the shoulder, the dislocation inwards presents the following: the elbow is separated from the side, and carried a little backwards; the humerus appears to be directed towards the middle of the clavicle; moving the limb backwards is not very painful, but carrying it forwards is exquisitely so; a manifest prominence may be noticed under the pectoral muscle; the arm is scarcely longer than in the natural state; and the patient's attitude resembles that of the foregoing case.

Were a dislocation outwards ever to happen, it would be particularly characterized by a hard tumour under the spine of the scapula, by the inclination of the elbow forwards, and its separation from the side; and, lastly, by the length of the limb appearing a little increased.

A luxation upwards would be announced by a projection behind the clavicle, an obvious shortening of the arm, and its unnatural direction.

It is frequently much more easy to ascertain the existence, than the species, of luxation of the shoulder. Indeed, sometimes it is a most difficult matter to determine, whether a dislocation inwards is primitive or consecutive, as the apparent phenomena of each case are alike. The judicious and experienced Default taught, that this interesting point is only capable of being elucidated by attention to the history of the case, and the order in which the symptoms presented themselves. This excellent surgeon represents the distinction as of much practical importance, since the proper mode of reducing the two cases is different, the head of the bone having to describe a very short track in the primitive luxation, and a more circuitous one in that which is consecutive.

Dislocations of the shoulder do not commonly give rise to any accidental bad or troublesome symptoms. Sometimes, immediately after the occurrence, the joint is affected with a great deal of swelling; but this complaint generally subsides very quickly, under the use of the aqua vegeto-mineralis.

In certain instances, the pressure of the head of the bone on the axillary glands and veins produces an œdema of the whole limb. Default seldom observed this happen, except where the reduction had been delayed. The treatment he recommends is to apply a roller to the limb, after reducing the head of the bone.

Another accident, which was several times observed by this distinguished surgeon, is a paralysis of the limb, occasioned, in the luxation inwards, by the pressure of the head of the bone on the axillary plexus of nerves. In some instances, this affection proved incurable; in others, it yielded to the employment of strong ammoniacal liniments. A few obstinate cases were cured by making an issue just over the clavicle by means of the moxa; but this last method was as frequently unavailing as successful.

Reduction of Luxations of the Shoulder.—The infinite variety of modes proposed for reducing dislocations of the shoulder may be referred to two general classes. Some consist in replacing, by a mechanical force, the head of the humerus in the cavity from which it has escaped, whether previous extension be made or not. Others are restricted to disengaging the head of the humerus from the situation which it accidentally occupies, and the reduction is left to be accomplished entirely by the action of the muscles.

The history of all the methods intended to operate on the first principle would be tedious and unprofitable. Suffice it to state, that almost all of them act in the following manner. Something being placed under the axilla, serves as a fulcrum, on which the arm is moved in the way of a lever, the resistance being the luxated head of the humerus, and the power being applied either to the lower part of this bone or to the wrist. It was in this manner that the ambli of Hippocrates acted, that machine so renowned even in modern times, and of which numerous modifications have been devised by Paulus Ægineta, Ambrose Paré, Duverney, Freke, &c. By such an apparatus, the head of the humerus was at once directed towards the glenoid cavity of the scapula, and disengaged from its unnatural situation.

Extension of the arm usually produces this second effect, and has been accomplished in a variety of ways. Sometimes the weight of the body on one side, with the dragging of the dislocated limb on the other, served to make the extension. It was on this principle that the ladder, the door, and the stick operated, as described by Hippocrates in his treatise on fractures, and repeated by all subsequent writers. On other occasions, the trunk has been immovably fixed, while the arm was forcibly extended. This was the mode pursued in employing the machines described by Oribasius.

Sometimes no perceptible extension at all was made, and the head of the humerus, being propelled outwards by something put under the axilla, was pushed by the surgeon at once into the glenoid cavity.

With Default, we shall abstain from entering into a particular explanation of the objections to the preceding methods. Petit and B. Bell have already detailed their disadvantages. Whoever considers that the head of the bone has escaped through the ruptured and lacerated capsular ligament, and that it is impossible to know precisely the exact situation of the opening, must perceive how absurd it is to attempt to direct the head of the bone to it by any artificial force.

However well covered with soft materials the body may be, which is put under the axilla for the purpose of serving as a fulcrum, an unpleasant chaffing, or even dangerous degrees of stretching and laceration, may arise from its application, when the trunk is suspended over it, as in the employment of the door, stick, &c. By such practice, Petit saw the

the neck of the humerus fractured, and the axillary artery ruptured, so that an aneurism was the consequence.

A wife objection, also made by Default to the use of any apparatus of the foregoing kinds, is, that few surgeons are provided with the instrument, and therefore much useful time would be lost in procuring it, when the ease is actually waiting for relief. Besides, says he, when the luxation is consecutive, how can any mechanical contrivances have the effect of drawing back the head of the bone through the track by which the displacement has taken place? For instance, if a luxation inwards has succeeded one downwards, the head of the bone ought to be drawn downwards before being replaced in its natural cavity. How can the direction of the extension be varied accordingly? It is likewise to be observed, that every apparatus alluded to refits the action of the muscles, which, in fact, ought to be the principal agent in the reduction. Were a luxation ever to happen upwards, no apparatus could answer, as must be most evident.

No doubt, however, when the head of the humerus is luxated downwards, and is not situated far from the glenoid cavity, the machines to which we have alluded will often serve to effect the reduction with tolerable facility. But in such cases, there is no real occasion for artificial contrivances, as natural means will be found quite sufficient. In short, the reduction may be executed with the hands, and with this advantage, that the direction of the movements may be regulated and varied with more precision.

The following method was frequently pursued by Default with success: the patient sat on a chair of middling height: Default placed the hand of the luxated limb between his knees, which he moved backwards, so as to make extension, and disengage the head of the bone, while an assistant held back the trunk, and made the requisite counter-extension. Default now took hold of the upper part of the humerus with both his hands, and pushed its head upwards and a little outwards into the glenoid cavity.

This mode is mentioned by Petit, though complicated with the employment of a napkin, which was put under the axilla, and over the surgeon's neck, who forced upwards the head of the bone by drawing back his head.

In recent luxations of the shoulder downwards, Default sometimes often found even a more simple plan answer: he put his left hand in the axilla to serve as a fulcrum, while, with the right, which was applied to the lower and external part of the arm, he moved the humerus towards the trunk, at the same time pushing the bone upwards. By this double movement, directed upwards and outwards, the head of the humerus is put into its natural situation. See *Œuvres Chirurgicales de Default, par Bichat, tom. i. p. 363, 364.*

Mr. Hey notices, that if the head of the os humeri remains in the axilla, and not far removed from the glenoid cavity, the reduction may sometimes be executed with a very small degree of extension. Thus, in the relation of one case, he observes: "after I had put every thing in proper order for the reduction, I desired the assistants, who were to make the extension, to keep the arm elevated at a right angle with the body, till I should direct them to begin the extension. In doing this, they kept the arm a little upon the stretch, waiting for my orders. While the arm was in this state, I placed my fingers below the head of the bone, that I might be ready to co-operate with them; and pressing my fingers upwards into the axilla, that I might feel the head of the bone distinctly, the reduction was unexpectedly made by this gentle effort." *Pract. Observ. in Surgery, p. 295—226, edit. 2.*

The same experienced surgeon once saw a luxated shoulder

reduced by the mere efforts of the patient, who, while preparation for the reduction was making, walked about in pain, and after placing his hand on the back of a chair, and moving his body in different directions, cried out, as if hurt more than usual. He then sat down, and said that he was easy, and could move his arm better. In short, the bone was actually reduced. *P. 297. op. cit.*

Reduction of Luxations of the Shoulder by Means of Extension, as practised by Default.—There must be an adequate number of assistants, in order to increase, according to necessity, the force which is to overcome the resistance experienced; but, in general, two are quite sufficient. A thick pad should be procured, for the purpose of guarding the margins of the axilla from injury; and the assistants should be furnished with a sheet, doubled into folds, about four inches in breadth, and also with a towel folded in the same manner.

The patient is to sit on a lowish chair, or he may be laid on a strong immoveable table. Default long followed the first of these modes, according to ordinary custom, though, as Bichat remarks, it is not in every respect the most advantageous. In the sitting posture, indeed, the arm may be very well extended transversely; but if, as often happens, it is necessary to direct the extension upwards or outwards, the assistant, being then obliged to raise or lower himself, does not possess equal power in the new posture, and finds himself embarrassed, and incapable of varying the direction of the extension, according as the surgeon may think best.

As for the patient, he finds such posture, in which the trunk is only partly supported, much more irksome than that in which the chest lies equally upon an horizontal surface. Motives of this kind induced Default, in the latter years of his practice, to renounce the sitting position.

The patient's posture being arranged, the linen pad is to be put under the axilla of the affected side, and the middle of the folded sheet is to be placed on such compress, while the two ends are to be carried obliquely before and behind the chest to the opposite shoulder, where, being held by an assistant, they serve to fix the trunk, and to make the counter-extension. The pad hinders the sheet from pressing on the margins of the pectoralis major and latissimus dorsi. Were it not so, these muscles, being pulled upwards, would draw the humerus in the same direction, and defeat the extension, which is performed as follows.

Default made two assistants take hold of the fore-arm above the wrist, or else he caused the folded towel to be applied to this part, and confided to the care of one or two assistants, who were to begin the extension in the same direction in which the dislocated bone lies. This first movement, intended to disengage the head of the humerus from the place in which it happened to be lodged, was followed by another, which varied according to the kind of luxation. When the dislocation was downwards, Default gradually brought the arm near the side, at the same instant that he pushed it gently upwards. By this artifice, the head of the bone was inclined towards the glenoid cavity, into which it generally entered without difficulty.

When the luxation was inwards, the humerus was brought upwards and forwards, after the first extension in the direction of the bone: thus its head was directed backwards. Were a luxation to occur outwards, it would be necessary to move the humerus, during the extension, exactly in a direction opposite to that recommended in the foregoing instance.

As soon as the head of the humerus has been disengaged by the first extension, the movement communicated to the bone by the subsequent extension ought in general to be precisely in the contrary direction to that in which the head of the bone has escaped.

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When any difficulty seems to oppose the reduction, the bone should be moved in different directions, after the requisite extension has been made, with due attention to the principle just laid down. This method will frequently answer when simple extension will not, the head of the bone being conducted by the movements towards the glenoid cavity.

When the luxation was consecutive, Default, by means of the first extension in the direction of the dislocated bone, brought its head into the situation where it was originally lodged, and he then acted just as if the case were altogether a primitive one. Very often, whether the accident is of one kind or the other, can only be distinguished at the time of the reduction. In fact, when the extension is well managed, the reduction mostly happens spontaneously, and if the head of the bone is luxated inwards consecutively, it may be observed descending along the inside of the scapula, and then passing over the inferior part, and ascending towards the laceration in the capsule.

It has been stated that when the extension is properly managed, the reduction is effected almost spontaneously. Whatever may be the kind of primitive luxation, it is evident that the muscles surrounding the articulation are on one side stretched, and on the other relaxed. Hence a change in their contractions, and in the direction of those contractions, is necessarily occasioned. This alteration is such, that if the muscles act, instead of pulling the head of the bone towards the lacerated capsule, they drag it in quite a contrary direction, and thus produce a consecutive luxation.

But it is very different, when, by means of extension, the direction of the action of the muscles has been rectified. They now tend to pull the head of the bone towards the ruptured capsule, and indeed they do so with much more certainty than the surgeon, who is always ignorant of the precise situation of the opening in the capsule. On the other hand, when the extension is ill made, and the natural direction of the muscles has not been restored, the head of the bone is forced against another part of the capsule; and hence the difficulty of reduction so frequently experienced.

It follows from the preceding observations, first; that the whole skill in the treatment of luxations is to make the extension in an advantageous direction. Secondly; that, in general, what has been termed coaptation is almost always useless. Thirdly; that the reduction of a luxation does not consist in putting the head of the bone into its cavity again; but in placing the muscles in a state in which they are enabled to reduce the bone.

But it is not to be denied that there are cases where the action of the muscles being perverted, in consequence of the long existence of the dislocation, and the formation of adhesions to the surrounding parts, it becomes necessary to resort to means for forcing, as it were, the passage of the head of the bone into the glenoid cavity.

When the luxation has been reduced, the arm is to be kept motionless for a few days, lest the head of the bone should slip out of its place again. Surgeons have been accustomed to apply the spica bandage, though without the least reason, as it does no good whatsoever, because it has no effect in confining the limb. The proper practice is to keep the arm quiet, and close to the side with a roller and sling. Default himself employed the bandage described in the article FRACTURE. See *Fracture of the Clavicle*.

Method adopted by English Surgeons.—In this country, surgical practitioners always reduce dislocations of the shoulder while the patient is in a sitting posture, and, instead of imitating the French, they adhere to the ancient mode of applying the extending force to the luxated bone itself, just above the elbow. No doubt, they have been more influenced

in such practice by the authority of Mr. Pott, than by any real advantage attending the method. According to the notions of this latter gentleman, "all the force used in reducing the luxated head of a bone, be it more or less, be it by hands, towels, ligatures, or machines, ought always to be applied to the other extremity of the said bone, and as much as possible to that only." Another maxim laid down by Pott is, that in order to make use of an extending force with all possible advantage, and to excite thereby the least pain and inconvenience, it is necessary that all parts, serving to the motion of the dislocated joint, or in any degree connected with it, be put into such a state as to give the smallest possible degree of resistance.

"This (says Mr. Pott) I take to be the first and great principle by which a surgeon ought to regulate his conduct in reducing luxations. This will shew us why a knowledge of all the muscular and tendinous parts, acting upon or in connection with the articulations, is absolutely necessary for him who would do his business scientifically, with satisfaction to himself, or with ease to his patient. It will shew us that the mere position of the limb below the luxated joint, is what must either relax or make tense the parts in connection with that joint, and, consequently, that posture is more than half the business. It will shew us why sometimes the luxated os humeri slips in, as it were of its own accord, by merely changing the position of the arm, when very violent attempts, previous to this, have proved unsuccessful. It will shew us why extending the arm in a straight line, horizontally, or so as to make a right angle with the body, must in some instances render all moderate attempts fruitless. Why the method of attempting reduction by the heel in the axilla is so often successful, notwithstanding two very considerable disadvantages under which it labours; viz. part of the force being *lost in the elbow*, and the tense state of one head of the biceps cubiti. Why the tying down the fore-arm in the common ambi is wrong for the same reasons. Why the fore-arm should at all times (let the method of reduction be what it may) be bent; viz. because of the resistance of the long head of the biceps in an extended posture. Why, when the os humeri is luxated forward, or so that its head lies under the great pectoral muscle, the carrying of the extended arm backward, so as to put that muscle on the stretch, renders the reduction very difficult; and why, on the contrary, the bringing the arm forward, so as to relax the said muscle, removes that difficulty, and renders reduction easy, &c."

In our opinion, some of these observations do not shew the thing intended, quite as well as Mr. Pott seems to conceive. We do not see how *all* the parts, in connection with a joint, can be relaxed by posture. We see, it is true, how bending the elbow relaxes the biceps, but then it puts the long head of the triceps on the stretch, which may also resist the reduction. As for the extending force being *lost* in the elbow, when applied below the dislocated bone, we have endeavoured to prove the error of the supposition in our general remarks. With respect to the last part of the foregoing, we think the explanation given by Bichat, in his edition of Default's works, more correct, namely, that when the luxated head of the humerus lies forward under the pectoral muscle, carrying the elbow forwards and inwards tends to throw the head of the bone backwards and outwards, and then the muscles are enabled to act with effect in promoting the reduction.

To the truth of the ensuing remarks, delivered by Mr. Pott, we have pleasure in assenting. That in the reduction of such joints as consist of a round head moving in an acetabulum, or socket, no attempt ought to be made for replacing the said head, until it has by extension been brought forth from

from the place where it is, and nearly to a level with the said socket. This will shew us why the old method by the door, or ladder, sometimes produced a fracture of the neck of the scapula, Mr. Pott himself has seen happen. Why, if a sufficient degree of extension be not made, the towel, over the surgeon's shoulder, and under the patient's axilla, must prove an impediment rather than an assistance, by thrusling the head of the humerus under the neck of the scapula, instead of directing it into its socket. Why the common method of bending the arm, that is, the os humeri, downward, before sufficient extension has been made, prevents the very thing aimed at, by pushing the head of the bone under the scapula, which the continuation of the extension, for a few seconds only, would have carried into its proper place. When the head of the os humeri is drawn forth from the axilla, and brought to a level with the cup of the scapula, it must be a very great and very unnecessary addition of extending force, that will, or can keep it from going into it. All that the surgeon has to do, is to bring it to such a level; the muscles attached to the bone will do the rest.

A very just and important maxim, inculcated by Mr. Pott, and indeed by every judicious surgical writer of recent date, is, that whatever kind or degree of force may be found necessary for the reduction of a luxated joint, such force be employed gradually; that the lesser degree be always first tried, and that it be increased *gradatim*. See Pott's Remarks on Fractures and Dislocations, vol. i. of his works.

After adverting to a few impediments to the reduction of dislocated shoulders, we may here (not abruptly we hope) take leave of the subject, without expatiating on the methods pursued in this country, because in fact the practice of Default, as already related, differs from our's chiefly in the extension being made at the wrist. If we suppose the elbow bent, and the extending force applied just above the joint, it will be easy to follow the directions already given, with regard to the manner of making the extension, and the time and mode of altering the position of the bone during the process.

We shall conclude our account of dislocations of the shoulder, with noticing some circumstances which may tend to render the reduction difficult.

The first to which we shall request the reader's attention, is the narrowness of the lacerated opening in the capsular ligament. The practice of Default, when he had reason to suspect this kind of impediment, was to endeavour to dilate the aperture by moving the humerus very freely and forcibly in every direction, and pushing its head at the same time towards the glenoid cavity.

The luxation not being recent, may be another cause hindering the reduction, and is sometimes an insurmountable obstacle to success. The luxated head of the bone, after a time, contracts adhesions; and the surrounding cellular substance becomes condensed, and converted as it were into a new kind of capsular ligament, which confines the bone in its unnatural situation. Most surgical authors recommend us in such a case to make no endeavour to put the bone into its place again, as the attempt would, in all probability, fail, and might bring on serious consequences, by reason of the violence which must be exerted. Default once professed the same doctrine, but in the latter part of his life experience led him to a bolder practice. After being completely successful in reducing some luxations, which had existed from fifteen to twenty days, he was encouraged to attempt the reduction of others, which had happened from thirty to five and thirty days; and during the two years before his death, he had, in Bichat's presence, replaced dislocations of the shoulder after ten weeks, and even three months, when the

head of the humerus had escaped either at the inferior, or internal part of the capsule. Notwithstanding the long continued extensions which were employed, there were none of the terrible consequences induced, with which authors have intimidated the generality of practitioners. In two instances, a sudden and unaccountable emphysema of the shoulder took place, which yielded to the use of a bandage and the saturnine lotion. See *Œuvres de Default par Bichat*, tom. i. p. 377.

In cases of this kind, before the extension is begun, the bone should be freely moved about in every possible direction, in order, in the first instance, to break the adhesions, lacerate the condensed cellular substance, that serves as the accidental capsule, and thus produce, as it were, a second luxation for the purpose of curing the first. The means for extension are then to be applied as usual, with an increased number of assistants. In these cases we have seen the multiplied pulley used with advantage, though it is certainly a dangerous machine, unless in careful hands.

Frequently the first attempts are unavailing, and the luxated head of the bone continues immovable, in the midst of the most powerful efforts. The extension is then to be stopped, and the bone moved about again in all directions; every resistance is to be broken; let the arm describe a large segment of a circle in the place which it occupies; and let it be rotated on its axis. Then let extension be repeated in every direction.

For cases proving the occasional efficacy of such practice, we must refer to Default's *Œuvres Chirurg. par Bichat*, tom. i. p. 375.

In this excellent work it is observed that, supposing the attempts to fail, they are not entirely useless; for, by moving the head of the bone somewhat towards the glenoid cavity, or even just before it, they give the limb a greater freedom of motion.

A third obstacle to the reduction of all luxations arises from the power of the muscles, which power is exerted with violence in consequence of the manner in which these organs are stretched. Sometimes the resistance of the muscles, indeed, absolutely hinders the head of the bone from being at all moved, notwithstanding the extension is very considerable. In such a case, bleeding and the warm bath are to be tried, in order to bring on a temporary weakness and relaxation, during which the attempts at reduction may be made with the best prospect of success. Yet a still more certain plan is long continued unremitting extension, which is sure of fatiguing the resisting muscles, and as soon as they are worn out, the bone may easily be replaced. Default in certain cases did not succeed before the half, or even the whole of the day had been spent in keeping up the extension, by means of his apparatus for the broken clavicle, when apparatus draws outward the shoulder and into the neck. (See *Fracture of the Clavicle*.) The muscles can only support a violent contraction a certain time. To permanent extension, though moderate in degree, they cannot make long resistance, they become fatigued, they are incapable of hindering the head of the bone from being moved in the desired direction, and the reduction is accomplished.

We have seen that Mr. Pott and Default have particularly adverted to the difficulty of reduction, arising from the bone being pressed against the neck of the scapula, when the elbow was depressed, before the extension had sufficiently engaged the head. Mr. Hey has also noticed this obstacle to reduction, as follows: "the difficulty of reducing a dislocated humerus, not only arises from the resistance or compression of the muscles; but also from the resistance which is made by the pressure of the glenoid process against the

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neck of the humerus, when the head of the bone lies deep in the axilla beyond that process. This hindrance to reduction will be increased in proportion to the depression of the acromion; if the extension is made in a horizontal direction. For in this case the edge of the glenoid cavity pitches against the neck of the humerus, and, in some degree, prevents the head of the bone from advancing forward. In order to remove this hindrance, the head of the humerus must be lowered by elevating the arm, and the edge of the glenoid cavity raised from the neck of the humerus by repelling the acromion." Mr. Hey then states that he has now, for several years, preferred the method recommended by Mr. Bromfield, for repelling the acromion during the extension, and he insists on the propriety of bending the fore-arm, before applying the means for extension, so that the biceps may be relaxed as much as possible, and not hinder the glenoid cavity from being repelled. See *Practical Observations in Surgery*, p. 209, 300. edit. 2. A description of Bromfield's method may be found in this gentleman's *Chirurgical Observ. and Cases*, vol. i. chap. 6. p. 266.

Luxations of the Elbow-joint, or of the Fore-arm from the Humerus.—Here authors have generally described four kinds of dislocation; *viz.* backwards, forwards, outwards, and inwards; but all these cases do not occur with equal frequency, as experience proves, and the structure of the joint might enable us to anticipate.

The luxation of the bones of the fore-arm backwards are by far the most common; the dislocation of them forwards is very rare, was never observed by Default or Petit, and indeed cannot happen without a fracture of the olecranon. Luxations inwards or outwards are also not frequent, and when they do happen they must almost inevitably be incomplete, in consequence of the great extent of the articular surfaces. The frequency of luxations backwards, compared with that of lateral dislocations, is estimated in Default's works by Bichat as 10 to 1. The luxation forward being so uncommon, no comparison whatever is assigned. The coronoid process, forming only an inconsiderable curvature, cannot make any vast resistance to the ascent of the olecranon and radius, up the posterior part of the humerus. But the kind of hook which the olecranon makes, effectually hinders this process itself as well as the radius from slipping forwards in front of the humerus. Indeed, as we have already observed, a luxation in this direction may be regarded as impossible, without a fracture of the olecranon. The lateral ligaments, and the reciprocal manner in which the irregular surfaces of the articulation fit each other, are also strong obstacles to lateral dislocations. Luxations backwards are, as we have said, by far the most frequent.

In the luxation backwards, the radius and ulna may ascend more or less behind the humerus; but the coronoid process of the ulna is always carried above the articular pulley, and is found lodged in the cavity destined to receive the olecranon. The head of the radius is placed behind and above the external condyle of the humerus. The annular ligament, which confines the superior extremity of the radius to the ulna, may be lacerated; in which case, even when the bones are reduced, it is difficult to keep them in their proper places, as the radius tends constantly to separate from the ulna.

This luxation always takes place from a fall on the hand; for, when we are falling, we are led by a mechanical instinct to bring our hands forwards to protect the body. If in this case the superior extremity, instead of resting vertically on the ground, be placed obliquely with the hand nearly in a state of supination, the repulsion which it receives from the ground will cause the two bones of the fore-arm

to ascend behind the humerus, whilst the weight of the body pressing on the humerus, directed obliquely downwards, forces its extremity to pass down before the coronoid process of the ulna.

The fore-arm, in this luxation, is in a state of half-flexion, and every attempt to extend it occasions acute pain. The situation of the olecranon, with respect to the condyles of the humerus, is changed. The olecranon, which in the natural state is placed on a level with the external condyle, which is itself situated lower than the internal, is even higher than the latter.

This luxation may be mistaken for a fracture of the olecranon, of the head of the radius, or even of the inferior extremity of the humerus. Such a mistake is attended with very bad consequences; for if the reduction be not effected before the end of fifteen or twenty days, it is often impossible to accomplish it afterwards. The swelling, which supervenes in twenty-four hours after the accident, renders a diagnosis more difficult; but the olecranon and internal condyle are never so obscured, that the distance between them cannot be found to be increased, though Boyer makes a contrary assertion. It is true, that the rubbing of the coronoid process and olecranon against the humerus, may cause a grating noise, similar to that of a fracture: and some attention is certainly requisite to establish a diagnosis between a fracture of the head of the radius, and a dislocation of the fore-arm backwards.

The following method of reducing the case is advised by Boyer:—The patient being firmly seated, an assistant is to take hold of the middle part of the humerus, and make the counter-extension, while another assistant makes extension at the inferior part of the fore-arm. The surgeon, seated on the outside, grasps the elbow with his two hands, by applying the fore-fingers of each to the anterior part of the humerus, and the thumbs to the posterior, with which he presses on the olecranon, in a direction downwards and forwards. This method will be in general successful. If the strength of the patient, or the long continuance of the luxation, render it necessary to employ a greater force, a fillet is to be applied on the wrist, to make extension, and a cushion is to be placed in the axilla, and the arm and trunk fixed, as is done in cases of luxation of the humerus.

A bandage may afterwards be applied, in the form of a figure of 8, and the arm is to be kept in a sling. The laceration which always takes place, is always followed by more or less swelling, which is to be combated by antiphlogistic means.

At the end of seven or eight days, when the inflammatory symptoms are nearly gone, the articulation is to be gently moved, and the motion is to be increased every day, in order to prevent an anchylosis, to which there is a great tendency.

In this luxation, the annular ligament which confines the head of the radius to the extremity of the ulna, is sometimes torn, and the radius passes before the ulna. In such cases, pronation and supination are difficult and painful, though the principal luxation has been reduced. The head of the radius may be easily replaced, by pressing it from before backwards, and it is to be kept in its place by a compress, applied to the superior and external part of the fore-arm. The bandage and compresses are to be taken off every two or three days, and re-applied. This is necessary, on account of the necessity of moving the articulation to prevent an anchylosis.

If the luxation be not soon reduced, it becomes irreducible; the heads of the radius and ulna grow to the back part of the humerus, and the patient can neither bend nor extend

tend his arm. However, in some cases, especially in young persons, some motion is acquired in time; the heads of the radius and ulna making in the humerus cavities, in which they perform some motions, but always imperfectly.

The luxation forward should be treated as a fracture of the olecranon, with which it would be inevitably accompanied. It may be necessary, on account of the great injury done to the soft parts, to bleed the patient copiously, and put him on an antiphlogistic regimen.

As to the lateral luxations, either inwards or outwards, they are always incomplete, and easily discovered. They are reduced by drawing the humerus and fore-arm in contrary directions, and at the same time pushing the extremity of the humerus, and the two bones of the fore arm in opposite directions.

These luxations cannot be produced without considerable violence; but when the bones are reduced, they are easily kept in their place. It will be sufficient to pass a roller round the part, to put the fore-arm in a middle state, neither much bent nor extended, and to support it in a sling. But much inflammation is to be expected from the injury done to the soft parts. In order to prevent it, or at least mitigate it, the patient is to be bled two or three times, and put on a low diet, and the articulation is to be covered with the lotio aq. litharg. acet. It is scarcely necessary to repeat, that the arm is to be moved as soon as the state of the soft parts will admit of it.

The dislocation of the fore-arm backward, is said to occur ten times as frequently as lateral luxations; and those forward are so rare, that no comparison whatever can be drawn. *Oeuvres Chir. de Default, tom. i.*

Lateral luxations have been divided into *complete*, that is, when the articular surfaces have entirely lost their state of reciprocal contact; and into *incomplete*, that is, when only one bone, or a part of it, is thrown off the humerus. But what cause can operate with sufficient force to produce the first occurrence? The mischief would also be so great, were such a case to happen, that amputation would most likely be requisite.

The incomplete lateral luxation may be produced by a blow, which drives the upper part of the fore-arm violently outward, or inward. A footman, says Petit, in falling from a coach, had his arm entangled in the spokes of a wheel, and a dislocation outward was the consequence. Another man luxated his fore-arm inward, by falling from his horse and driving his arm against an uneven place.

When the ulna is pushed into the situation of the radius, the space between the olecranon and internal condyle is much greater than is natural. These points of bone are always very distinguishable, let the joint be ever so much swollen; and hence, the information to be derived from an examination of them, may be obtained in every case, without exception. Also, when the ulna is pushed into the place of the radius, the latter bone cannot be easily rotated, nor can the fore-arm be bent and extended in a perfect manner.

The dislocation inward must be very uncommon, as the form of the bones is almost an insurmountable obstacle to such an accident. It may happen, however, as the authority of Petit confirms.

All recent dislocations of the elbow are very easily reduced, and as easily maintained so; for the reciprocal manner in which the articular surfaces receive each other, and their mutual eminences and cavities, will not readily allow the bones to become displaced again.

The application of a bandage in the form of a figure of 8,

and supporting the arm in a sling, are proper in all these cases.

Luxation of the Radius from the Ulna.—The majority of authors, who have written on dislocations of the fore-arm, have not separately considered those of the radius. Some detached observations, on luxations of its superior extremity, are to be found here and there; a subject which Duverney alone has fully treated of. The dislocations of its lower end, which are more frequent, and easy of occurrence, have almost escaped the notice of French, and also English writers. At present, cases of this sort have been so numerously collected, that a particular account of them may be offered.

Difference of Structure, between the two Joints of the Radius with the Ulna.—The radius, the moveable agent of pronation and supination, rolls round the ulna, which forms its immoveable support, by means of two articular surfaces; one above, highly convex, broad internally, narrow outwardly, and corresponding to the little sigmoid cavity of the ulna, in which it is lodged; the other below, concave, semi-circular, and adapted to receive the convex edge of the ulna. Hence there are two joints, differing in their motions, articular surfaces, and ligaments. By ascertaining such differences, we shall be enabled to find out those which exist between the luxations of the upper and lower head of the radius.

Above, the radius, in pronation and supination, only moves on its own axis; below, it rolls round the axis of the ulna. Here, being more distant from the centre, its motions must be both more extensive and powerful than they are above. The head of the radius, turning on its own axis in the annular ligament, cannot dislodge in any direction. On the contrary, below, the radius, in performing pronation, stretches the posterior part of the capsule, and presses it against the immoveable head of the ulna, which is apt to be pushed through, if the motion be forced. A similar event, in a contrary sense, takes place in supination. The front part of the capsule, being rendered tense, may now be lacerated.

Add to this disposition, the difference of strength between the ligaments of the two joints. Delicate and yielding below; thick and firm above; their difference is very great. The upper head of the radius, supported on the smaller immoveable articular surface of the ulna, is protected from dislocation in most of its motions. On the contrary, its lower end, carrying along with it in its motions the bones of the carpus which it supports, cannot itself derive any solid stability from them.

Differences of Luxations of the Radius.—From what has been said, the following conclusions may be drawn; 1. that with more causes of luxation, the lower articulation of the radius has less means of resistance; and, that under the triple consideration of motions, ligaments tying the articular surfaces together, and the relations of these surfaces to each other, this joint must be very subject to dislocation. 2. That, for opposite reasons, the upper joint cannot be very subject to such an accident.

Indeed what could be the cause producing it in this situation? Can it arise from a violent pronation, or supination? The lower joint being the weakest would give way the first, and however forcible any motion of this kind might be, the upper head of the radius would only be rotated on its own axis. How then can this part be dislocated without being pushed forward or backward? All the muscular and ligamentous support of the joint must be broken; and the muscles and ligaments are too strong to admit of this, and the motion itself too feeble. Can the accident originate from

any impulse on the radius, from below upward? The immoveable resisting end of the humerus would then prevent the radius from quitting the capsular ligament. Can the accident arise from a violent extension or flexion of the forearm? Here, the whole force operating on the ulna, the radius scarcely feels the impulse.

Hence, accidental dislocations of the radius, suddenly produced by an external cause, must, if they ever happen, be exceedingly uncommon at its upper end. This is not the case with respect to such dislocations which occur slowly at this joint, especially in children, in whom the ligaments become lax in consequence of repeated efforts. With this kind of case, we have here nothing to do.

Experience sometimes seems to militate against the above reflections. Duverney quotes some instances of dislocations of the radius, suddenly produced by external causes. Some other practitioners mention similar examples. But, in their examinations, have these men paid all due attention? An analogous case has been transmitted to the French Academy of Surgery, by one of its fellows; but doubts have arisen concerning its reality, and there are too few facts for, and too much presumptive evidence against, the truth of such cases to believe their existence. Desault himself rejected their reality.

Luxation of the lower End of the Radius.—The causes are the same as those of all analogous cases. 1. Violent action of the pronator and supinator muscles. This is, doubtless, a very unusual cause, for Desault never knew an instance of it. 2. External force, moving the radius violently into a state of pronation, and rupturing the back part of the capsule; or into a state of supination, and breaking the front part of the capsular ligament.

Hence, there are two kinds of dislocation; one forward, the other backward. The first is very frequent; the second is much less so. The latter case never presented itself to Desault but once, in the dead body of a man who had both his arms dislocated, and no particulars could be learnt. The other case occurred very often in the practice of this eminent surgeon. Five examples have been published. Doubtless, this difference is owing to all the principal motions of the radius being in the prone direction.

This observation is confirmed by the fact, that the lower joint of the radius, in the dead subject, may be dislocated as easily by a supine, as a prone motion of this bone.

The symptoms of the luxation forward are: 1. Constant pronation of the forearm. 2. An inability to perform supination, and great pain on this being attempted. 3. An unusual projection at the back of the joint, in consequence of the protrusion of the little head of the ulna through the capsule. 4. The position of the radius is more forward than natural. 5. Constant adduction of the thumb, which also is almost always extended. 6. A half-bent state of the forearm, and very often of the fingers. Thus, indeed, is the position which the forearm usually assumes in all affections of its bones, and, in the present instance, the posture cannot be changed without considerable pain. 7. More or less swelling around the joint. This sometimes comes on immediately after the accident, but always afterwards, if the reduction should remain unaccomplished. The condition of the joint may thus be obscured, and the accident mistaken for a sprain; as Desault often observed to have occurred with surgeons, who had been called to these accidents before him. The serious consequence of this mistake is, that no attempt at reduction is made, and the articular surfaces having time to contract adhesions, the disorder is frequently rendered irremediable.

A luxation of the radius backward is characterized by

symptoms the reverse of those above-mentioned. They are a violent supination of the limb; inability to put it prone; pain on making the attempt; a tumour in front of the forearm formed by the head of the ulna; a projection backward of the large head of the radius; and abduction of the thumb.

Reduction.—When the dislocation is forward, an assistant is to take hold of the elbow, raising the arm a little from the body; another is to take hold of the hand and fingers.

The surgeon is to take hold of the end of the forearm with both his hands; one applied to the inside, the other to the outside, in such a manner, that the two thumbs meet each other before, between the ulna and radius, while the fingers are applied behind. He is then to endeavour to separate the two bones from each other, pushing the radius backward and outward, while the ulna is held in its proper place. At the same time the assistant, holding the hand, should try to bring it into a state of supination, and consequently the radius, which is its support. Thus pushed, in the direction opposite that of the dislocation, by two powers, the radius is moved outward, and the ulna returns into the opening of the capsule, and into the sigmoid cavity.

If chance should present a dislocation of the radius backward, the same kind of proceeding, executed in the opposite direction, would serve to accomplish the reduction.

Luxations of the Wrist.—The carpal bones may be luxated from the lower ends of the radius and ulna forwards, backwards, inwards, or outwards. The two first cases, especially the one backwards, are the most frequent. The dislocation backwards is rendered easy by the direction of the convex articular surfaces of the scaphoid, semilunar, and pyramidal bones, which sloping more backwards than forwards, must make them more disposed to slip in this direction than any other. The accident may be caused by a fall on the back of the hand, while much bent; in which event the first row of the carpal bones slide backwards into the oblong cavity of the radius, lacerate the posterior ligament, and form an eminence behind the lower ends of the bones of the forearm. This prominence, the depression in front of the wrist, and the extraordinary flexion of the hand, which cannot be extended, are the characteristic signs of this kind of dislocation.

The dislocation forwards generally arises from a fall on the palm, the fingers being extended, and more force operating on the lower than upper part of the palm. The luxation is seldom complete; and the hand remains painfully extended. The great many tendons, which run before the wrist, and the annular ligament being pushed forward, the prominence formed by the carpal bones, in front of the ends of the radius and ulna, is not easily detected, and the case may be mistaken for a sprain.

Dislocations inwards, or outwards, are never complete. The projection of the carpal bones at the inner or outer side of the joint, and the distortion of the hand, make such cases sufficiently evident.

All dislocations of the wrist are very easy of reduction. For this purpose, gentle extension must be made, while the two surfaces of the joint are made to slide on each other in a direction contrary to what they took when the accident occurred.

Dislocations of the wrist are always attended with a great deal of spraining of numerous tendons and laceration of ligaments, and consequently considerable swelling generally follows, and the patient is a long time in regaining the perfect use of the joint. To relieve the symptoms as much as possible, the best plan is to keep the hand and wrist continually covered with linen wet with the saturnine lotion, and

to put the fore-arm and hand in splints, as in the case of a fracture. (See FRACTURE.) The arm must also be kept perfectly at rest in a sling.

When the ruptured ligaments have united, the use of liniments will tend to remove the remaining stiffness and weaknesses of the joint.

Luxations of the Bones of the Carpus and Metacarpus.—A dislocation of the carpal bones from each other seems almost impossible. The os magnum, however, has been known to be luxated from the deep cavity formed for it by the trapezoides and semilunare, in consequence of too great a flexion of the bones of the first phalanx on those of the second, and it forms a tumour on the back of the hand. Chopart. Boyer. Richerand.

The metacarpal bones are never luxated from each other. The first one is sometimes, though very rarely, pushed off the trapezium.

Luxations of the Fingers.—The first phalanges may be dislocated backwards off the heads of the metacarpal bones. A luxation forwards would be very difficult, if not impossible, because the articular surfaces of the metacarpal bones extend a good way forwards, and the palm of the hand makes resistance to such an accident. The first phalanges of the thumb and little finger can alone be dislocated inwards; and the first phalanx of the thumb is alone subject to be luxated outwards. This phalanx is also most liable to dislocations backwards, behind the head of the first metacarpal bone, in which case it remains extended, while the second is bent.

These dislocations should be speedily reduced; for, after eight or ten days, they become irreducible. In a luxation of the first bone of the thumb, which was too old to be reduced, Default proposed cutting down to the head of the bone, and pushing it into its place with a spatula. Dislocations of the thumb and little finger inwards, that of the thumb outwards, and luxations of the first phalanges of the other fingers backwards, are all reduced by making extension on the lower end of the affected thumb, or finger. The first and second phalanges may also be dislocated backwards.

After the reduction, the thumb or finger affected should be rolled with tape, and incased, and supported in plaster-board, till the lacerated ligaments have united; taking care to keep the hand and fore-arm quietly in a sling.

Luxations of the Femur, or Thigh-bone, at the Hip.—These dislocations may take place upwards and outwards on the external surface of the os ilium; upwards and forwards on the body of the os pubis; downwards and inwards on the foramen ovale; and downwards and outwards on the os ischium.

The luxation upwards and outwards, and that downwards and inwards, are the most frequent, and it is not easy to say which of these two cases happens most often. It is to be understood, however, that dislocations of the hip are far less common than those of the shoulder. We have seen only three cases of the first description; but, at least, from fifteen to twenty dislocations of the shoulder. Mr. Hey informs us, that seven instances of the latter accident, and three of the former, are all that have occurred in his practice. (Pract. Obs. p. 314. edit. 2.) The following account of luxations of the thigh-bone at the hip is from Boyer's work on the Diseases of the Bones, transl. by Farrell.

No anatomical reason can be given for the frequency of the dislocation upwards and outwards; the edge of the acetabulum projects more at the superior and exterior parts than at any other; the orbicular ligament, which is very thick at this place, and the interior ligament of the articulation,

which must be previously ruptured, oppose the dislocation in this direction. There is little, on the contrary, to oppose the luxation downwards on the foramen ovale. The inferior and internal part of the circumference of the cavity, the place by which the bone escapes in this species of luxation, presents a deep notch formed into a hole by a ligament, under which the wifils of the articulation enter. The orbicular ligament is thinner here than at any other place; the motion of abduction, in which this luxation takes place, is more extensive than that of adduction; and lastly, the round ligament within the articulation does not oppose it, as it may take place without its being ruptured.

Luxation upwards and forwards is very rare; that downwards and backwards is still more so; and, perhaps, as shall be observed farther on, never occurs but secondarily.

When, by a fall from a place more or less elevated, on the sides of the feet, or on the knee, the thigh is pushed forwards and inwards, the head of the femur, forced towards the superior and external part of the acetabulum, breaks the internal and orbicular ligaments, escapes through the laceration in the latter, and ascends on the internal face of the os ilium; but as the part of the os ilium immediately above and at the external side of the cavity is very convex, the head of the femur soon abandons its first position, and slides backwards and upwards into the external fossa of the os ilium, following the inclination of the plane towards this fossa, and obeying the action of the gluteal muscles, which draws it in this direction. The head of the femur, in ascending thus on the external face of the os ilium, pushes upwards the glutæus minimus, which forms a sort of cap for it; and the glutæus maximus and medius are relaxed by the approximation of the points into which they are inserted. The pyriformis is nearly in its natural state, the gemini, obturators, and quadratus femoris, are a little elongated. The psoas magnus and iliacus internus are relaxed, as are also the other muscles inserted into the trochanter minor. If to this description it be added, that the orbicular ligament, torn at its superior part, is stretched over the acetabulum, and covers it, an exact idea may be formed of the change occasioned in the surrounding parts by this luxation of the femur.

The affected thigh is shorter than the sound one; it is a little bent, and carried inwards. The knee inclines more forwards and inwards than the opposite one; the leg and thigh are turned inward, and the foot points in this direction. The trochanter major is brought nearer the anterior and superior spinous process of the os ilium, and is at the same time elevated and carried a little forward; the latter circumstance may be considered as the necessary consequence of the rotation inwards of the thigh. The natural length of the limb cannot be restored without reducing the luxation; the foot cannot be turned outwards, and any attempt to do so causes pain; but the inclination of the foot inwards may be increased. If the patient endeavours to walk, he extends the foot to put the top of it on the ground; and though the heel is raised, he is still lame; for the diseased limb remains always shorter than the other, and the pain occasioned by the attempt to walk renders progression still more difficult.

Luxation of the femur upwards and outwards has nothing in common with the fracture of the neck of this bone but the shortness of the limb. The easy rotation of the member outwards and inwards, &c. &c. preclude all possibility of confounding them, unless the surgeon be remarkably inattentive.

It is difficult to assign the cause of the foot and remainder of the limb being turned inwards in this luxation. It may be

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be established as a general rule, that luxated members always take a direction determined by the elongation of the muscles of the side opposite that to which the luxated bone is carried: thus, in luxation of the arm downwards and inwards, the deltoides and infraspinatus muscles, lengthened by the separation of their points of insertion, move the elbow out from the body, and give the arm an oblique direction. In this case, the obturator, gemini, and quadratus femoris, being elongated, the point of the foot ought to be turned outwards. This phenomenon depends perhaps on the external portion of the orbicular ligament which comes from the anterior and inferior spine of the os ilium; this portion, which is very thick, being elongated in the luxation outwards, draws the great trochanter forwards, and consequently turns towards the entire limb.

The difficulty of reducing luxations of the thigh, from the strength and number of its muscles, renders every dislocation of which it is susceptible very distressing. The laceration and injury done to the soft parts are nearly as considerable as in dislocation of the ginglymoidal articulations.

To effect the reduction, the patient is extended on a table firmly fixed, and covered with a mattress, which is to be tied to it; a sheet, folded longitudinally, is applied to the groin of the sound side, in order to make counter-extension. The middle part is applied against the superior and internal part of the thigh, and the two ends passed before and behind the pelvis, cross on the hip, and are held by a sufficient number of assistants. By this means the trunk is fixed, but there is nothing to prevent the pelvis from yielding to the extending force. To answer this purpose, another sheet, folded in a similar manner, is placed transversely on the spine of the os ilium, and its ends are brought horizontally before and behind the abdomen towards the hip of the opposite side, where they are held by assistants. This apparatus, similar to that placed on the point of the shoulder in a luxation of the arm, answers the same purposes, as it presses only on the superior part of the glutæus maximus and medius, and does not stimulate them to contract. The extending force is to be applied to the inferior part of the leg, in order to have it as far as possible from the parts which resist the return of the head of the femur. The number of assistants for making extension and counter-extension is to be proportioned to the exigencies of the circumstances and the power of muscles. The surgeon, placed at the external side of the limb, presses on the great trochanter, and when the head of the bone has been brought on a level with the acetabulum, he endeavours to force it into it.

In this country, as we have previously explained, surgeons generally apply the extension to the dislocated bone itself, just above the knee. The disappearance of all the symptoms, and especially the noise made by the head of the femur on re-entering its cavity, indicate the success of the operation. This success is seldom obtained without having previously made several fruitless endeavours, whether from not employing sufficient force to make extension and counter-extension, or from a spasmodic contraction of the muscles obstinately resisting the reduction.

When the bone is reduced, it is prevented from leaving its place by bringing the thighs together by means of a bandage passed below the knees. In the generality of cases, it will be advisable to take some blood from the patient, and confine him for a few days after the accident to a very low diet; and in all cases the hip is to be covered with emollient and resorbent applications, which may be kept on by means of the spica bandage for the groin. This bandage is well

adapted to this use, but is not at all fit for keeping the luxated bone in its proper place, as its action is made too near the centre of motion. The patient should be particularly directed not to walk too soon, nor at any time to fatigue too much the affected joint.

Luxation of the thigh downwards and inwards, or into the foramen ovale, is nearly as frequent as that just described; it is favoured, as we have said, by the great extent of the motion of abduction of the thigh; by the notch at the inferior and internal part of the acetabulum, by the weakness of the orbicular ligament at this side; and lastly, by the situation of the round ligament, the rupture of which is not a necessary consequence of it. It is occasioned by a fall on the feet or knees considerably separated from one another. The head of the femur slides from without inwards on the bottom of the acetabulum, and comes against the inferior and internal portion of the orbicular ligament, which it lacerates, and passes on to the foramen ovale between the ligament and the obturator externus.

In this species of luxation of the femur, the state of the soft parts surrounding the articulation is as follows: the glutæi, gemini, obturatores, quadratus femoris, psoas magnus, and iliacus internus, are elongated by the separation of their points of insertion. The rotation of the limb outwards is produced by the elongation of these muscles. The adductors, elongated, form at the interior part of the thigh a tense cord, which is felt from the pubis to below the middle of the thigh.

The affected thigh is longer than the sound one; the head of the femur being placed lower than the acetabulum, the great trochanter is removed to a greater distance from the anterior and superior spinous process of the os ilium, and the thigh is flattened in consequence of the elongation of the muscles. The adductors, extended obliquely from the pubis to the femur, form a cord which elevates the skin of the internal part of the thigh. A hard round tumour is felt at the inner and superior part of the thigh, formed by the head of the femur, which elevates the soft parts situated before the foramen ovale. The leg is slightly bent; the knee and foot, turned outwards, cannot be brought back to their proper direction. If the patient attempt to walk a few steps, he makes a semicircular motion with the foot, and places at once the entire sole on the ground; and though he keep the knee bent, still the limb is too long, and occasions lameness. The mode of progression of persons whose thigh is luxated in this direction may be compared to that of a mower: the elongated extremity, like the leg which the mower keeps forwards, describes a semicircular motion outwards.

All these symptoms, taken together, form a combination too striking to admit of error in our diagnosis, or to allow us to confound this luxation with any other, or even with fracture of the neck of the femur.

The prognosis is somewhat less unfavourable in this than in luxation upwards and outwards. The muscles, which might oppose the reduction, being all elongated by the very circumstance of the luxation itself, render the reduction easier; besides, the confusion of the soft parts is less considerable, and the round ligament is stretched, but not broken. It is reduced in the same manner as the other, except that the extension is to be made at first downwards and outwards, before bringing the limb to its natural direction.

Luxation upwards and forwards is much rarer than the preceding, and more than one practitioner has described it rather as possible than as having absolutely taken place. It has been also called luxation on the pubis, though it may be reasonably presumed that the head of the femur is removed

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moved so far from the acetabulum but in very few cases, and that it only advances near the ilio-pectineal eminence. Default met with a luxation of this kind in a porter of the flour-market; his foot slipped, and the leg and thigh were carried backwards, whilst a heavy burden was placed on his shoulders. His body was bent backwards, and the head of the femur, directed forwards and upwards, burst its capsule and triangular ligament, and passed under the crural arch into the fold of the groin, where it was easily felt through the integuments.

The whole extremity is turned outwards in this luxation; it is also shortened. The great trochanter, brought nearer the anterior and superior spinous process of the os ilium, is placed before that eminence; that part into which the psoas and iliacus muscles are inserted is raised up, and a tumour is formed by the head of the femur in the fold of the groin, which compresses more or less the crural nerves placed at the external side of the vessels of this name, and occasions dull pains, with numbness and even paralysis, when the contusion has been very great; the knee, turned outwards, is also carried backwards. This symptom is particularly remarkable shortly after the accident has taken place; for if the dislocation has continued some days, the thigh may reassume its natural direction, and perform even gentle rotatory motions inwards, the direction outwards still continuing. It is proper to remark, with respect to the tumour formed by the head of the femur in the groin, that the psoas and iliacus muscles may, in fractures of the femur immediately under the little trochanter, bring forwards the superior portion of this bone, cause it to project in the groin, and form an eminence there which might impose on us, if we were not apprized of the possibility of such an event taking place.

This luxation is particularly dangerous, as it requires a combination of violent efforts to produce it, and as it necessarily must be accompanied with great contusion and lacerations. Nevertheless, in the case treated by Default, the reduction, though difficult, was not followed by any serious accident; and the patient, at the end of fifteen days, had almost entirely recovered the strength and use of his limb.

The process for reducing it does not differ from that pointed out for the others.

Luxation of the femur downwards and backwards may, like that of the humerus inwards and forwards, be either primary or secondary. It is primary, when, in consequence of some effort, the head of the femur is forced from the acetabulum at its inferior and posterior part, and is placed at the junction of the os ilium and ischium; it is secondary, when it succeeds to the luxation upwards and outwards, the head of the femur, which was placed at first in the external iliac fossa sliding downwards and backwards, its passage in this direction being favoured by the bending of the thigh on the pelvis.

In these two cases, the head of the femur rests against that part of the ossa innominata where the os ilium and ischium join. The muscles which cover the posterior part of the articulation, such as the pyriformis, gemini, obturators, and quadratus femoris, are raised up and stretched; the psoas magnus and iliacus internus are in a great state of tension, and this explains the turning of the limb outwards. When this luxation is primary, the extremity is lengthened; a hard tumour is felt at the posterior and inferior part of the thigh; the great trochanter, by descending, is removed farther from the spine of the os ilium, and the knee and sole of the foot are turned outwards; but if it be secondary, the thigh is much bent against the pelvis; the knee and sole of the foot are turned inwards, because the primary luxation has been upwards and outwards. Secondary lux-

ation in this direction is much more frequent than the primary; in reducing it the same rules are to be observed as in other species of luxations.

Whatever may be the species of luxation, we should always be certain that it is perfectly reduced before leaving the patient. To ascertain this, we ought to move the thigh in various directions, taking care at the same time to omit that motion which might reproduce the luxation.

When a luxation of the femur upwards and outwards has not been reduced, the thigh remains short, and becomes shorter every day, until the head of the femur has made for itself a kind of articular cavity in the surface of the external iliac fossa. The acetabulum lessens in size, or is entirely obliterated. The gluteus minimus is emaciated, and serves as an orbicular ligament to the new articulation. The head of the femur loses its spherical figure, is forced backwards, and its neck becomes shorter; the person is lame, and walks on the point of the foot. If the luxation is downwards and inwards, the foramen ovale becomes the new articulating cavity; the obturator externus, raised and pushed inwards by the head of the femur, becomes emaciated and ligamentous, and it and the gluteus minimus even sometimes ossify. The lameness arises in this case from the excess of length of the diseased limb, which always diminishes in size, in consequence of the muscles not being sufficiently exercised, or their action being impeded.

Luxations of the Patella, or Knee-pan.—It is impossible for the patella to be dislocated downwards without the tendon of the extensor muscles of the leg being first ruptured; nor upwards, unless the ligament of the patella is broken. In this last case the extensor muscles may draw the bone more or less upwards towards the groin.

Dislocations inwards, or outwards, may happen without other mischief. They occur when the patella is violently pushed in one of these directions. According to Boyer, great relaxation of the inferior ligament of the patella may create a predisposition to the accident. Such, says he, was the case of the young man, whose patellæ were luxated outwards by the slightest motion of the knees, as related by Hard in the Journ. de Méd.

The dislocation outwards is the most common. This may depend partly on the internal edge of the patella projecting more than the external one, and, therefore, being more exposed to violence; and partly, on the outer condyle of the thigh-bone allowing the patella to slip over it with facility.

Boyer observes, that the external condyle of the femur, which is naturally more eminent anteriorly than the inner one, may be depressed, and this depression, from whatever cause it may proceed, favours the dislocation outwards. He tells us that he has seen, among the military convicts, three cases of luxation of the left patella outwards from such a cause. In these three individuals the patella was placed at the outside of the condyle, though not altogether away from it. The anterior surface of the bone was turned outwards; the posterior one inwards; the internal edge was placed anteriorly, and projected under the skin, while the external edge was directed backwards. In all these instances the luxation had taken place during infancy. By relaxing the extensors of the leg, and bending the thigh, the patella could easily be replaced; but unless confined in its proper situation, it was soon dislocated again.

Another case is recorded by the same writer, where a luxation of the patella outwards followed a gunshot-wound in the vicinity of the knee.

Luxations outwards, produced by external violence, are rarely complete, as such an accident could only arise from a degree

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degree of force that is hardly ever exerted. The dislocation is much promoted by the knee being, at the time of the blow, in a moderate state of flexion, as the extensor muscles of the leg and ligament of the patella are then relaxed, and the inner edge of the patella very prominent, so as to be exposed to the action of external force.

In luxations of the patella outwards, the patient experiences severe pain, and cannot bend his knee. The latter joint is deformed; the pulley of the condyles of the femur may be felt through the skin; the patella forms a tumour in front of the external condyle; the anterior surface of the knee-pan is become the external one, while the posterior surface is now internal. The internal edge is turned more forwards than inwards, and the external one is now turned almost quite backwards.

The symptoms of a luxation inwards are very analogous to those of the preceding case, allowance being made for the difference of situation and the relation of parts to each other.

In every case of dislocated patella, the reduction should be effected as soon as possible. The patient is to be laid on a bed, with his leg extended and thigh bent. In this position the extensor muscles and their tendon, and the ligament of the patella, are relaxed, and the latter bone may easily be put back into its proper situation by pressure.

The inflammatory swelling, which usually affects after an accident of this nature, is to be subdued by general and topical bleeding, rest, and the saturnine lotions. After the swelling and inflammation are diminished, the joint should be gently bent and extended every day, and rubbed with the linimentum fapon. comp.

Luxations of the Knee.—The tibia, at its articulation with the condyles of the femur, may be luxated either backwards, forwards, or to either side.

A complete luxation of the knee is an exceedingly uncommon circumstance, and could not happen without a total laceration of all the numerous ligaments and tendons which strengthen the joint. For the production of such mischief, we must suppose the operation of a degree of violence that hardly ever takes place, putting out of the question the tearing away of limbs by cannon-balls. Even incomplete luxations, inwards or outwards, are very rare, so much are these accidents opposed by the extent of the articular surfaces, and the strength of the ligaments and tendons. Dislocations forwards or backwards are still more uncommon, in consequence of the manner in which the patella and crucial ligament resist their occurrence. However, when the leg is fixed, and the body and thigh are forced onwards, the tibia may be partly forced away from the lower end of the femur to one side or another. The accident implies the operation of considerable violence. The deformity makes the nature of the case very manifest. The reduction is easily accomplished by pushing the heads of the bones in opposite directions, while the articular surfaces are a little separated by moderate extension of the limb. After the reduction, the main business of the surgeon is to avert and diminish inflammation of the joint by cold washes, leeches, venesection, opening medicines, low diet, perfect rest, &c.

Luxations of the Ankle Joint.—The foot may be luxated inwards, or outwards; or forwards, or backwards; and the dislocation in any of these directions may be complete or incomplete. Luxations inwards or outwards, are the most frequent. The former, however, are more common than the latter. As the internal malleolus does not descend so far as the external, the astragalus has a less space to describe from without inwards, than in the contrary direction. The dislocation inwards is occasioned by a violent abduction of

the foot, and is characterized by the sole being turned outwards, and the back of the foot inwards, by the pain and inability of moving the foot; and, lastly, by the projection made by the astragalus below the internal malleolus.

The luxation outwards is attended with an impossibility of moving the foot; the sole is turned inwards and the back of the foot outwards; and the astragalus projects below the external malleolus.

All luxations of the foot should be reduced as quickly as possible. One assistant is to make the counter-extension by fixing the leg, and, while another draws the foot, the surgeon is to push the latter part in a direction contrary to that in which it is luxated. Nothing facilitates the reduction of dislocations of the ankle so materially as relaxing the powerful muscles of the calf of the leg, by bending the knee and extending the foot.

When the reduction has been accomplished, the limb is to be put in splints, just as if the case were a fracture of the leg, (see FRACTURE,) and the antiphlogistic treatment is indicated for the prevention of violent inflammation.

These cases, in former days, generally ended so badly, that J. L. Petit recommends amputation never to be delayed more than twenty-four hours after the accident. More modern experience, however, has proved the general possibility of curing dislocations of the ankle, and this even when the case is compound, that is, attended with a wound communicating with the injured point.

A fracture of the fibula near its lower end is a frequent complication of a luxation of the foot inwards. That bone, therefore, should always be carefully examined in the latter case.

Luxations forwards and backwards, less frequent than those described, are however sometimes met with. The first is occasioned by a fall backwards while the foot is fixed to the ground; the second by a fall on the feet, with the body inclined forwards and the leg much bent. The luxation forwards is more difficultly produced than that backwards, on account of the articular pulley of the astragalus, which inclines towards the posterior side, being permitted to slide much on the tibia without abandoning it in the extension of the foot. When the extension is carried too far, luxation forwards is produced.

In the luxation backwards, the external and posterior ligaments and the posterior part of the capsule are torn; in that forwards the anterior and external ligaments, the anterior fibres of the internal lateral ligament, and the anterior part of the capsule, are torn. The symptoms of the first species are, a diminution of length in that part of the foot between the lower part of the leg and the anterior extremity of the toes, elongation of the heel, tension of the tendo Achillis, and relaxation of the extensors of the toes. It is impossible either to bend or extend the foot; this symptom distinguishes luxation from sprain, in which the foot may be moved, though not without pain, however high the inflammation may be.

Contrary symptoms accompany the luxation forwards: the foot is lengthened, the heel is shortened, and the foot, much extended, cannot be bent, &c.

The reduction of both is easily effected, after which it will be necessary to put the limb in splints, and lay it in the bent posture.

The very thick and short ligamentous substance which unites the astragalus to the os calcis, binds them so strongly together, that they follow one another in their motions and form, as it were but one bone. Hence they are never completely separated, even in the most desperate cases of luxation of the foot; but one or both of them may be luxated

from the scaphoides and cuboides. The transverse direction of the articulation formed by these four bones, suggested to Chopart the ingenious idea of amputating only a part of the foot. But these luxations, less dangerous than the others, can be occasioned only by a violent effort in which the anterior part of the foot is fixed, as happened in the two cases related by J. L. Petit, the foot being fastened in an iron grate, whilst the body was drawn backwards. The astragalus and os calcis may, under these circumstances, be luxated, but particularly the former, the head of which slides from below upwards, in the cavity of the posterior face of the scaphoides, and forms a tumour on the back of the foot. The inflammatory swelling renders it often difficult to ascertain this luxation. It is not easily reduced, even shortly after it has taken place. Boyer failed in a case of this kind in which the head of the astragalus was luxated upwards and inwards by a fall from a horse; but in some time the person felt no inconvenience from the affection, he could walk without pain or lameness, and nothing remained but the deformity occasioned by the tumour.

The other bones of the tarsus and metatarsus are too strongly tied together to admit of luxation. The phalanges of the toes cannot be luxated by external violence, on account of their shortness. However, the possibility of luxation of the first phalanx of the great toe from the first bone of the metatarsus may be easily conceived. See Boyer on the Bones, vol. ii.

Compound Luxations.—We shall conclude the present article with a few remarks on the treatment of compound dislocations. The luxation of a large joint, being conjoined with an external wound, leading into the capsular ligament, is a circumstance that has a particular tendency to increase the danger of the accident. In many cases we see injuries of this description followed by violent and extensive inflammation, abscesses and sloughing, fever, delirium, and death. When the patient is advanced in years, is much debilitated, or of an unhealthy irritable constitution, compound luxations, especially if attended with much contusion and other injury of the soft parts, and wrongly treated, very often have a fatal termination. This, however, is not the general event of these cases, and whatever may have happened in former times, we now know, that in the present improved state of surgery such accidents mostly admit of cure. We would not, however, by any means insinuate censure against every instance of amputation performed in these cases: we know that such operation is occasionally indispensable immediately when the accident is seen, and we are equally aware, that it may become necessary in a future stage, when extensive abscesses or sloughing, joined with threatening constitutional symptoms, have occurred. Our only design is to recommend the endeavour to cure the generality of compound luxations. But if a case were to present itself, attended with very great contusion and laceration of the soft parts, we should be as earnest advocates for amputation as any practitioners.

The treatment of a compound dislocation requires the reduction to be effected without delay, and with as little violence and disturbance as possible. The limb is then to be placed in splints, with the requisite pads, eighteen-tailed bandage, &c. The wound is to be freed from any dirt or extraneous matter, and its lips accurately brought into contact with strips of adhesive plaster. The joint is to be covered with linen wet with the saturnine lotion, the bandage is to be loosely laid down, and the splints fastened on with their proper straps or pieces of tape, and the limb is to be kept perfectly at rest in an eligible posture. The patient, if strong and young, is to be bled. This last practice may be more freely adopted in the country than in London, or large

hospitals. Purgings, however, must never be omitted, and an anodyne, the first night or two, will be highly proper. Saline draughts, antimonial, and a low regimen, are also indicated during the first few days of the symptomatic fever which commonly follows so serious an accident.

If the case takes a favourable course, the constitutional disposition will not be excessive, nor will the pain and inflammation of the limb be immoderate. Sometimes the wound even unites, more or less, without suppuration, a circumstance of the highest importance, as tending more than any thing to lessen the danger, by changing the case, as it were, from a compound into a simple one. In other cases, the wound is not united, but the inflammation and suppuration are not violent or extensive, and there is every reason to expect ultimate success. When the wound is disposed to unite favourably, lint and adhesive plaster are the best dressings. In other instances, while the suppuration is at all copious, or the inflammation high or extensive, emollient poultices are most eligible.

When the symptomatic fever and first inflammatory symptoms are over, and there is much discharge, attended with marks of approaching weakness, the patient is to be allowed more food, and be directed to take bark, cordials, porter, wine, &c. If his nights are restless, he must have opiates; and, in short, all such medicines as his particular complaints may require, are to be prescribed.

When the inflammation of a compound dislocation is violent or extensive, general bleeding, and the use of leeches, are the most effectual means of counteracting the mischief.

In certain cases, the most skilful treatment is unavailing. The joint and limb become affected with considerable pain and swelling; the fever runs high; delirium comes on; and the patient may even perish from the violence of the first symptoms, the limb being generally at the same time attacked with gangrene. If these first dangers are avoided, the wound may not heal favourably; the inflammation may be extensive; large abscesses under the fasciæ may be formed; and the hectic symptoms and sinking state of the patient may make the only chance of recovery depend upon amputation. But even this operation is sometimes deferred till too late, and the patient must be left to his miserable fate.

Whoever gives the smallest reflection to the nature of compound fractures, will perceive, that it is often a matter of the last importance to make a right decision at the very beginning, whether amputation should be immediately done, or whether an attempt to save the limb ought to be made. In some instances, the patient's sole chance depends upon the operation being performed at once without the least delay, and the opportunity of doing it never returns.

Thus, when great inflammation and a rapid mortification of the limb follow the accident, the patient may die before the sloughing has shown the least inclination to stop.

But, besides this first critical period, the surgeon often has to exercise a nice degree of judgment in a future stage of the case; we mean when the suppuration is copious, and the health much impaired. Here the practitioner may err in taking off a limb that might be saved; or he may commit a worse fault, and make the patient lose his life in a fruitless attempt to save the member. No precepts can form the right practitioner in this delicate part of surgery; genius alone cannot do it; we would add, mere experience, however great, cannot do it: the opportunity of making observations, and the talent of pronouncing by them, are here the things which make the consummate surgeon.

LUXEMBOURG, FRANCIS-HENRY DEMONTMORENCY, Duke of, in *Eng. cyc. ly.*, a celebrated French general, son of the

count of Bouteville, who was beleaded under Lewis XIII. for fighting a duel, was born in 1628. He was educated for the military profession, and at the age of fifteen was, at the battle of Rocroi, under the illustrious Condé, whose various fortunes he followed. He resembled that hero in several of his qualities, and was himself admitted a duke and peer of France. In 1667, he was promoted to a lieutenant-generalship, and in that character he was, in the following year, active in the conquest of Franche-Comté. He had the chief command, in 1672, in the invasion of Holland, where, in one campaign, he took a number of towns, and gained the battles of Bodegrave and Woerden: after this, he made a famous retreat with an army of 20,000 men, against 70,000. In 1675, he was opposed to the prince of Orange, and by his success obtained the dignity of marshal of France. In 1690, he gained the battle of Fleurus, which was followed by several other very important victories. Previously to these last-named successes he had been detained a prisoner in the Bastille more than a year, on charges connected with his amours, to which, notwithstanding the deformity of his person and features, he was much addicted. He died in 1695, and with him, it has been said, terminated the victories and grandeur of Lewis XIV. No general after him possessed, to so high a degree, the attachment and confidence of the soldiers. His uniform success, when contending with king William, rendered him an object of jealousy to that prince, who once, in the bitterness of his heart, called him a "hump-back;" "What does he know of my back," said the marshal, "he never saw it?" Moreri.

LUXEMBURG, in *Geography*, one of the ten Catholic provinces of the Netherlands before the French revolution, bounded on the north by the bishopric of Liege, and duchies of Limburgh and Juliers, on the E. by the electorate of Treves, and on the S. and W. by France; to which, by a late treaty, it is now annexed, constituting, in part, the department of the *Forêts*; which see. It lies in the centre of the forest of Ardennes. Its soil, though not fertile, produces some corn; but it furnishes a good breed of cattle, wine, all sorts of game, iron-works, and founderies for cannon, which are the chief source of its wealth. It is watered by many small rivers which run into the Meuse and Moselle. It contains, besides the city of Luxemburg, 23 other smaller towns.

LUXEMBURG, a city of France, principal place of a district, and capital of the department of the *Forêts*. From being a castle, built by the people of Treves, it was enlarged by the Romans, and called "Augusta Romanorum." When Merovingus, king of France, conquered the country, it was called the "city of the sun," because the sun was anciently adored there, as the moon was at Arlon, Jupiter at Ivoy, now called Carignan, and Mars at Marche en Famine. This city is small, but strong, on account both of its situation and fortifications, which were thought to be the strongest in Europe. It is divided by the river Alzitz, which runs through it, into the Upper and Lower Towns; the former being situated on a rock, the latter in a plain. Its number of inhabitants is estimated at about 10,000, its two cantons contain 20,522, on a territory of 247½ kilometres, in 14 communes. Having frequently changed masters, being at one time in the possession of France, at another time in that of Spain, again under the dominion of the States General, to which it was ceded by the barrier treaty in 1701, and afterwards, viz. in 1715, possessed by the emperor; it was blockaded by the French, after they had acquired by arms the surrounding country, and surrendered to them on the 7th of June, 1795, by capitulation. The surrender of Luxemburg put the French in possession of the whole country on the left of the Rhine,

except Mentz; 50 miles S.S.E. of Liege. N. lat. 49° 40'. E. long. 6° 13'.

LUXEUIL, a town of France, in the department of the Upper Saône, and chief place of a canton, in the district of Lire; 14 miles N.E. of Vesoul. The place contains 3080, and the canton 13,261 inhabitants, on a territory of 190 kilometres, in 27 communes. N. lat. 47° 49'. E. long. 6° 27'.

LUXOR, **LUXOREIN**, or *Akfor*, a village of Egypt, on the right side of the Nile, the site of which is the ruins of the celebrated city of *Thebes*, which see. Of these ruins we shall now only mention from Mr. Browne's Travels (p. 135.), that they extend for about three leagues in length along the Nile. East and west they reach to the mountains, a breadth of about 2½ leagues. The river is here about 300 yards broad. The circumference of the ancient city mull, therefore, have been about 27 miles. This ingenious traveller is of opinion that Luxor and Akfor are corruptions of El Kufur, the real term, which is still applied to the ruins by the Arabs; 18 miles S. of Kous.

LUXURIANT PLANTS, a term in *Gardening*, signifying such as become greatly augmented in growth beyond their common natural state, and which rarely acquire that degree of perfection which is the case with those of more moderate growths. This sometimes happens from the excess of nourishment, and sometimes from the nature of the plants.

But it is produced differently; sometimes prevailing in the whole plant, sometimes in particular parts, as in some of the shoots, and frequently in the flowers.

The first of these may be considered such as shoot much stronger than plants of the same species generally do, and it happens both in herbaceous plants and trees, &c. which never attain perfection so soon as the more moderate growers: thus, many sorts of esculent plants, which shoot luxuriantly to leaves and stalks, &c. as cucumbers, melons, cabbages, cauliflowers, turnips, radishes, beans, peas, &c. never arrive so soon to perfection as those of moderate growth; and such plants as appear to be naturally of themselves of a very luxuriant nature, are very improper to stand, from which to save seed for future increase.

And this is also the case in fruit-trees; as such as are very luxuriant shooters are much longer before they attain a bearing state than those of middling growth, and they never bear so plentifully, or have the fruit attain such perfection. This luxuriance is frequently acquired by unskilful pruning, especially in wall-trees, &c. as it is often the practice, when wall or espalier trees assume such a growth, to cut all the shoots short; by which, instead of reducing the tree to a moderate state of shooting, it has its vigour increased, as too considerable shortening of strong shoots promotes their throwing out still stronger, and producing more abundant or superfluous wood. Therefore, in pruning very luxuriant espalier and wall-fruit trees, they should be assisted somewhat in their own way, as it were, by training in plenty of shoots annually for a year or two, to divide the redundancy of sap; or, in the summer and winter prunings, always leaving them rather thicker than in the common practice, and mostly at full length, unless it be necessary to shorten such as are of very considerable length, or in some particular part of the tree, to force out a supply of wood to fill a vacancy. Some sorts of fruit-trees should, indeed, never be generally shortened in the common course of pruning, except in casual, very extended, irregular growths, or occasionally for procuring a supply of wood, as mentioned above. This is particularly necessary in apples, pears, plums, cherries, and fig-trees; for, if generally shortening was to be practised in

in these sorts, they would continue shooting every year so luxuriantly to wood, that they would never form themselves into a proper bearing state: even in those trees where shortening is necessarily practised in winter, in most of the annual supplies of shoots, as in peaches, nectarines, &c. in cases of luxuriant growth, it should be very sparingly performed, the general shoots not being cut very short, and some of the most vigorous left almost or quite at the full length. This is the proper method to reduce luxuriant trees to a moderate growth, and to a bearing state; as by training the shoots thicker, and leaving them longer, and continuing it for a year or two, the redundant sap, having greater scope to divide itself, cannot break out with that luxuriance as when it has not half the quantity of wood to supply with nourishment, as in the case of short pruning. See ESPALIER, WALL-TREES, and PRUNING.

This state seldom occurs with any continuance in standard-trees, where permitted to take their natural growth, except in casual straggling shoots, which should always be taken out. Over-luxuriant shoots are mostly met with in trees and shrubs; but require more particularly to be attended to in the culture of the fruit-tree kind, especially those of the wall and espalier sort, which undergo annual pruning.

They are such as shoot so vigorously in length and substance, as greatly to exceed the general growth of those usually produced on the same kind of plant or tree, and are sometimes general, but in other cases only happen to particular shoots in different parts of a tree, &c. They are discoverable by their extraordinary length and thickness, and by their vigour of growth, which always greatly impoverishes the other more moderate shoots in their neighbourhood, and likewise the fruit, &c. as well as often occasions a very irregular growth in the respective trees. Such shoots frequently occur in wall and espalier fruit-trees, and are the effects of injudicious pruning. When they are in general wholly so, they should be managed as directed above; but when only in particular shoots here and there in a fruit tree, or other tree or shrub under training, such shoots being of such a very luxuriant nature as to draw away the nourishment, at the expence of the adjacent moderate shoots, and which, by their vigorous irregular growth, cannot be trained with any degree of regularity; they should for the most part, as soon as discoverable, in the summer or winter prunings, be cut out, taking them off as close as possible to the part of the branch whence they originate, that no eye may be left to shoot again; unless such a shoot should rise in any part of a tree or shrub, where a further supply of wood may be requisite; in which case it may be retained and shortened as convenient, to force out a supply of more shoots laterally to fill the vacancy.

Where it prevails in other trees and shrubs than those of the fruit kind, they should have occasional attention, pruning them in regular order in their younger advancing growth, or afterwards occasionally in particular sorts, as may be necessary: observing, in either, when any straggling shoots, &c. assume a very luxuriant rambling growth, greatly exceeding the other general branches, that they may be more or less reduced or cut entirely away close to their origin, as may be most expedient, according to the nature of growth of the trees or shrubs, either in summer or winter, &c.

Most double flowers may be considered as luxuriant, especially such as have the cup or corolla multiplied, or so augmented in the number of their leaves or flower-petals inward, as to exclude some part of the fructification, as the same thing occurs in flowers as in esculent plants and fruit-trees, from their over-luxuriant growth; for, as the flower is designed for perfecting the fruit and seed, when the petals are

multiplied to the diminution of the stamina, &c. no impregnation ensues, and of course no fruit or seed is produced.

In the double varieties of most kinds of flowers produced on ornamental flowering plants, this luxuriance is generally considered as a superior degree of perfection; and has different modifications.

The highest degree of this sort of luxuriance is met with in carnations, anemones, ranunculuses, the poppy, lychnis, peony, narcissus, violet, and some others.

LUXURY, says Mr. Hume, (Ess. vol. i. p. 285.) is a word of an uncertain signification, and may be taken in a good as well as a bad sense. In general, it means great refinement in the gratification of the senses; and any degree of it may be innocent or blameable, according to the age, or country, or condition of the person. The bounds between the virtue and the vice cannot here be exactly fixed, more than in other moral subjects. To imagine, that the gratifying of any sense, or the indulging of any delicacy in meat, drink, or apparel, is of itself a vice, can never enter into a head, that is not disordered by the frenzies of enthusiasm. "I have, indeed," says our author, "heard of a monk abroad, who, because the windows of his cell opened upon a noble prospect, made a covenant with his eyes never to turn that way, or receive so sensual a gratification." Such is the crime of drinking Champagne or Burgundy, preferably to small beer or porter. These indulgences are only vices, when they are pursued at the expence of some virtue, as liberality or charity; in like manner as they are follies, when for them a man ruins his fortune, and reduces himself to want and beggary. When they entrench upon no virtue, but leave ample subject whence to provide for friends, family, and every proper object of generosity or compassion, they are entirely innocent, and have in every age been acknowledged such by almost all moralists. To be entirely occupied with the luxury of the table, for instance, without any relish for the pleasures of ambition, study, or conversation, is a mark of stupidity, and is incompatible with any vigour of temper or genius. To confine one's expence entirely to such a gratification, without regard to friends or family, is an indication of a heart destitute of humanity or benevolence. But if a man reserve time sufficient for all laudable pursuits, and money sufficient for all generous purposes, he is free from every shadow of blame or reproach. Since luxury may be considered either as innocent or blameable, one may be surpris'd, says Mr. Hume, at those preposterous opinions which have been entertained concerning it; while men of libertine principles bestow praises even on vicious luxury, and represent it as highly advantageous to society; and on the other hand, men of pure morals blame even the most innocent luxury, and represent it as the source of all the corruption, disorders, and factions incident to civil government. This author endeavours to correct both these extremes, by proving, 1st, that the ages of refinement are both the happiest and the most virtuous; and 2dly, that wherever luxury ceases to be innocent, it also ceases to be beneficial; and when carried a degree too far, is a quality pernicious, though perhaps not the most pernicious to political society. In proof of the first point, he considers the effects of refinement both on private and public life. For his reasoning we must refer to the Essay, above cited. Industry, knowledge, and humanity, says our author, are linked together by an indissoluble chain, and are found, from experience as well as reason, to be peculiar to the more polished, and, what are commonly denominated, the more luxurious ages. He adds, that these advantages are not attended with any disadvantages that bear any proportion to them. The more men refine upon pleasure, the

less will they indulge in excesses of any kind; because nothing is more destructive to true pleasure than such excesses. Besides, industry, knowledge, and humanity diffuse their beneficial influence beyond the sphere of *private* life, on the *public*, and render the government as great and flourishing as they make individuals prosperous and happy. Our author concludes his Essay on "Refinement in the Arts," with the following observations. "Luxury, when excessive, is the source of many ills; but is in general preferable to sloth and idleness, which would commonly succeed in its place, and are more hurtful both to private persons and to the public. When sloth reigns, a mean uncultivated way of life prevails amongst individuals, without society, without enjoyment. And if the sovereign, in such a situation, demands the service of his subjects, the labour of the state suffices only to furnish the necessities of life to the labourers, and can afford nothing to those who are employed in the public service."

An excellent writer, to whom we shall next refer, takes occasion, from a consideration of the mode of living which actually obtains in any country, to illustrate the true evil and proper danger of luxury. Luxury, as it supplies employment and promotes industry, allures population. But it is attended with a consequence, which counteracts and often overbalances these advantages. When, by introducing more superfluities into general reception, luxury has rendered the usual accommodations of life more expensive, artificial, and elaborate; the difficulty of maintaining a family, conformably with the established mode of living, becomes greater, and what each man has to spare from his personal consumption proportionably less: the effect of which is, that marriages become less frequent, agreeably to the maxim, which lies at the foundation of this reasoning, that men will not marry to *sink* their place or condition in society, or to forego those indulgences, which their own habits, or what they observe amongst their equal, have rendered necessary to their satisfaction. This principle is applicable to every article of diet and dress, to houses, furniture, and attendance; and this effect will be felt in every class of the community. For instance, the custom of wearing broad cloth and fine linen repays the shepherd and flax-grower, feeds the manufacturer, enriches the merchant, gives not only support but existence to multitudes of families: hitherto, therefore, the effects are beneficial; and were these the only effect, such elegancies, or, if they may be so called, such *l'etiquette*, could not be too general. But here follows the mischief: when once fashion hath annexed the use of these articles of dress to any certain class, to the middling ranks, for example, of the community, each individual of that rank finds them to be *necessaries* of life: that is, finds himself obliged to comply with the example of his equals, and to maintain that appearance which the custom of society requires. This obligation creates such a demand upon his income, and withal adds so much to the cost and burthen of a family, as to put it out of his power to marry, with the prospect of continuing his habits or of maintaining his place and situation in the world. We see, in this description, says our author, the cause which induces men to waste their lives in a barren celibacy; and this cause, which impairs the very source of population, is justly placed to the account of luxury. It appears, upon the whole, to be the tendency of luxury to diminish marriages, and that in this tendency the evil of it resides. Hence it may be inferred, that of different kinds of luxury, those are the most innocent which afford employment to the greatest number of artists and manufacturers; as those, in other words, in which the price of the work bears the greatest proportion to that

of the raw material. Thus, luxury in dress, in furniture, is universally preferable to luxury in eating, because the articles which constitute the one, are more the production of human art and industry, than those which supply the other. We may also conclude, that it is the *difference*, rather than the *degree*, of luxury, which is to be dreaded as a national evil. The mischief of luxury consists in the obliquation that it forms to marriage. But, as it is only a small part of the people in any country that is composed by those of higher rank, the facility, or the difficulty, of supporting the expence of their station, and the consequent increase or diminution of marriages among them, will have but little influence on the state of population. As long as the prevalence of luxury is confined to a few of elevated rank, much of the benefit is felt, and little of the inconvenience. But when the imitation of the same manners descends, as it always will do, into the mass of the people; when it advances the requisites of living beyond what it adds to men's abilities to purchase them, then it is that luxury checks the formation of families, in a degree that ought to alarm the public. To all which we may add, that the condition most favourable to population is that of a laborious, frugal people, ministering to the demands of an opulent, luxurious nation; because this situation, while it leaves them every advantage of luxury, exempts them from the evils which naturally accompany its admission into any country. Paley's *Princ. of Mor. and Pol. Philos.* vol. ii.

In our country there was formerly a multitude of penal laws intended for restraining excess in apparel; chiefly made in the reigns of Edward III., Edward IV., and Henry VIII., against piked shoes, short doublets, and long coats, all of which were repealed by statute 1 Jac. I. c. 25. Excess of diet, which is one species of luxury, is still prohibited by 1 Edward III. stat. 3, which ordains that no man shall be served at dinner or supper with more than two courses: except upon some great holidays there specified, in which he may be served with three. See *SUMPTUARY LAWS*.

LUYTS, JOHN, in *Biography*, a philosopher and astronomer, was born in North Holland in 1665. He became professor of philosophy and mathematics at Utrecht, where he died in 1721. He wrote 1. An Astronomical Work, in which he rejected the Copernican system, entitled "Instituta astronomica in qua doctrina sphaerica, atque theoria, intermixto usu sphaerae celestis, et variis chronologicis, pertractantur." 2. An Introduction to Modern and Ancient Geography, with many plates. In all that he wrote and taught he showed himself a great partisan of the Aristotelian philosophy, in opposition to that of Descartes, Moveri.

LUZ, LA, in *Geography*, a sea-port town of the island of Canary; five miles N. of Ciudad de las Palmas.—Also, a town of France, in the department of the Higher Pyrenees, and chief place of a canton, in the district of Argeles. The place contains 2135, and the canton 6222 inhabitants, on a territory of 552 kilometres, in 17 communes.

LUZARA, a town of Italy, in the department of Minicio; 16 miles S. of Mantua.

LUZARCHES, a town of France, in the department of the Seine and Oise, and chief place of a canton, in the district of Pontoise; 5 leagues N. of Paris. The place contains 1696, and the canton 11,411 inhabitants, on a territory of 180 kilometres, in 22 communes. N. lat. 49° 5'. E. long. 2° 30'.

LUZECH, a town of France, in the department of the Lot, and chief place of a canton, in the district of Cahors; 2½ leagues from Cahors. The place contains 2049, and the canton

canton 10,504 inhabitants, on a territory of 162½ kilometres, in 12 communes. N. lat. 44° 26'. E. long. 1° 23'.

LUZERATH, a town of France, in the department of the Rhine and Moselle, and chief place of a canton, in the district of Coblenz. The place contains 614, and the canton 2525 inhabitants, in 12 communes.

LUZERNE, a large county of Pennsylvania, bounded north by Tioga county in New York, east and south-east by Northampton, west by Lycoming and Northumberland counties; about 79 miles in length from north to south, and 75 in breadth from east to west, divided into 19 townships, and containing 2 churches, 33 saw-mills, 24 grist-mills, 2 fulling-mills, and 1 oil-mill. The number of inhabitants is 128,399. Near the Susquehanna river, which, with its tributary streams, well waters it, the soil is very fertile, and produces good crops of wheat, flax, and hemp. The northern parts abound with pine, timber, and sugar-maple. In the townships of Wilksbarre, Kingston, Exeter, and Plymouth, are large beds of coal. Coal and bog-iron are found in several places, and two forges have been erected. In this county are many remains of ancient fortifications, which are of an elliptical form, and covered with large white oak-trees. Its chief town is Wilksbarre.

LUZIOLA, in *Botany*, Juss. 33. An annual Peruvian grass, which Dombey took for a *Zizania*. It is described by Jusseu as monœious, without any calyx; the corolla of two valves, without awns. Male flowers in a loose terminal spike. Stamens usually eight, sometimes nine or ten; anthers stalked. Female flowers panicle, inferior, much smaller. Styles two. Seed ovate, naked.

LUZULA, a genus established by Decandolle in his edition of Lamarck's *Flora Française*, v. 3. 158; and adopted by Mr. R. Brown, Prodr. Nov. Holl. v. 1. 591. It consists of such Linnæan *Junci* as have a capsule of a single cell, with only three seeds, as is the case with *J. campylois*, Linn. (Juncoides; Mich. Gen. 41. t. 31.) Whether the small number of the seeds be a sufficient character, seems to us at best doubtful, considering how various their number is in other *Junci*. The capsule having one cell or three is certainly of no importance, in either the three-seeded or many-seeded species; some having perfect partitions from the centre of their valves, others more or less of a ridge there in the place of them. The capsule of *Juncus Forsk.*, Engl. Bot. t. 1293, for instance, which by the number of its seeds should be a *Luzula*, has a capsule of three cells. It is indeed much to be wished, that plants so unlike the habit of most *Junci* could, by any sound character, be separated from them; but without such they are best as they are.

LUZURIAGA, so called by the authors of the Flora Peruviana, in honour of a Spanish botanist, or patron of the science, of the same name. Ruiz et Pavon Fl. Peruv. Brown Prodr. Nov. Holl. v. 1. 281.—Class and order, *Hamambia Monogypia*. Nat. Ord. *Sarmentaceæ*, Linn. *Ajphoditi*, Juss. *Alphodææ*, Brown.

Eff. Ch. Calyx none. Corolla in six deep, equal, spreading, beardless segments, deciduous. Filaments inserted into the base of each segment, thread-shaped, smooth, curved at the point; anthers arrow-shaped, cohering, longer than the filaments. Style thread-shaped, with three furrows; stigma simple. Berry with a few, nearly globose, seeds.

This genus consists of climbing weak shrubs, with simple ribbed leaves. Flowers cymose or umbellate, terminal and axillary; their footstalks as it were articulated with the rather tapering base of the flower. Berry black, sometimes enclosing only a single seed. Mr. Brown is not quite cer-

tain of his genus being precisely the same with that of the Flora Peruviana. He defines two New Holland species.

1. *L. cymosa*. Cymes terminal, deeply divided. Branches round. Young branches striated, smooth. Found near Port Jackson, as well as within the tropic.

2. *L. montana*. Umbels axillary, stalked. Branches striated, rough. Found near Port Jackson.

LUZY, in *Geography*, a town of France, in the department of the Nièvre, and chief place of a canton, in the district of Châteaun-Cléon; 5 leagues S.S.E. of Moulins-en-Gilbert. The place contains 1607, and the canton 8743 inhabitants, on a territory of 417½ kilometres, in 9 communes.

LUZZANA, a town of Italy; 22 miles S. of Mantua.

LUZZI, a town of Naples, in Calabria Citra; 4 miles S. of Bitugiano.

LUZZO MARINO, in *Ichthyology*, a name given by the Italians to the fish called by the ancient Greek writers, and many of the modern Latin authors, *fisherius*; and by Pliny, Varro, and some other of the old Roman authors, *judis*. Gaza has called it the *colleolus*, and the French, at this time, call it *spet*. Salvian has given the figure of it, but it is an imperfect one; for he has omitted the first fin of the back.

LYBIA, in *Ancient Geography*. See **LIBYA**.

LYCÆA, *Arctos*, in *Antiquity*, an Achaian festival resembling the Roman *lupercalia*, in which the conqueror was rewarded with a suit of brazen armour.

LYCANTHROPIA, in *Ancient Medicine*, from *lycos*, a wolf, and *anthropos*, man, as it were *man to be*; a term applied to that variety of mania or melancholy, which induced the persons affected to wander out in the night, howling and making other noises, frequenting church-yards, or places of burial; in which circumstances they were supposed to imitate or to resemble wolves. Aetius and Paul of Aegina have described such patients as pale, with dry and hollow eyes, parched tongue and mouth, excessive thirst, and perpetual sores on their legs, in consequence of the frequent accidents which they met with. The same term was also applied to those maniacs, who fancied themselves transformed into wolves. The appellation of *lycanthropia* was also given to the disease, when the patients imitated the manners of dogs, or imagined themselves to be changed into these animals.

LYCAON, in *Zoology*. See **Black Fox**.

LYCAONIA, in *Ancient Geography*, a province of Asia Minor, south of Galatia. According to Strabo, Hauria made a part of it. It was situated between mountains, and is supposed to have derived its name from *lycos*, a wolf, because the country, from its situation, formed a proper retreat for those animals. The principal places of Lycaonia, according to Ptolemy, were Adapfus, Cana, Iconum, Paralais Coena, Castis, and Baratta. The apostles of this country are said to have been St. Paul and St. Barnabas. The notitia of Hierocles reckons in this province 15 episcopal towns.

LYCEUM, *Arctos*, in *Antiquity*, the name of a celebrated school, or academy at Athens, where Aristotle explained his philosophy.

The place was a grove in the suburbs of Athens, which had previously been used for military exercises. It was composed of porticoes, and trees planted in the quincunx form, where the philosophers disputed walking. Hence *philosophy of the Lyceum* is used to signify the philosophy of Aristotle, or the Peripatetic philosophy. Simas observes, that the Lyceum took its name from its having been originally a temple of Apollo Lyceus; or rather, a portico or gallery built by Lyceus, son of Apollo; but others mention it to have

have been built by Pisistratus, or Pericles. Here he delivered his lectures to a promiscuous auditory in the evening, when the Lyceum was open to all young men without distinction; but in the morning his disciples were more select, and such as had been previously instructed in the elements of learning, and discovered abilities and dispositions suited to the study of philosophy. The latter he called his morning walk, and the former his evening walk. Aristotle continued his school in the Lyceum twelve years.

LYCHNANTHUS, in *Botany*, a name given by Gmelin to the *Cucubalus baccifer* of Linnaeus, which is superfluous, this plant being perhaps the only true *Cucubalus*; see that article.

LYCHNIDEA. See **PHLOX** and **SELAGO**.

LYCHNIS, λυχνίς of the Greeks, which word also signifies a lamp. Hence some have supposed that its botanical application arose from the down of the plant having been used to make wicks for lamps. This, however, by no means appears to have been the fact. The most probable and apparent explanation of the name is from the resemblance of the calyx to a lantern, its sides being semi-transparent between the ribs or veins, or the whole, in some instances, quite membranous, round, and inflated, like the horn lanterns still used by the Chinese. Possibly the appearance of the stigmas, flaments, or crown of the corolla, in several species, might favour the idea of a lamp with its flame. We must recollect that this name of *Lychnis* has been always used, with great latitude, for all the Campion tribe, by the old botanists; though now restricted, by Linnaeus and his followers, to one particular genus of that family. The short mention in Dioscorides, of his λυχνίς, is quite insufficient to determine either the wild or garden plant of which he speaks. Linn. Gen. 231. Schreb. 312. Willd. Sp. Pl. v. 2. 807. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 493. Ait. Hort. Kew. ed. 2. v. 3. 132. Juss. 302. Lamarck Illustr. t. 391. Gært. t. 130.—Class and order, *Decandria Pentagynia*. Nat. Ord. *Garyophyllet*, Linn. Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, oblong, tubular, membranous, five-toothed, permanent. *Cor.* Petals five; their claws the length of the calyx, flat, each crowned with a double erect seale; border flat, wedge-shaped, often divided. *Stam.* Filaments ten, longer than the calyx, fixed to the claws of the petals, five alternate ones later than the rest; anthers incumbent. *Pist.* Germen superior, nearly ovate; styles five, awl-shaped, longer than the flaments; stigmas downy, reflexed contrary to the motion of the sun. *Peric.* Capsule more or less ovate, clothed with the calyx, of from one to five cells, opening by five rigid reflexed teeth at the top. *Seeds* numerous, roughish, somewhat kidney-shaped.

Obs. *L. dioica* has the flaments and pistils in separate flowers and on different plants. *L. Viscaria* has undivided petals, and a capsule of five cells. Some other species are esteemed to vary in the number of their styles from five to four, or even three. *L. apetala* has the corolla concealed within the calyx.

Ess. Ch. Calyx of one leaf, oblong. Petals five, with claws; the border usually divided. Capsule superior, with five teeth at its orifice, of from one to five cells.

Ten species of *Lychnis* occur in the fourteenth edition of *Syst. Veg.*, of which one, *alpestris* of the *Supplementum*, is made by Jacquin, Aiton, and Willdenow, a *Silene*, surely with great propriety. But there can be no doubt that *quadridentata* ought to be referred to the same genus, as having naturally only three styles, or at most but four. These two species being removed hence, the above-men-

tioned anomaly in the number of the styles in the present genus is done away; for *alpina*, reputed to have four styles, is now known to have naturally, if not invariably, five; see Engl. Bot. t. 2254. We therefore retain but eight of the species of Linnaeus, or rather of Murray, for Linnaeus was originally correct respecting the above. To these eight two are added by Willdenow, from Aiton and Lamarck.

1. *L. chalcidonica*. Scarlet Lychnis. Linn. Sp. Pl. 625. Curt. Mag. t. 257. Ger. em. 466.—Tufts terminal, level-topped, many-flowered. Leaves ovate, rough, somewhat undulated.—This is said by Gmelin to grow wild in all parts of Russia and Siberia. It is one of the oldest ornaments of our flower-gardens, being a hardy perennial, very showy, and remarkable for the rich deep scarlet of its blossoms, especially when double. These appear in June and July, forming a large, dense, convex, terminal tuft, two or three inches wide. The stem is three or four feet high, round, hairy, leafy, but little branched. Leaves sessile, opposite, pointed, wavy, rough, dark green, clasping the stem with their broad, ovate, often combined, bases. We have never seen the pale red, nor the white varieties, mentioned by authors.

2. *L. Flos cuculi*. Meadow Lychnis, or Ragged Robin. Linn. Sp. Pl. 625. Curt. Lond. fasc. 1. t. 33. Engl. Bot. t. 573. (Armoria pratenfis; Ger. em. 600.)—Petals in four deep, linear segments. Leaves lanceolate, smooth. Fruit roundish, of one cell.—Frequent in moist meadows throughout Europe, flowering in June. The root is perennial. Stem twelve or eighteen inches high, with rough angles, viscid above. Leaves narrow. Panicle forked. Petals pink, very delicate, with a brown, angular, smooth calyx. There is a double variety, and some mention a white one.

3. *L. Viscaria*. Red German Catchfly. Linn. Sp. Pl. 625. Fl. Dan. t. 1032. Engl. Bot. t. 788. (Muscipula angustifolia; Ger. em. 601.)—Petals undivided. Leaves linear-lanceolate, smooth. Fruit of five cells.—Native of dry or rocky pastures in the north of Europe. We have gathered it in the fissures of rocks, a mile south of Edinburgh, and have it also from Perthshire. It flowers in May and June. A double variety is common in gardens, and a pure white one is sometimes seen. The roots are woody, tufted, and perennial. Herb smooth. Stem a foot high, angular, brown and very clammy under each joint. Leaves narrow. Flowers in a dense, forked, oblong bunch or spike. Petals crimson, only slightly emarginate, not cut or cloben. Capsule ovate, of five cells, though this species is so nearly allied in habit to the foregoing, whose capsule has but one cell.

4. *L. alpina*. Red Alpine Campion. Linn. Sp. Pl. 626. Tour in Lapland, v. 2. 19. Curt. Mag. t. 394. Fl. Dan. t. 65. Engl. Bot. t. 2254.—Smooth. Petals cloben. Flowers corymbose. Leaves linear-lanceolate.—Native of the Lapland, Siberian, Swiss and Pyrenean mountains; discovered on the Clova mountains of Angusshire, by Mr. G. Don, in 1795. It is much smaller than the last, and not at all viscid. The petals are divided at least half way down, and their crowns but small. See Sm. Tr. of Linn. Soc. v. 10. 342, for the confusion and contrariety of description which has attended this species.

5. *L. magellanica*. Magellanic Campion. Lamarck Dict. v. 3. 641. Willd. n. 7.—Somewhat hairy. Leaves linear. Petals cloben, scarcely longer than the calyx.—Fruit of one cell.—Gathered by Commerçon in the Straits of Magellan. We know this species solely by Lamarck's account. He compares its habit and foliage to that of Thrift, *Statice Armorica*, but observes that it is next akin to *L. alpina*, differing in having narrower, and somewhat downy leaves, fewer and larger

larger flowers, whose petals scarcely exceed the length of their bell-shaped calyx.

6. *L. fibrica*. Siberian Campion. Linn. Sp. Pl. 626. —Hairy. Leaves lanceolate. Stem forked, many-flowered. Petals cloven, twice as long as the calyx. Fruit of one cell. —Gathered in Siberia by Gmelin, who sent it to Linnaeus, but it does not find a place in the *Flora Sibirica*. This has greatly the habit of *Silene alpestris* above-mentioned, but is all over hairy; the petals more obtuse, and less deeply cloven; the styles five. The root is very long and simple, tufted at the crown, bearing numerous stems a span high, which are about twice forked. Calyx bell-shaped, tapering at the base. Petals apparently reddish. Capsule ovate, of one cell, with recurved irregular teeth.

7. *L. leia*. Small Portugal Campion. Ait. Hort. Kew. ed. 1. v. 2. 118. —Petals cloven. Flowers solitary. Leaves linear-lanceolate, smooth. Calyx with ten ribs. —Brought from Portugal, by the late Dr. Edward Whittaker Gray, in 1778, to Kew garden, where it is said to be a hardy annual, flowering in July. If this species still exists, it ought to be figured in some periodical work; it being greatly to be wished that the authors of such would prefer unpublished plants to those already often delineated. We know of no plate of this or the last-mentioned.

8. *L. coronata*. Chinese Lychnis. Thunb. Jap. 187. Linn. Syst. Veg. ed. 14. 435. Curt. Mag. t. 223. (*L. grandiflora*; Jacq. Col. v. 1. 149. Ic. Rar. t. 84. *Hedonia sinensis*; Lour. Cochinch. 286; see *HEDONIA*). —Leaves elliptic-lanceolate, smooth. Flowers axillary or terminal, solitary. Petals jagged. —Native of China and Japan, from whence Dr. Fothergill procured the plant in 1774. It flowers in June or July, or later, and must be kept in the greenhouse in winter, or at least protected by extraordinary covering, if left in the border. The root is perennial. Stem weak, round, smooth, two feet high. Leaves elliptic-lanceolate, pointed, smooth, pale beneath. Flowers remarkable for their great size, sharply jagged petals, and red-lead, very vivid, colour.

9. *L. diaica*. Red or White Field Campion. Linn. Sp. Pl. 626. —a. (red) Curt. Lond. fasc. 2. t. 32. Engl. Bot. t. 1579. —b. (white) Fl. Dan. t. 792. Engl. Bot. t. 1580. Leaves hairy. Flowers dioecious. Fruit of one cell. Crown of each petal four-cleft. —A very common plant throughout Europe; the red-flowered kind in hedges and shady bushy places in spring; the white more usually in fields or open situations in summer. The latter is a stronger plant, and from its evening fragrance has been called *L. vespertina* by Dr. Sibthorp, while the former is his *diurna*; see Fl. Ox. m. 145, 146. Both are usually dioecious, but not invariably so. There is a bluish-coloured variety, otherwise moist like the white; but we have found it in cultivation soon evanescent. The roots of both are perennial. Plant hairy and somewhat viscid, two or three feet high. Stem forked. Leaves ovate or lanceolate. Limb of each petal cloven half way down, generally with two small acute lateral lobes, its crown moreover consisting of two obtuse central teeth, and two acute lateral ones.

10. *L. apetalus*. Apetalous Mountain Campion. Linn. Sp. Pl. 626. Fl. Lapp. ed. 2. 150 t. 12. f. 1. —Calyx inflated, longer than the petals. Stem nearly single-flowered. —Native of the mountains of Lapland and Siberia. The root is perennial. Stem, in the Lapland specimens, a span high, and quite simple, single-flowered; in some of Gmelin's, from Siberia, taller, with from three to five flowers. The whole herb is slightly downy. Leaves lanceolate, rather narrow. Flower drooping. Calyx ovate, closed, with ten rough, purplish-brown ribs. Petals small and nar-

row, with an obsolete brownish border, entirely included, along with the stamens and pistil, in the hollow of the calyx. Capsule obtuse, of one cell.

LYCHNIS, in Gardening, contains plants of the hardy, herbaceous, flowery, perennial kind, of which the species cultivated are the scarlet lychnis (*L. chalcidonica*); the red-flowered lychnis, meadow pink, or ragged robin, (*L. flos cuculi*); the Chinese lychnis, (*L. coronata*); the viscous lychnis, or catchfly, (*L. viscaria*); the rose-flowered lychnis, wild red campion, or red bachelor's buttons (*L. diurna*); and the white-flowered lychnis, wild white campion, or white bachelor's buttons, (*L. vespertina*.)

In the first sort there is a variety with very double flowers, of a beautiful scarlet colour, they are produced in close clusters, sitting upon the top of the stalk; when the roots are strong, the clusters of flowers are very large, and make a fine appearance, coming out the latter end of June, and in moderate seasons continue nearly a month in beauty.

Of the fifth sort there is a variety with double flowers, cultivated in gardens by the name of red bachelor's buttons, which is an ornamental plant, and continues long in flower.

And the sixth sort has varieties with purple, or bluish-coloured flowers; with quadrid petals; with hermaphrodite flowers; with double flowers, cultivated in gardens by the name of double white bachelor's buttons.

Method of Culture.—They may be increased with facility in the single sorts by seed, and parting the roots; and in the double ones by dividing or slipping the roots; and sometimes by cuttings of their stalks.

The seed should be sown in the early spring, as in March, in a bed or border of light earth, in an eastern aspect, each sort separate, raking them in lightly, or they may be sown in small drills. The plants come up in two or three weeks, when they should have occasional waterings and hand-weedings; and when the plants are two or three inches high, be planted out in beds or borders, in rows six inches asunder, watering them till fresh-rooted, letting them remain till the autumn or following spring, when they should be transplanted where they are to remain.

Both the single and double may be increased by slipping the roots, but it is more particularly applicable to the double sort, as they cannot with certainty be obtained from seed: the season for performing this work is the autumn after the stalks decay, when the whole root may either be taken up and divided into as many slips as are furnished with proper root-fibres, or the main root stand, and as many of the outer offsets as seem convenient to be slipped off: these slips, when strong, should be planted at once where they are to remain; but when rather small and weak, it is better to plant them in nursery rows, half a foot asunder, to remain a year, and then transplant them for good where they are to stand.

The planting of cuttings of the stalks is mostly practised for the double scarlet sort, when it increases but sparingly by offsets of the root. It is performed in summer, when the stalks are well advanced in growth, but before they flower, or have become hard and woody. Some of them should be cut off close to the bottom, and divided into lengths of four or five joints, planting them in an eastern border of rich, moist loamy earth, two thirds of their length into the ground, leaving only one joint or eye out, watering them directly, and repeating it occasionally with necessary shade in hot weather. They will be well rooted, and form proper plants for transplanting in the autumn. If the cuttings, as soon as planted, are covered down close with hand-glasses, it will greatly promote

mote their rooting, so as to form stronger plants before the winter season comes on.

The only culture they require afterwards is clearing them from weeds in summer, and supporting with stakes those which need it, cutting down and clearing away the decayed stalks in the autumn.

Of the third sort, as being rather more tender, some plants should be planted in pots, for moving under the protection of a frame or greenhouse in the winter season.

All these plants are very ornamental for the pleasure-ground, particularly the double-s. and prosper in any common soil, remaining in all weathers unhurt, being of many years duration in root; and, when of some standing, send up many stalks every spring, terminated by numerous flowers, making a fine appearance in summer. The scarlet double lychnis claims the preference, though the single scarlet sort is also very showy. And all the other species in their respective double-flowered states are ornamental. They are all kept in the nurseries for sale. In planting out, the tallest growers should be placed the most backward, and the others more towards the front.

LYCHNITIS MARMOR. See MARBLE.

LYCIA, in *Ancient Geography*, a country of Asia Minor, originally called Mylias, from the Myliæ, a people of Crete, who settled there, and afterwards Lycia, from Lycus, the son of Pandion, king of Athens; situated upon the Mediterranean, and forming a kind of peninsula, on the west of which was the Glaucus Sinus, and on the east another gulf, in the lower part of which was Attalea. To the south was the Mediterranean. The adjacent countries were on the west, Caria, to the north a small part of Phrygia Pacatiana, and to the north-east Pamphylia. Its boundaries were various at different times. Ptolemy places in Lycia the countries called Mylias and Carbalia, or Cabalia. Pliny says that the Lycians had thirty-six towns; Strabo ascribes to them twenty-three, of which six were very considerable. Lycia was intersected by several chains of mountains, passing from the north and north-east, and extending towards the sea. The most considerable rivers were the Xanthus and Limyrus. Its principal towns were Telmissus, Pinara, Xanthus, Patara, Myra, Limyra, Olympus, and Phaselis. The six towns, particularly noticed by Strabo, after Artemidorus, were Xanthus, Patara, Pinara, Olympus, Myra, and Tlos. The chief mountains of Lycia were Taurus and Chimæra. In the first ages of Christianity, Hierocles reckons as episcopal thirty towns, and Leonie Sage thirty-eight. The inhabitants of Lycia were originally from the island of Crete: and they were for a long time addicted to piracy. Diodorus Siculus, and Plato before him, reckon the Lycians among the Greek nations of Asia, as being descended from the Argians. Although they were governed by kings, it does not appear that the government was completely monarchical; a confederacy having been formed by twenty-three cities, which sent deputies to a general assembly, by which the affairs of the nation were managed. The soil of this country was fruitful, and the air reckoned very wholesome. The Lycians are highly commended by the ancients for their sobriety, and manner of administering justice. They continued to be governed by their own kings after they were subdued by the Persians, paying them tribute. They afterwards fell with the Persians under the power of the Macedonians, and after the death of Alexander, were governed by the Seleucids. When Antiochus the Great was confined by the Romans beyond mount Taurus, Lycia was granted to the Rhodians; but these disobliging the Romans in the war with Perseus, Lycia was declared a free country, and continued in this state till the reign of Claudius, who pro-

voked at their intestine dissensions, reduced their country into the form of a province.

LYCIUM, in *Botany*, *lyceum*, of the Greeks, so called, as is generally supposed, from Lycia, its native country; but what was the precise plant intended, has never been settled by commentators. Dioscorides describes it as a "spinous tree, with twigs three cubits or more in length, bearing thick-set leaves, like box. The fruit is like pepper, black, thick-set, bitter, and smooth. Bark pale. Roots woody." This description accords in many points with some species of the received *Lyceum*, but with none, that we are acquainted with, in every point. Box-thorn. Linn. Gen. 103. Schreb. 136. Willd. Sp. Pl. v. 1. 1057. Mart. Mill. Dict. v. 3. Art. Hort. Kew. ed. 2. v. 2, 3. Sm. Prodr. Fl. Græc. Sibth. v. 1. 155. Juss. 126. Lamarck Illustr. t. 112. Gærtn. t. 132. (Jasminoides; Mich. Gen. 224. t. 105. Duhamel Arb. v. 1. 305.)—Class and order, *Pentandria Monogynia*. Nat. Ord. *Luride*, Linn. *Solanæ*, Juss.

Gen. Ch. Cal. Perianth inferior, small, slightly five-lobed, obtuse, erect, permanent. Cor. of one petal, funnel-shaped; tube cylindrical, spreading, incurved; limb small, in five deep, obtuse, spreading segments. Stam. Filaments five, awl-shaped, inserted into the middle of the tube, and closing its orifice with their beard-like hairiness, shorter than the limb; anthers erect. Pist. Germen superior, roundish; style simple, projecting beyond the stamens; stigma cloven, thickish. Peric. Berry roundish, of two cells. Seeds several, kidney-shaped. Receptacles convex, fixed on each side of the partition.

Ess. Ch. Corolla tubular; its orifice closed by the beards of the filaments. Berry of two cells, with many seeds.

The species of this genus have been very imperfectly explained in many of the works of Linnaeus. The fourteenth edition of *Syst. Veg.*, edited by Murray, contains eleven, of which the first and fifth are one and the same plant, no *Lyceum* at all, but the *Scriffa* of Justen; see Willd. Sp. Pl. v. 1. 1061; see also our article DYONIA. The seventh and eighth also are but one species, *boerhaavi-jolium* of Linn. Suppl. and the eleventh, *capfulare* of Sp. Pl. 278, appears, by the Linnaean herbarium, to be a new description of *Hydrolea*; called *glabra* in the Banksian collection, where is the other half of the very same specimen, of which a part was sent to Linnaeus by Müller, who received it from New Spain. Seven, therefore, only of the above number remain, to which three are added from Thunberg, in Willdenow. The latter, therefore, is correct in his enumeration, except with respect to the *capfulare*. But Thunberg has given more recent illustration of his own new species in the ninth volume of the Linnaean Society's Transactions, with plates. We shall briefly describe the whole, with an additional species from Michaux.

1. *L. afrum*. African Box-thorn. Linn. Sp. Pl. 277. (*L. folis hircaribus*; Trew. Ehret. 4. t. 24. Jasminoides aculeatum humile, halimi minoris folio, flore majori violaceo, fructu crassiore, per maturitatem flavescente; Mich. Gen. 224. t. 105. f. 2.)—Leaves clustered, linear, tapering at the base. Branches straight, ending in a spine.—Native of the north of Africa, and some parts of Spain. It has been long cultivated in the greenhouses of the curious, but has little to attract general admiration. The stem is shrubby, rigid, much branched; each branch ending in a stiff straight spine. Leaves linear, bluish, entire, various in length and breadth, many together in lateral clusters, smooth, rather glaucous and fleshy. Flowers solitary, purple, about an inch long, drooping; on simple stalks, usually twice or thrice as long as the calyx. Linnaeus cites Micheli very erroneously,

erroneously, which Willdenow, not turning to the book, has omitted to correct.

2. *L. rigidum*. Rigid Box-thorn. Thunb. Prodr. 37. Tr. of Linn. Soc. v. 9. 153. t. 14.—Leaves clustered, linear. Branches straight, ending in a spine. Flowers nearly sessile.—Gathered by Thunberg near Cape Town, flowering in July and August. It differs from the former chiefly in having the *flowers* nearly sessile, with a much shorter and broader *corolla*. The *leaves* also are narrower.

3. *L. ruthenicum*. Tartarian Box-thorn. Murr. Comm. Gott. for 1779, p. 2. t. 2. Ehrh. Exsicc. n. 4. (*L. tataricum*; Pall. Ross. v. 1. fasc. 1. 78. t. 49.)—Leaves linear, clustered, from spinous buds. Branches elongated, pendulous.—Native of Siberia and Tartary. The *branches* are long, slender, pendulous, compound, with a pale smooth bark, and a solitary prominent spine from each bud. *Leaves* linear, bluntish, tapering at the base, scarcely more than three or four in each cluster. *Flowers* drooping. *Corolla* funnel-shaped, about half an inch long, pale purple. *Calyx* somewhat two-lipped. This is smaller in all its parts than the following.

4. *L. barbarum*. Willow-leaved Box-thorn, or Blue Jasmine. Linn. Sp. Pl. 277. Schkuhr. Handb. v. 1. 147. t. 46.—Leaves lanceolate, solitary or clustered, very unequal. Spines axillary. Branches elongated, pendulous.—Native of Europe, Asia, and Africa, very hardy with us, and long cultivated for bowers and trellises, being a rambling shrub of very luxuriant growth, though no great beauty. Its *flowers* are purple. *Berries* of an orange-red. The Chinese variety, distinguished by gardeners, and figured by Duhamel, differs scarcely in any thing. The *calyx* is occasionally three or five-cleft, and somewhat two-lipped, in that as well as the ordinary kind. This plant blossoms from May to the very end of autumn, bearing flowers and fruit together in abundance.

5. *L. tetrandrum*. Four-cleft Box-thorn. Thunb. Prodr. 37. Tr. of Linn. Soc. v. 9. 154. t. 15. Linn. Suppl. 150.—Leaves obovate, clustered. Branches straight, angular, ending in a spine. Flowers four-cleft.—Native of the Cape of Good Hope, towards the sea, flowering in June. Thunb. A rigid, branched, smooth *shrub*, with the habit of the first two species, but very small, fleshy, obovate *leaves*, and small, funnel-shaped, short, white *flowers*, whose *corolla* is four-cleft, and *stamens* four only.

6. *L. cinereum*. Grey-barked Box-thorn. Thunb. Prodr. 37. Tr. of Linn. Soc. v. 9. 154. t. 16.—Leaves lanceolate, clustered, nearly equal. Branches ending in a spine. Flowers on very short stalks.—Found at the Cape of Good Hope by Thunberg. He describes the *stem* as round, striated, smooth, grey, much branched, zigzag, and erect; the *branches* alternate, slender, elongated, each terminating in a sharp spine. *Leaves* smooth, acute. *Flowers* axillary, solitary, on stalks scarcely longer than the calyx, and not half the length of any of the leaves.

7. *L. horridum*. Succulent-leaved Box-thorn. Thunb. Prodr. 37. Tr. of Linn. Soc. v. 9. 154. t. 17.—Leaves obovate, fleshy, smooth. Branches numerous, ending in a spine. Flowers on very short stalks.—Grows in maritime situations at the Cape, flowering from September to November. Thunb. The *stem* is three feet high, rigid, abounding with short spinous *branches* in every direction. *Leaves* from three to seven in a cluster, not half an inch long, sessile, thick, smooth; flattish and green above; convex, white, and marked with a green line, beneath. *Flowers* solitary, small, on short stalks. They are represented in the figure with four segments only, though of this nothing

is said in the character or description. If it be corrected, the present species comes very near the fifth.

8. *L. europæum*. European Box-thorn. Linn. Sp. Pl. ed. 1. 192. Mant. 47. (*Jasminoides aculeatum*, *falciis folio*, *flore parvo*, *ex albo purpurascens*; Mich. Gen. 224. t. 105. f. 1.)—Leaves obovate, oblique, clustered. Spines lateral and terminal. Stem erect.—Native of the south of Europe; hardy in our gardens, flowering all summer long. Linnæus confounded this, in the second edition of *Sp. Pl.*, with his *barbarum*, from which it is very distinct. The *stem* and *branches* are firm and upright. *Leaves* obovate, oblique or twisted, sometimes minutely downy. *Corolla* paler, longer, and more slender. There is no prominent green line, running down the branches from each bud, as in the *barbarum*.—The present is *Rhamnus primus* of Clusius and Dodonæus; see Ger. em. 1334. fig. 1.

9. *L. boerhaavifolium*. Glaucon-leaved Box-thorn. Linn. Suppl. 150. (*L. heterophyllum*; Murr. Comm. Gott. for 1783. p. 6. t. 2. *Elætria halimifolia*; P'Herit. Stirp. fasc. 1. 45. t. 23.)—Leaves ovate, oblique, acute, glaucous. Spines lateral. Flowers in terminal clusters.—Native of Peru. This is a very pretty *shrub*, with spines accompanying the buds on the stem and older branches; the young shoots are unarmed, slender, spreading horizontally. *Leaves* scattered, stalked, about an inch long, ovate, entire, glaucous, smooth. *Flowers* several together, in a cluster, or short panicle, at the end of each branch, purplish, very fragrant. *Calyx* hemispherical, with five sharp equal teeth. *Corolla* rather short and funnel-shaped, with long projecting *stamens* and style; the former hairy at the base. The *stigma*, according to P'Heritier, is sometimes capitate, sometimes cloven, or of two valves, which must surely be owing to the different periods of its age.

10. *L. barbatum*. Fringed Box-thorn. Murr. in Syst. Veg. ed. 14. 228. Thunb. Prodr. 37. Tr. of Linn. Soc. v. 9. 155. (*L. inerme*; Linn. Suppl. 150.)—Leaves ovate, smooth. Branches zigzag, without spines. Panicles axillary.—Gathered by Thunberg at the Cape of Good Hope, on little hills about Cape-town and elsewhere, flowering in August and the following months. "The *stem* is shrubby, quite smooth, two feet high or more, with alternate, spreading, zigzag, rugged, grey *branches*. *Leaves* opposite, stalked, ovate, pointed or bluntish, entire, smooth, green above, pale beneath, an inch or more in length. *Foot-stalks* three quarters of an inch long. *Flowers* axillary, panicled, on capillary stalks. *Stipulas* or *bracteas* fringed with white. *Berry* two-lobed, compressed, abrupt, with two furrows and two cells." Thunb.—Of this we have neither seen a specimen nor figure, nor has it yet appeared in any English garden.

11. *L. carolinianum*. Carolina Box-thorn. Mich. Bo-real-Amer. v. 1. 95. Donn Cant. ed. 5. 47.—Leaves spatulate-oblong. Branches without spines. Flowers four-cleft.—Native of the rushy salt-marshes of Carolina, Georgia, and Florida. Said to have been brought to England in 1806. The *stem* is shrubby. *Leaves* narrow. *Flowers* blueish, four-cleft, with four *stamens*.

LYCUM, in Gardening, contains plants of the shrubby exotic kind, of which the species cultivated are the African boxthorn (*L. afrum*); the willow-leaved boxthorn (*L. barbarum*); the European boxthorn (*L. europæum*); and the Tartarian boxthorn (*L. tataricum*).

The second sort affords several varieties. The first has a shrubby stalk seven or eight feet high, sending out several irregular branches, armed with strong spines, and furnished with short thick leaves: the flowers which come out from the side of the branches are small and purple. They appear

in July and August, but do not produce seeds in this climate.

The second has the stalk four or five feet high, sending out many irregular branches, covered with a very white bark, and armed with a few short spines; the leaves are about three inches long, and one inch broad in the middle, alternate, pale green. The flowers appear in May, and are succeeded by small round berries that ripen in the autumn, when they become as red as coral.

The third rises with weak irregular diffused branches to a great height, requiring support; some of these branches have in one year been upwards of twelve feet long; the lower leaves are more than four inches long, and three broad in the middle; they are of a light green and a thin consistence, placed without order on every side of the branches. As the shoots advance in length, the leaves diminish in size, and towards the upper part are not more than an inch long and a quarter of an inch broad; fitting close to the stalks on every side. The flowers come out singly at every joint towards the upper part of the branches, on short tender peduncles, and are of a pale colour with short tubes; the brins are spread open, broader than either of the former sorts, and the style is considerably longer than the tube of the corolla.

Method of Culture.—All these plants may be increased by seeds, cuttings, or layers.

The seeds should be sown in the autumn soon after they are ripe, in pots, being plunged into an old tan-bed in winter, and covered with the glasses in frosty weather; but in mild weather be open to receive moisture; in the following spring the pots should be plunged into a moderate hot-bed, to bring up the plants, which must be inured to bear the open air as soon as the danger of frost is over, and when they are three inches high, be shaken out of the pots, and each planted in a small separate pot filled with loamy earth, being placed in the shade till they have taken new root, when they may be removed to a sheltered situation, to remain till the autumn, when they should be either removed into the greenhouse, or placed under a hot-bed frame, to shelter them from hard frost. They must at first be kept in pots, and treated in the same way as myrtles, and other hardy greenhouse plants; but when they are grown strong, a few of them may be planted out in the open ground in warm situations, where they stand moderate winters, but are commonly destroyed by hard frosts.

The cuttings should be made from the young shoots, and be planted in a shady border in July, being duly watered; and when they have taken root, be treated in the same manner as the seedling plants. This is the usual mode of increasing them, as some sorts never produce seeds in this climate.

In the third sort the cuttings should be planted in the spring, in an eastern border; and the plants should not be removed till the autumn, when they may be planted to cover walls, as the branches are too weak to support themselves.

The third variety may also be increased by dividing and planting its creeping roots.

The layers must be made from the young branches, and be laid down in the spring; and when rooted in the autumn, taken off, and managed as in the other methods.

The hardy sorts afford variety in warm situations in the open ground, and the other sorts among greenhouse collections.

Lycium, in the *Materia Medica*, the name of a fruit called by the French *baye d'Adignon*, the Avignon berry, and by many authors the *pyracantha*. The shrub which

produces it is the *lycium five pyracantha* of Gerrard. (See *LYCIUM, supra*) The fruit is about the size of a grain of wheat, and is not round, but of an angular form when dried, sometimes of three, sometimes of four angles, and sometimes dented in at one end like a heart. It is of a yellowish-green colour, and of a bitter and astringent taste. It should be chosen fresh dried, and large. There was formerly a rob, or inspissated juice made from these berries, much in use in medicine; but this was generally adulterated with a rob made of the berries of the woodbine, privet, sloe, or other shrub, and is now quite out of use. The dyers in France and Holland use it for a yellow; and the Dutch have another use for it, which is, that they boil it in alum-water, and mixing it in whitening, form it into twisted sticks, which they sell to the painters in water-colours, under the name of *fil de grain*.

LYCOCTONON. See *ACONITE*.

LYCODONTES. See *BURONITE*.

LYCOGALIA, in *Botany*, so named by Micheli, from *lyx*, a wolf, and *gala*, milk, a genus of the fungus tribe, whose internal appearance and substance, in an early state, are like a mass of thick cream. It is included under *Mucor* by Linnaeus, Schreber, and others. Perf. Syn. 157. Mich. Gen. 215. t. 95. Albert. and Schwein. 83. (*Reticularia*; Bulliard Fung. v. 1. t. 476. f. 1—3.)—Class and order, *Cryptogamia Fungi*. Nat. Ord. *Fungi*.

Eff. Ch. Case roundish, membranous, smooth, lodging a mass, originally pulpy and deliquescent, finally powdery intermixed with distant internal fibres.

1. *L. argenteum*. (*L. griseum majus*; Mich. Gen. 216. t. 95. f. 1. *Reticularia Lycopodon*, var. 2; Bull. Fung. v. 1. 95. t. 476. f. 1. *Mucor lycogalus*; Bolt Fung. v. 3. 133. t. 133. f. 2.)—Cushion-shaped, somewhat hemispherical, naked, even of a silvery white.—Found upon rotten wood in autumn.—About an inch or more in diameter, brown and pulpy when young, of a brilliant white when arrived at maturity, discharging, by one or more irregular accidental openings, a mass of rich dark saffron-coloured powder.

2. *L. turbinatum*. (*Reticularia Lycopodon*, var. 3; Bull. v. 1. 95. t. 476. f. 2.)—Top-shaped, naked, even, pale brown. Found in similar situations, though rarely. But half the size of the former, at most, and furnished with a kind of short stalk, which gives it a pear-shaped figure. Hence Persoon was induced to make this a distinct species, though he appears to have known it merely by the account of Bulliard. The latter says it is pellucid when young.

3. *L. punctatum*. (*Reticularia Lycopodon*, var. 4; Bull. v. 1. 95. t. 476. f. 3.)—Aggregate, globose, dotted, greyish.—Found on rotten wood. Nearly as big as the first, but more globose, and of an ashy-grey; its surface dotted all over with minute points.

4. *L. atrum*. Albert. and Schwein. n. 233. t. 3. f. 3.—Cushion-shaped, black. Its powder is intermingled with branched, tree-like, radiating fixed threads. This, not mentioned by Persoon, is described by the above authors of the *Confessus* of Fungi, growing near Nistie in Upper Lusitania, as found upon fir trees from April to June, and more sparingly in October and November. It is the size and shape of the first species; white in the beginning, then of a dirty yellow, afterwards reddish-brown, and finally black. This fungus is remarkable for leaving, as it were, a skeleton of branched black fibres, radiating from a centre, when the coat and powder are gone.

5. *L. minutum*. Perf. n. 4. (*L. minuta*; Perf. Obs. Mycol. fasc. 2. 26. *L. globosum*, granis pili magnitudine, ære costis colore; Mich. Gen. 216. t. 95. f. 2. *Lycopodon*

don epidendrum; Linn. Sp. Pl. 1654. Hudf. 645. With. v. 4. 385. Sowerb. Fung. t. 52. Bolt. Fung. v. 3. 110. t. 119. f. 1. Mucor; Schæff. Fung. t. 193.)—Aggregate, globose; at first scarlet; then brown, with rose-coloured powder.—Common on the trunks of trees, after rain, in summer and autumn. Its vivid vermilion or scarlet hue, when young, is very striking. In decay it turns brown or black. Mr. Sowerby has exhibited, in his t. 400. f. 2, 3, what he esteems a luxuriant variety of this, but which seems to us a distinct species, being much larger, confluent, pale pink and veiny, soon turning quite black. In an early state it looked like the intestines of a fowl.—*Lycoperdon pisiforme* of Linnæus is judged by Persoon to be only a roughish-coated variety of this *Lycogala minutum*.

6. *L. conicum*. Pers. n. 5.—Scattered, conical; at first red; then purplish-violet.—Found, very rarely, on the rotten trunks of trees. About one or two lines high, exactly conical, but obtuse, clothed with little scattered fibrous granulations. Powder of a violet red. Persoon.

LYCOIDES, a term used by medical writers to express the disorders which arise in the human body by a long retention of the seed. These are sometimes madness, and very often dangerous quinities and swellings, and inflammations about the neck and throat. If we consider the natural tendency of the disorders of this kind to affect the neck, and the remarkable swelling of the necks of bucks, and some other animals at rutting time, it may give some rational hints towards understanding the alteration of the voice in boys who arrive at puberty.

Blancard derives the word *lycoides*, from *λύκος*, *lupus*, and *ειδος*, *forma*, from a supposition that wolves are subject to this disorder.

LYCOMING, in *Geography*, a county of America, in the N.W. part of Pennsylvania, bounded N. by the state of New York, and W. by Alleghany county; 150 miles long and 86 broad, being the largest in the state. The north and west parts are unsettled. It is divided into 10 townships, and contains 5414 inhabitants.—Also, a creek, which runs south, and discharges itself into the W. branch of Susquehanna, a few miles W. of Loyalsock creek.

LYCOPERDASTRUM, in *Botany*, Baitard Puff-ball, Mich. Gen. 219. t. 99. See *SCLERODERMA*.

LYCOPERDOIDES, Mich. Gen. 219. t. 98, a genus consisting of three species of fungi, very unlike each other. The first has a stout thick many-rooted stem, four inches high, and is the *Scleroderma tinctorium* of Persoon, Syn. 152. The others are subterraneous productions, akin to the *Lycoperdon cerinum* of Linnæus.

LYCOPERDON, so called by Tournefort, from *λύκος*, a wolf, and *πίσος*, to explode backwards, this author having certainly improved the old foolish name, *Crepitus lupi*, by making it less generally intelligible. We do not presume to account for this curious appellation. The French call the fungus to which it is applied *Vesse-loup*, or Wolf-bladder; the English *Puff-ball*; and the Germans *Bössl*; from which last Linnæus contrived the barbarous name *Bovista*. Linn. Gen. 569. Schreb. 770. Mur. Mill. Dict. v. 3. Pers. Syn. 130. Juss. 5. Tourn. t. 331. Lamarek Illustr. t. 887.—Class and order, *Cryptogamia Fungi*. Nat. Ord. *Fungi*.

Eff. Ch. Cafe caulescent, arising irregularly at the top, clothed with scaly or pointed warts.—(The powder or seed is greenish.) Persoon.

The author last mentioned defines 14 species of this genus, very properly restricting it to such fungi as answer to the above character, and excluding the starry puff-balls, (see *CEASTRUM*); as well as the *Tuber*, the *Scleroderma*, and

some others which Linnæus comprehended under his *Lycoperdon*. Examples are

L. giganteum. Pers. n. 1. Batf. h Fung. t. 165. (*L. maximum*; Schæff. Fung. v. 4. 130. v. 2. t. 191. *L. Bovista*; Bulliard t. 447. *L. Proteus*; Sowerb. Fung. t. 332, two upper figures.)—This is often found as big as a man's head, in dry upland pasture, in various parts of England and the south of Europe. When the upper part, and the whole powdery contents, are blown away, the spongy base, with a thin torn edge, remains for a considerable time. The root is small, but tough.

L. pyriforme. Pers. n. 12. Schæff. Fung. v. 4. 128. v. 2. t. 185. (*L. ovoideum*; Bulliard t. 435. f. 3.)—Found on rotten stumps in beech woods in autumn. It is an inch and a half high, and an inch broad, tapering at the base, and pointed at the top, of a dirty brownish-white.

L. gossypinum. Pers. n. 14. Bulliard t. 435. f. 1.—Found on rotten wood in France. A pretty species, about one-fourth of an inch in diameter, globose with a short taper base, all over white or pale grey, and covered as it were with a fine down or cottony subulance.

LYCOPERSICON, from *λύκος*, a wolf, and *πέρσιον*, a peach, the Tomato, or Love-apple, *Solanum Lycopersicum* of Linnæus. This fruit is valued for its grateful acidity in Italy, Spain and Portugal, where it makes a principal ingredient in many soups and other dishes, being moreover supposed to possess a stimulating, or aphrodisiac property. Raised in England, its flavour is more insipid, and its qualities not in any respect, as far as we have heard, remarkable; except that few stomachs can bear it in any great quantity. The fruit is best fried in slices, peppered and salted, as a sauce for game or any roast meat.

LYCOPHRON, in *Biography*, son of Periander, king of Corinth, flourished about five hundred and fifty years before the Christian era. The murder of his mother Melissa, by his father, had such an effect upon him, that he resolved never more to speak to him. This resolution was strengthened by their uncle Proclus, king of Epidaurus, who took Lycophron and his brother under his protection. When the infirmities of Periander obliged him to look for a successor, Lycophron, who was then in the island of Corcyra, refused to come to Corinth while his father was there, and he was induced to promise to settle in that city, only on condition that his father would come and dwell on the island which he left. So fearful, however, were the Corcyrians of the tyranny of Periander, that they killed the son to prevent the meditated exchange from taking place.

LYCOPHRON, a famous Greek poet and grammarian, was born at Chalcis, in Eubœa, and flourished about three hundred years before the Christian era. He was one of those poets who lived in the reign of Ptolemy Philadelphus, and who from their number obtained the name of Pleiades. According to Ovid he was slain by an arrow. He was author of several tragedies, of which the titles of twenty have been preserved; but the only work that has come down to us, is a very singular poem, entitled "Alexandra," or Cassandra, the subject of which is a series of predictions feigned by him to have been uttered by that daughter of Priam. This poem contains 1474 verses, the obscurity of which has procured the epithet of "Tenebrosus" to its author. It is a mixture of prophetic effusions, supposed to have been delivered by Cassandra during the Trojan war. The best editions are that of Bank, 1516, enriched with a commentary by Tzetzes; that of Canter, 1596; and that of our countryman, archbishop Potter, in 1702.

LYCOPITHELMUS, the *wolf's eye-stone*, a name given by some authors to such pieces of agate, or any other

semi-pellucid stone, as happen to have circular spots in them, resembling in colour the eye of that animal.

LYCOPODIODES, in *Botany*. See the following article.

LYCOPODIUM, from *λυκος*, a wolf, and *πους*, the foot, from the incurved, and often finger-like, shape of the spikes or extreme branches. Club-moss, or Wolf's-claw.—Linn. Gen. 561. Schreb. 753. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 1108. Swartz. Fil. 174. Brown Prodr. Nov. Holl. v. 1. 165. Juss. 12. Lamarck Illustr. t. 872. Michaux Boreal-Amer. v. 2. 282. Dill. Musc. 441. (Lycopodioides; Dill. Musc. 462. Selago; ibid. 435. Selaginoides; ibid. 460.)—Class and order, *Cryptogamia Musci*, Linn. *Crypt. Miscellanea*, Schreb. *Crypt. Filices*, Smith. *Crypt. Lycopodineæ*, Swartz.—Nat. Ord. *Musci*, Linn. Dill. *Musci spurii*, Juss. *Lycopodineæ*, Brown.

Eff. Ch. Capsules axillary, sessile, naked, mostly solitary, of one cell; some kidney-shaped, of two elastic valves, and full of fine powder; others two or three-lobed, of two or three valves, lodging from one to six globose bodies.

This beautiful and ample genus, one of the most elegant, with respect to habit, in the whole vegetable kingdom, holds as it were an intermediate place between the ferns and mosses. Some botanists have therefore been most inclined to refer it to the one tribe, others to the other. Its habit, most like the mosses, does yet by no means strictly accord with that order; and their fructification, being now well understood, separates them distinctly from *Lycopodium*, whose nature in that respect is almost totally in the dark, agreeing so far with ferns. The seeds of the latter, however produced, agree as nearly as can be with the powder found in the compressed or kidney-shaped capsules of the genus in question, which powder moreover has been likewise proved, by experiment, to be real seed. But the globular bodies found in peculiar capsules upon *L. denticulatum* and other species, proved themselves seeds by germinating, according to Brotero, Tr. of L. Soc. v. 5. 162, yet such species are furnished besides with what seems to be the genuine fruit of the genus. In this difficulty Professor Swartz and Mr Brown have prudently contented themselves, in the generic character, with mentioning these two kinds of apparent capsules and seeds, without positively asserting either to be such.

Joseph Fox, a poor journeyman weaver of Norwich, is the first person upon record who ever raised plants of *Lycopodium Selago* from the dust of the kidney-shaped capsules; see Tr. of Linn. Soc. v. 2. 314, where Mr. Lindsay's account of having succeeded equally well with the dust of *L. cernuum* in Jamaica, is also to be found. Sprengel cites the authority of Professor Willdenow in confirmation of this. We cannot but admit therefore that this dust, so exactly resembling the known seed of ferns, is real seed. This is the *Pulvis Lycopodii*, formerly kept in the apothecaries shops, on account of some reputed qualities long since disbelieved. It is still used in Germany to produce the appearance of lightning upon the stage; for being very light and highly inflammable, it takes fire instantaneously, with a sort of hissing explosion, while floating in the air. The dust of *L. clavatum* is collected and sold on the continent, for this purpose. With respect to the globular bodies, whose bulk is beyond all measure greater than that of these minute seeds, it is impossible to doubt the assertion of Professor Brotero, who in the fifth volume of the Transactions of the L. Soc. describes their germination, radicle, cotyledons, &c.; so that we must allow the existence of two kinds of seed on the same plant. The same phenomenon has been suspected in the genera *Fucus* and *Conserva*, though bota-

nists have been so justly cautious of admitting it, that they have not dared to trust their own eyes. Perhaps the actual existence of the fact in *Lycopodium*, may sanction our belief of it in these other instances. The difference however between these two kinds of seeds in *Lycopodium* is far more essential than Professor Sprengel seems to insinuate, when he says it "only proves that the capsules of several species of this genus are of two different shapes." (Crypt. 195, English translation.) Nothing can be greater than the apparent difference betwixt the two kinds of seeds themselves, which is such as to overset all analogy hitherto known. An idea advanced in Engl. Bot. v. 16. p. 1148, that the kidney-shaped capsules may be abortive ones, can hardly be admitted; for although we hear of no experiment made with the contents of the two different kinds of capsules from the same individual plant, (which if plants could be raised from both, would be truly an *experimentum crucis*;) yet the kidney-shaped capsules of the species in question, *L. Selaginoides*, are too precisely like those from which vegetating seeds have been obtained, to allow of a doubt concerning them. We ought not to omit that Dillenius first observed these different kinds of seeds in *Lycopodium*, and has founded upon them the different genera into which he has divided it, as quoted among the synonyms above.

The 14th edition of *Syst. Veg.* contains 29 species of *Lycopodium*, six of which are British. Professor Swartz defines 65; exclusive of the Linnæan *nudum*, which he establishes as a distinct genus, by the name of *Psilotum*; as well as of several others, which he finds mentioned in books, but could not satisfactorily ascertain.—Fifteen species have axillary sessile capsules, all uniform, of two valves, containing the above-described powdery kind of seeds. The remaining 50 bear their capsules in terminal spikes, each capsule being accompanied by a peculiar scale or bractea, generally toothed or fringed, totally unlike the leaves, and mostly of a paler or more tawny colour. Of these 50, 26 have the same kind of capsules and seeds as the above 15, and no other; one, (*L. Selaginoides*, Engl. Bot. t. 1148.) has, besides such capsules, very remarkable four-lobed ones, of two three-lobed valves, and containing four globose white seeds. The remainder have kidney-shaped as well as roundish, rarely three-lobed, capsules, either intermixed in the same spike, or the former are in the upper part, the latter in the lower. By this statement it appears, that no known species is without the kidney-shaped compressed capsule, bearing the minute dust-like seed, analogous to that of ferns; the larger globose seed being, as it seems, more of an adventitious nature.

Examples of the axillary species are,

L. linifolium. Linn. Sp. Pl. 1563. Sw. n. 1. (Selago linearis foliis; Dill. Musc. 440. t. 57. f. 5.)—Leaves alternate, remote, lanceolate.—Native of South America and the West Indies. Taken up by Dillenius from Plumier, who in his *Filices*, t. 166. f. C, C, gives an original plate of this species, which no other botanist appears to have seen. The root is fibrous. Stems seemingly pendulous, above two feet long, slender, slightly branched, leafy throughout. Leaves scattered, half an inch at least distant from each other, often near two inches long, entire, taper-pointed, somewhat ovate and twisted at the base. Capsules axillary, solitary, kidney-shaped. No other known species can vie with this in the size and distance of its leaves.

L. guineoides. Linn. Suppl. 448. Sw. n. 4.—Leaves three in a whorl, imbricated, ovate-lanceolate, obtuse, entire. Branches elongated.—Gathered in the island of Mauritius by Sonnerat or Commerçon, and given by Thouin to the younger Linnaeus. No other botanist seems to have seen the plant. It appears to be very tall, with the habit of the former,

former, but differs essentially in its much closed and whorled leaves, not half an inch long, blunt and concave, without rib or vein; the upper ones very gradually shorter and more ovate, with solitary, palish, axillary, roundish, slightly reniforme, capsules.

L. Selago. Fir Club-moss. Linn. Sp. Pl. 1565. Engl. Bot. t. 233. Sw. n. 12. Fl. Dan. t. 104.—Leaves scattered, in eight rows, somewhat imbricated, lanceolate, acute, rather concave. Stem forked, erect, level-topped.—Native of rather moist mountainous heaths; the only British species of this first section. The stems are about a span high, beset with dark, shining, fir-like leaves. Capsules small, brownish-yellow.

The spiked species are not only numerous, but, in many instances, remarkable for size and beauty. The British ones are *inundatum*, Linn. Sp. Pl. 1565. Engl. Bot. t. 239; *alpinum*, ib. 1567. E. Bot. t. 234;—*annotinum*, ib. 1566. E. Bot. t. 1727; and the common *clavatum*, ib. 1564, E. Bot. t. 224.—This last grows abundantly on dry mountainous heaths, creeping on the ground to the extent of several feet; the fruit-bearing branches only being erect. These bear one, two or three, finger-like dense spikes of ovate, taper-pointed, membranous-edged, imbricated bracts, each with an axillary solitary brown capsule.

Of the foreign ones none is more striking than *L. Phlegmaria*. Linn. Sp. Pl. 1564. (*L. erectum dichotomum, foliis cruciatis, spicis gracilibus*; Dill. Musc. 450. t. 61. f. 5.—Leaves ovate or heart-shaped, entire; the lower ones four in a whorl. Spikes thread-shaped, forked.—This grows in various parts of the East Indies, as well as in the isle of Bourbon. Mr. Menzies gathered our specimen in Otaheite. It is 18 inches or more in height, slightly forked or branched, clothed with numerous shining leaves, not so regularly whorled, at least the upper ones, as Dillenius found them. The long, terminal, slender, forked spikes, with their little roundish bracts, scarcely broader than the accompanying capsules, are very singular.

Among the species with two sorts of capsules is

L. flabellatum. Linn. Sp. Pl. 1568. (*Lycopodioides dentatum erectum filicinum, caule tereti ramosissimo*; Dill. Musc. 468. t. 65. f. 5. Muscus squamosus erectus; Plum. Fil. t. 43. Amer. t. 24.)—Leaves two-ranked, ovate, oblique, fringed at the base, accompanied by a double row of smaller imbricated ones in front. Stem round, repeatedly branched, flattened above.—The figures of this species, which is found in the West Indies, give but an inadequate idea of its beauty. Its flat fan-like shape, and the exquisitely neat arrangement of the innumerable little shining leaves, give it a peculiar and striking aspect. The spikes are small, and sparingly produced. Root fibrous. Whole plant from one to two feet high.

LYCOPOLIS, in *Ancient Geography*, viz. the city of the Wolves, an ancient town of Upper Egypt, in the Thebais, situated on the western side of the Nile; so called, because extraordinary worship was paid here to wolves, which, according to Diodorus Siculus, drove back the Ethiopians when they invaded Egypt, and pursued them to Elephantina, on the borders of Ethiopia. This city is supposed to have stood where the present town of Monfalut now stands.

LYCOPSIS, in *Botany*, so called by Pliny, being also the *wolf*; of Dioscorides, owes its derivation to *lycus, a wolf*, and *opsis, a face, or countenance*, from the circumstance of the flowers being ringent, and having the appearance of a grinning mouth; the herbage is also furnished, says Ambrosinus, with a sort of rigid hairiness similar to the coat of a wolf. Linn. Gen. 78. Schreb. 103. Willd.

Sp. Pl. v. 1. 779. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 220. Ait. Hort. Kew. ed. 2. v. 1. 297. Juss. 131. Lamarck Illustr. t. 92. Gærtn. t. 67.—Class and order, *Pentandria Monogynia*. Nat. Ord. *Asperifolia*, Linn. *Borragineæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, in five, oblong, acute, spreading, permanent segments. *Cor.* of one petal, funnel-shaped; tube cylindrical, bent in a curve; limb five-cleft half way down, obtuse; mouth closed, with five convex, prominent, uniting scales. *Stam.* Filaments five, very small, placed at the curve of the tube of the corolla; anthers small, covered. *Pist.* Germens four, superior; style thread-shaped, the length of the stamens; stigma obtuse, cloven. *Peric.* none, except the very large, inflated calyx. *Seeds* four, rather long.

Eff. Ch. Corolla with a curved tube, its mouth closed with convex scales.

Linnaeus was acquainted with seven species of *Lycopsis*, to which Willdenow has added two more, *L. ciliata*, and *obtusifolia*. This genus is particularly marked by the tube of the flowers being curved: indeed this circumstance is considered by Linnaeus and Willdenow as a sufficient essential character. The following species will serve to illustrate the genus.

L. pulla. Dark-flowered Bugloss. Linn. Sp. Pl. 198. Jacq. Austr. t. 188.—Leaves entire. Stem erect. Calyx, when in fruit, inflated, pendulous.—Found in fields and by road-sides in Tartary and Germany, where it flowers from the beginning of May to July.—Root perennial, of nearly a finger's thickness, long, blackish. Stem about a foot high, roundish; simple below; dividing upwards into flowering branches. Leaves alternate, sessile, soft, thickish, pale green. Flowers solitary; petals smooth, dark purple or nearly black, the tube reddish at its base, the limb marked with five sunk dots at the bottom. Seeds roundish, somewhat rugose, sticking to the pendulous and swelling calyx.

L. arvensis. Small Bugloss. Linn. Sp. Pl. 199. Engl. Bot. t. 938. Curt. Lond. fasc. 5. t. 17. Fl. Dan. t. 435.—Leaves lanceolate, bristly. Calyx, when in flower, erect.—Very common in fields and waste places all over England. It flowers in June and July.—The whole plant is hispid. Stem round, angulated, erect, branched. Leaves oblong heart-shaped, embracing the stem. Clusters in pairs, terminal, leafy. Flowers small, of a lively blue colour, with a white eye. Seeds angular, rugose, tuberculated. The juices of this plant are mucilaginous, like those of Borage.

LYCOPUS is said to be derived from *lycus, a wolf*, and *pus, a foot*, though we are perfectly incompetent to trace the origin of such a derivation. Linn. Gen. 15. Schreb. 20. Willd. Sp. Pl. v. 1. 120. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 29. Ait. Hort. Kew. ed. 2. v. 1. 47. Brown. Prod. Fl. Nov. Holl. 500. Tournef. t. 89. Juss. 111. Lamarck Illustr. t. 18.—Class and order, *Diandria Monogynia*. Nat. Ord. *Pericillata*, Linn. *Labiata*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, tubular, cloven half way down into five, narrow, acute, segments. *Cor.* of one petal, rather unequal; tube cylindrical, the length of the calyx; limb obtuse, spreading in four, nearly equal divisions; the upper one broader, emarginate; the lower smaller. *Stam.* Filaments two, generally longer than the corolla, inclining to the upper segment; anthers small. *Pist.* Germen superior, four-cleft; style thread-shaped, straight, as long as the stamens; stigma cloven, reflexed. *Peric.* none, except the calyx containing the seeds in its bottom. *Seeds* four, roundish, bluntish.

Eff. Ch. Corolla four-cleft; one of its lobes notched. Stamens distant. Seeds four, naked, blunt.

1. *L. europæus*. Water Horehound. Gypsywort. Linn. Sp. Pl. 30. Engl. Bot. t. 1165. Curt. Lond. fasc. 3. t. 2. —Leaves very deeply serrated.—Found abundantly on the banks of pools and ditches, in a sandy soil, flowering in July and August.—*Root* perennial. *Stem* square. *Leaves* opposite. *Flowers* white, many in a whorl. *Seeds* four, obovate, blunt, square, furrowed.—The whole herbage is inodorous, though the flowers are sometimes sweet-scented. It varies occasionally in having deeply pinnatifid leaves, more or less hairy: indeed they are scarcely ever quite smooth. Dr. Smith remarks that “the glandular dots, form of the corolla, and whole habit shew the affinity of this plant to *Plantago*,” but he thinks that the seeds would serve sufficiently to distinguish it without adverting to the number of its flaments.

2. *L. exaltatus*. Italian Water Horehound. Linn. Suppl. 87. Willd. n. 2. Sm. Pl. Græc. Sibth. v. 1. g. t. 12.—Leaves pinnatifid, toothed. Calyx four or five-cleft—A native of Italy, and also of Greece in Lupadia and Bithynia, flowering in the summer.—*Root* perennial, creeping. *Stem* erect, from four to six feet high, leafy, hairy, often tinged with red. *Leaves* opposite, crossing each other in pairs, deeply pinnatifid, hairy on both sides. *Whorls* axillary, sessile, dense, many-flowered. *Bractææ* small, linear-lanceolate, acute. *Corolla* tubular, white, a little longer than the calyx, mouth hairy. *Seeds* obovate, blunt, covered with resinous dots, aromatic.

The pinnatifid variety of *L. europæus* has by some authors been confounded with the present plant; but on account of that species having a more humble stem, the segments of its leaves never toothed, and the calyx invariably five-cleft, Dr. Smith thinks they are sufficiently distinct.

3. *L. virginicus*. Linn. Sp. Pl. 30. Michaux. Boreal-Amer. v. 1. 14.—Leaves stalked, elliptical, tapering at each end, equally serrated.—A native of America, from New England to Carolina. It flowers in the autumn.—The Linnæan specimen of this species has leaves above an inch in breadth, with strong, though not deep serratures. It therefore very ill agrees with the definition in *Flora Virginica*, “Leaves lanceolate, very finely serrated,” or with Clayton’s account, “Leaves long, narrow, and grassy.” It answers, however, exactly to Michaux’s definition, “Leaves broadly lanceolate, serrated, contracted, and entire at the base.”—The flowers are numerous, in dense whorls. *Seeds* angular, each crowned with several blunt teeth.

Besides the three species above described, Mr. Brown, in his Prodrômus to the Flora of New Holland, mentions another, which he calls *australis*, with the following character, “Leaves lanceolate, pointed, serrated, downy, roughish above, glandular beneath, entire, and attenuated at the base: serratures remote, equal, very acute. Stems striated.”—This is found all over New Holland, and in Mr. Brown’s opinion is very nearly allied to *L. europæus*. Michaux has another species under the name of *uniflorus*, which is thus characterized. “Plant very small. *Root* tuberous. *Stems* simple. *Leaves* oval, obtuse, obsolete toothed. *Flowers* axillary, solitary.” This is a native of North America.

LYCOSTAPHYLÆ, *wolf’s grapes*, a name given by some of the Greek writers to the *pomum amoris*, a kind of esculent nightshade, which we have much more properly called *hyoscyamus*, the *wolf’s peach*. (See SOLANUM.) Æmilius Macer tells, that the nightshades, in general, were called by the name *morella* in his time: his words are, “herbam

quam Græci strychnum dixere, Latini morellam dicunt.” The name *morella* seems to be formed upon the word *morion*, a name given both by the Greeks and Latins to one of the sleepy nightshades, and to the male mandrake of Dioscorides, which the shepherds were fond of eating; but which brought on sleepy disorders, if taken too largely.

LYCOSTOMUS, in *Ichthyology*, the name given by Elian, and many other of the Greek authors, to the *anchovy*, called by others the *encraulus* and *encrausibolus*, and by the late writers *encrasicolus*. See *CLUVEA Encrasicolus*, and *ANCHOVY*.

LYCTOS, in *Ancient Geography*, a town situated in the interior of the isle of Crete, and not far from Gnosus to the south-east. Of this town Polybius says, that it was a colony, originally of Lacedæmonians, and the most ancient of the Cretan towns, which produced men who were, without contradiction, the bravest and most virtuous in the whole island. The priority of its existence to Gnosus and Cortyna, however, has been doubted.

LYCURGIA, *λυκουργία*, in *Antiquity*, a festival celebrated by the Spartans in memory of Lycurgus, whom they honoured with a temple, and an anniversary sacrifice.

LYCURGUS, in *Biography*, the celebrated legislator of Sparta, supposed to have been born about the year 926, was son of Eunomus, king of that country, and brother to Polydectes. He might have succeeded to the throne himself on the death of Polydectes, but knowing that the deceased king’s widow was pregnant, he publicly declared that he would only hold the crown in trust for the child, provided it should prove a son. The queen, ambitious of retaining her place and dignity, proposed to marry Lycurgus, and destroy the infant before its birth. Lycurgus took measures to prevent the completion of her wicked proposals: she was, in due time, delivered of a boy, which being brought to him, as he was sitting at the table with the magistrates, he took it in his arms, placed it in the chair of state, and exclaimed, “Here Spartans is your king.” Lycurgus faithfully discharged the duty of regent and guardian during the minority of his nephew Charilaus, and as soon as the young prince came to years of maturity, he readily resigned all authority into his hands, left Sparta, and travelled into several foreign countries, with the view of observing their laws and customs. He first visited Crete, at that time governed by the laws of Minos: these laws he studied most carefully, and contracted a friendship with Thales, whom he persuaded to settle at Sparta. He thence passed over to Asia, making observations on the principal Ionian cities, which were overwhelmed in luxury and effeminacy. Here he met with the works of Homer, which he transcribed and brought into Greece. The confusion which followed his departure from Sparta, made his presence again necessary, and he returned home at the earnest solicitations of his countrymen. Perceiving that the disorders of the state admitted no other effectual remedy than a total change of the laws and constitution, he prepared to give a new legislative system to Sparta. He took care to fortify his authority with the functions of religion, and obtained from the oracle of Delphi a declaration, that the constitution he was about to establish, would be the most excellent in the world. [For an account of his institutions see the article *LACÆDEMONIANS*.] His principal object, as a patriot, was to render his country great and respectable among surrounding nations; this he attained, and Sparta, under the laws of Lycurgus, became a nation of invincible warriors, who, for a series of years, bore the greatest sway in the affairs of Greece, and were the bulwark of their friends, and the dread of their foes. Lycurgus has been

been compared to Solon, the legislator of Athens, and it has been said that the former gave his citizens morals conformable to the laws which he had established, and that the latter had given the Athenians laws which coincided with their customs and manners. The office of Lycurgus demanded resolution, and he shewed himself inexorable and severe. The Lacedæmonians shewed their respect for this great legislator by annually celebrating a festival in his honour, at which his praises were recited, and which was observed during several ages. It is not agreed in what manner, or when he died; according to Plutarch he voluntarily put an end to his life by abstinence, while he was yet of an age to enjoy it. Lucian says he died at the age of eighty-five. The laws of Lycurgus were abrogated by Philipomen in the year B.C. 188, but the Romans very soon re-established them. Plutarch. Univer. Hist.

LYCURGUS, an Athenian orator, son of Lyeophron, flourished in the time of Philip of Macedon, and is supposed to have died about the year 328 before Christ. He studied philosophy under Plato, and oratory under Isocrates, and attaching himself to a political life rose to eminence in the state. The superintendence of the public revenue was entrusted to him, in which office he conducted himself with the strictest integrity. He was appointed one of the magistrates, and in exercising the duties of his situation, he banished all persons of a dissolute character, and made a number of very useful regulations. As he thought the higher kinds of poetry possessed superior advantages, he patronized dramatic exhibitions, and caused statues to be erected in honour of the principal tragedians. He was the friend of Demosthenes, and a zealous advocate for liberty: when Xenocrates was dragged to prison because he had not paid the tribute exacted from strangers, he liberated him and confined the farmer of the tax in his stead. Lycurgus was one of the thirty orators whom the Athenians refused to deliver up to Alexander. Some of his orations are preserved, and have been printed in Collections of the Greek Orators. Plutarch. Lempriere.

LYCUS, in *Ancient Geography*, a river of Sarmatia, S.W. of Rhodus, which discharged itself into the Euxine sea. It is mentioned by Ovi.—Also, a river, which, according to Herodotus, took its rise in the country inhabited by the Thyssagætae, and traversing that of the Mæotæ, ran into the Palus Mæotis. Ptolemy mentions this river, which is supposed to be the same with the preceding.—Also, a river of Asia, in Parthia.—Also, a river of Asia Minor, in Caria, the source of which was in mount Cadmus, and it formed a lake in Latmicus Sinus.—Also, a river in Sicily, the same with Halycus.—Also, a river of Macedonia, mentioned by Plutarch.—Also, a river of Asia Minor, in Mysia, in the canton of Pergama.—Also, a river of Asia, which proceeding from Armenia, watered the plain near the town of Hieracia, and discharged itself into the Iris.—Also, a river of Asia, in Bithynia, the same with Rhyndacus, according to Pliny.—Also, a river of Asia, in Pontus, which mixed its waters with those of the Iris.—Also, a river of Asia, in Cappadocia, according to Ptolemy, who says that it was one of the branches of the Aborus which fell into the Euxine sea.—Also, a river of Asia, in Assyria, according to Polybius and Ptolemy.—Also, a river of Asia, in Syria, near the gulf of Issus, according to Pliny.—Also, a small river of the isle of Cyprus, which had its source in the interior of the island at mount Olympus, and discharged itself into the sea to the west of Amathus.—Also, a river of Phœnicia, which ran between Byblus and Beryta, according to the Itinerary of Antonine.

LYDD, in *Geography*, a small market-town in the hundred of Langport, in the lathe of Shepway, and county of Kent, England, occupies a low situate near the south-western extremity of the county, where a point of land running out into the sea forms Dengeneys bay, which, though very open, is of great service for vessels when the wind sets violently from particular quarters. Leland says, "Lydde is counted as a part of Romney, is in myles beyond Romney town, and is a market. The town is of a pretty quantite, and the townesche men use hotes to the se, the which at this tyme is a myle of. The hole town is conteyned in one parochie, but that is very large. Ther is a place beyond Lydde, wher at a great nombre of holme trees groweth upon a banke of baches throwen up by the se: and ther they bat fowle, and kill many birdes." The church, which is a spacious edifice, consist of a nave, chancel, and aisles, with a massive tower, ornamented with pinnacles at the west end. The monuments are numerous, and among them are many brasses, chiefly for bailiffs and jurors of the town. Lydd is a corporate town by prescription, and, like Romney, of which it is a member, is governed by a bailiff, jurats, chamberlain, and commonalty. The return under the population act of the year 1800 stated the number of houses to be 204, that of the inhabitants 1303. The latter are chiefly engaged in fishing, and other maritime employments, of which smuggling is considered as forming a material branch. Lydd is 71 miles distant from London; has a small market on Thursdays, and an annual fair. The holm trees, or sea hollies, mentioned by Leland, still grow on the beach near the town.

On the point of land called Dengeneys, is a light-house, 110 feet high, erected a few years ago, in place of a more ancient one, under the direction of Mr. James Wyatt, and partly on the model of the Eddystone light-house. This point is also defended by a fort, and several ranges of barracks have been erected in the vicinity. *Beauties of England and Wales*, vol. viii.

LYDDA, in *Ancient Geography*, a town of Judæa, in the tribe of Ephraim; which was one of the three towns that Demetrius, king of Syria, compelled the Samaritans to surrender to the Jews; it was also called Diospolis.

LYDGATE, JOHN, in *Biography*, an early English versifier, and a monk of the Benedictine abbey at St. Edmund's Bury, in the reign of Henry VI. He was educated partly at Oxford, and then travelled into foreign countries to acquire the learning of the times. He was the disciple and friend of Chaucer, and was regarded as a prodigy of learning at the period in which he flourished, and is said to have been a good poet and rhetorician, geometrician, astronomer, and theologian. He opened a school in his monastery for teaching the sons of the nobility the arts of versification and composition. He was an imitator of his master Chaucer, but is reckoned among those who contributed to the improvement of the English language. His principal pieces are "The Fall of Princes," from the French of Boccaccio; "The Story of Trobe," chiefly from Guido Colonna; and "The Troy Boke," or "Description of Troy." Besides these, a list has been given of his other pieces, amounting to 251, existing in MS. in different libraries.

LYDIA, in *Ancient Geography*, first called Meonia, from Meon, king of Phrygia a c Lydia, and afterwards Lydia, from Lydus, the son of Atys, one of its kings. Bochart, who denies the existence of such persons as Meon and Lydus, derives the name Lydia from the Phœnician word *lay*, to wind, because it lay on the banks of the Mæander, a river famous for its windings, and Meonia, from a Greek translation of the Phœnician word *lay*. Lydia and Meonia are sometimes distinguished; that part where mount Tmolus stood, watered

watered by the Pactolus, being properly called Mæonia, and the other lying on the coast of Lydia. Lydia, according to Pliny, Ptolemy, and other ancient geographers, was bounded by the Mysia major on the north, by Caria on the south, by Phrygia major on the east, and Ionia on the west. But the kingdom of Lydia, as the ancients understood it, extended from the river Halys to the Ægean sea. The chief cities of Lydia were Sardis, the seat of king Cræsus, Philadelphia, formerly the second city of Lydia, Thyatira, a colony of the Macedonians, and Magnesia, seated on the Mæander. The only mountain of any note in Lydia is Sipylus. Mount Timolus was once very famous for its wine and saffron. The rivers of this country, most worthy of notice, are the Pactolus and the Cayster.

As to the origin of the Lydians, Josephus, and almost all ecclesiastical writers after him, derive them from Lud, the fourth son of Shem, an opinion founded merely on the similarity of names. Some of the ancients suppose them to be a mixed colony of Phrygians, Mysians, and Carians. Others, finding some conformity in religion between the Egyptians and Tuscans, who were a Lydian colony, conclude that they were originally Egyptians. Their fables, however, shew that they were a very ancient nation, and of their high antiquity there is ample evidence.

The Lydians began, at a very early period, to be governed by kings, whose sovereignty seems to have been despotic, and the crown hereditary.

Of their kings there are three distinct races on record, viz. the Attyadæ, so called from Atys, the son of Cotys and grandson of Manes; the Heraclidæ, or descendants of Hercules, who began to reign about the time of the Trojan war; and the Merminadæ, who began to reign not long before the Medes shook off the Assyrian yoke, of which race the first king was Gyges, and the last Cræsus. As to the character of the Lydians, they were under Cræsus, and some of his predecessors, a very warlike people; but when subdued by the Persians, and enjoined by Cyrus, according to the advice given him by Cræsus, to wear long vests, and to apply themselves to such arts only as had a natural tendency to debase their manners, and enervate their courage, they became voluptuous and effeminate, unfit for action, and wholly given up to idleness, pleasure, and diversions. The soil of this country, watered by many rivers, was very fruitful; abounding with all sorts of grain, and celebrated for its exquisite wines. It was also enriched with several mines, whence Cræsus is said to have drawn his immense wealth.

As to the religion of the Lydians, it seems to have been much the same with that of the Phrygians. They worshipped Diana, Jupiter, and Cybele at Magnesia. The customs of the Lydians were similar to those of the Greeks, except that they used to prostitute their daughters, who had no other fortune except what they earned in this way. They punished idleness as a crime, and injured their children from their infancy to hardships. Their arms were not bows and arrows, but long spears anciently used by the cavalry; and if we may believe Herodotus, the Lydians far excelled all other nations in horsemanship. They were the first that introduced the art of coining gold and silver, for facilitating trade; the first that sold by retail, that kept eating-houses and taverns, and that invented public sports and shows, which were therefore called *ludi* by the Romans, who borrowed them of the Tuscans, the descendants of the Lydians. To these diversions they resorted for relief at a time, during the reign of Atys, when a great scarcity of provisions prevailed through the whole kingdom of Lydia. Having contrived various kinds of diversions, as Herodotus informs us, they used to play one

whole day without intermission, eating and drinking the next day without other amusement. After they had continued thus alternately fasting and feasting, and finding that their calamities increased rather than abated, the king divided the whole nation into two bodies, commanding them to determine by lot, which of the two should remain at home, and which should go abroad in quest of new habitations, since their native country could not afford them sufficient maintenance. Those who by lot were constrained to abandon their country, after many adventures, arrived in that part of Italy, which was then called Umbria, and is now named Tuscany. Thus they changed their name, being no longer called Lydians, but Tyrrhenians, from their leader Tyrrhenus.

Although the trade of the Lydians is no where particularly mentioned, we may well imagine that it was considerable, especially under their latter kings, when Lydia was in the meridian of its glory; on account of the splendour of this monarchy and the advantageous situation of the country. The same inference is justified by adverting to the immense riches, not only of the Lydian princes, but of several private persons. Herodotus (lib. vii. c. 23.) mentions one, named Pythius, who not only entertained Xerxes and his whole army, while he was marching with innumerable forces to invade Greece, but made him an offer of 2000 talents of silver, and 3,993,000 pieces of gold, bearing the stamp of Darius. This same Pythius was reckoned the richest man in the then known world. The last king of Lydia was Cræsus (see his article), with whose capture by Cyrus at the siege of Sardis (B.C. 548.) the ancient kingdom of Lydia terminated; and from this time it continued subject to the Persians, till they also were conquered by the Macedonians. Anc. Un. Hist. vol. iv.

LYDIAN, the name of one of the modes in Greek music, which occupied the middle place between the Æolian and Hypodorian. It was also sometimes called the Barbarian mode, from its being invented by a people of Asia. See MODE.

Euclid distinguishes two Lydian modes; that of which we have been speaking, and another called a low Lydian, and which is the same as the Æolian mode, at least as to its fundamental. The character of the Lydian mode was animated and interesting, yet melancholy, pathetic, and proper for voluptuous occasions; on which account Plato banished it his republic. It was said that by this mode Orpheus tamed wild beasts, and that Amphion built the walls of Thebes. Some say that it was invented by Amphion, the son of Jupiter and Anthiope; others by Olympus the musician, and disciple of Marsyas; while there are still others who assign it to Melampides. Pindar says, that it was first used at the nuptials of Niobe.

LYDIAN Games, was a name given to the exercises and amusements invented by the Lydians: they are said to have invented the quoit and games of chance, played with dice. These Asiatics, after they had lost their city, emigrated into Etruria, whither they carried their ceremonies and games. Some Romans, having a passion for foreign play, adopted the Lydian method of gaming, which in the time of the emperors was pursued with such excess, that Juvenal is very severe on the great number of those who were hastening to ruin by that means.

The Lydian games were at first called *Lydi* by the Romans, but afterwards, by corruption, *Ludi*.

LYDIAN Lyre, in the *Ancient Music*. The Trigon instrument or harp of the Asiatics or Barbarians was usually so called.

Julius Pollux, c. 10 of l. iv. Onomast. speaks of a Lydian harmony, mode or tune, proper for the flute, of which he

he ascribed the invention to Anthippus; and a little further, he says, that the Lydian nome proper for the flute was invented by Olympus or Marlyas.

For the scale and names or characters of the notes in the Lydian mode, see *MUSIC of the Greeks*, and *NOTATION*. The Lydian mode corresponded with our key of E.

LYDIAN STONE; *Lydischer stein*, Wern.; *Basanie*, Kirw.; *Pierre coralline* of some French mineralogists; vulgarly *Touchstone*, *Black jaffer*, &c.

Its colour is commonly greyish-black, which sometimes approaches to blueish and velvet black.

It is found massive and in irregular blunt-edged rolled pieces, sometimes traversed by veins of quartz, which are however more frequently seen in the common flint-slate, of which the Lydian stone is considered to be a subspecies.

Externally smooth and glistening; internally it is more or less glimmering. Its fracture is even, approaching to flat conchoidal, and also sometimes to uneven and splintery; in the large it passes into flaty. Fragments indeterminately angular, mostly sharp-edged; they are opaque, seldom translucent at the edges.

It is hard, but less so than quartz; brittle; not very easily frangible. Specific gravity 2.596, Kirwan; 2.880, Grofs; 2.887, Gerhard.

The Lydian stone is, like the common flint-slate, infusible *per se*; and it generally retains its black colour in a very intense heat.

With regard to its geognostic situation it differs considerably from the common *Flint-slate* (which see); for it does not, like this, form entire mountains, but only single strata. Thus it occurs alternating in uniform strata with primitive clay slate, in Saxony, Bayreuth, &c. To Mohs, however, it appears to be only the newer clay-slate formation which contains such strata; since the older clay slate of the lofty ridges of mountains in the Saxon Erzgebirge appears to be entirely destitute of Lydian stone. In secondary formations, such as the greywacke mountains, it occurs partly as rolled pieces (being the products of a destroyed older formation), partly in beds in uniform strata alternating with greywacke and greywacke slate; of this latter numerous examples occur in the Hartz mountains. Of the older formation of this rock, it is worth remarking that it occurs with traces of carbone.

The beds of Lydian stone, where they bask out, appear very much rent, and divided into cubic masses; and, indeed, this cubic form is still more or less discernible in the boulders and rolled pieces of this substance found in brooks and rivers. Mohs.

LYDIAT, THOMAS, in *Biography*, an English mathematician, was born at Okerton, in Oxfordshire, in 1572, and was educated at Winchester-school, from whence he removed to New college, Oxford, where he obtained a fellowship. He applied himself with great assiduity to the study of the languages, philosophy, astronomy, the mathematics, &c. In the year 1603 he resigned his fellowship, and contented himself with living on his patrimonial estate. The next seven years he spent in publishing several books which he had begun in the college, particularly his "Emendatio Teopseurum ab initio mundi huc usque compendio facta, contra Scaligerum." This work was dedicated to Henry, prince of Wales, who appointed him his chronographer and cosmographer. In 1609 he became acquainted with archbishop Usher, who gave him a situation in the college at Dublin, which he held about two years. In 1612 he was presented to the rectory of Okerton. He was a great supporter for his loyalty in the civil wars: at one time he was so completely stripped of all his property, that for three months together he was

under the necessity of borrowing a shirt, to be able to change his linen. He was twice forced away from his own house, and once made a prisoner in Warwick castle. He died extremely poor in 1646, when he was about 74 years of age. In 1660 a stone, with an inscription, was placed over his grave, at the expense of the fellows and wardens of his college: an honorary monument was likewise erected to his memory. He was a person of small stature, but of great parts, and of a public soul: he was a man of considerable and various erudition, and held in high estimation by learned men both at home and abroad. He wrote a great number of books, besides that already referred to, as 1. "De regni annorum formis," and a defence of the same in reply to Clavius and Scaliger. 2. "On the Origin of Fontaines." 3. Several treatises on Philosophy and Astronomy, &c. He left behind him a number of MSS.

LYDOWIARY, in *Geography*, a town of Samogitia; eight miles N.W. of Rostow.

LYE, in *Agriculture*, any watery fluid much impregnated with saline matter. In husbandry the term is generally applied to such fluids as are employed for the purpose of steeping grain; in which cases the best criterion of their strength is that of the swimming of an egg. See *STEEP*.

LYE, EDWARD, in *Biography*, a learned antiquarian, and great master of the Gothic and Saxon tongues, to whose labours we have had frequent occasion to refer, was born at Totness, in Devonshire, about the year 1694, where his father kept a school. He was educated at home till he was about nineteen years of age, when he was admitted at Hertford college, Oxford: here he took his degrees, and in 1719 was ordained priest, and presented to the living of Haughton-parva, in Northamptonshire. In this situation he employed himself in the profound study of the Anglo-Saxon language. His first publication was an edition of the "Etymologicum Anglicanum" of Francis Junius, from the author's MS. in the Bodleian library. To this he prefixed an Anglo-Saxon grammar. In 1750 he was presented to the vicarage of Yardley-Hallings. After this he published the Gothic gospels, with a Gothic grammar prefixed to them: but the great labour of the latter part of his life was his Anglo-Saxon and Gothic dictionary, which he had just finished and put to press, when death terminated his labours in 1767. It was published under the direction of the Rev. G. Manning in 1772.

LYEMMER. See *LYVIER*.

LYGDINUM MARMOR. See *MARBLE*.

LYGDUS LAPIS, in *Natural History*, a name given by some of the ancients to the species of alabaster, which others of them called *marmor lydiacum*, by which name there is only one species.

LYGE, in *Geography*, a town of Norway, near a lake of the same name; 16 miles N.W. of Christianland.

LYGFUM, in *Botany*, one of Loefling's genera, and so called from *lyge*, a seed or fruit, in allusion to the tough planty pulpy nature of the plant. Lodd. Bot. 284. t. 1. Linn. Gen. 31. Schreb. 25. Willd. Sp. Pl. 4. 110. Murr. M.J. Dec. 1. 3. J. Hort. Kew. 4. 1. 120. 121. Juss. 23. Lamarck Illust. t. 2. Richard in Sm. and Ken. Ann. of Bot. v. 2. 543. t. 15. Clavard. order. *Thellandria*. *Lygdium*. Nov. Ord. *Gracilaria*.

Gen. Char. Conch. of one ovate, a isolated, pointed, permanent valve, at length indented, separating at the lower side, and containing two equal, opposite, parallel, and lobate. Cor. of two valves, very hairy at the base, permanent; the outermost ovate, pointed, convex, and 1 1/2 times as long, linear, narrow, acute, cloven at the summit, awnlets. Sperm. Filaments (in each lobe) three, equal, 1 1/2

than the corolla, flattish, very narrow, anthers vertical, linear, cloven at each end. *Pist.* Germen superior, oblong, convex at the outside, flat at the inner; style simple, compressed, the length of the stamens; stigma simple, taper-pointed, incurved. *Pist.* none, except the hardened hairy base of the corolla of each st. rect, united longitudinally to the other. *Seeds* solitary, linear-oblong, convex at the outside, flattish, with a longitudinal furrow, at the inside.

Eff. Ch. Glume of one valve, convoluted, two-flowered. Corolla of two valve, the innermost twice as long as the outer, awnless. Seed solitary, enclosed in the hardened combined base of each floret.

1. *L. Spartum* Badard Mat-weed. Linn. Sp. Pl. 78. (*Sparta herba alterum*; Clus. Hist. v. 2. 220. *Spartum alterum* Phil.; Ger. em. 41.)—The only known species observed by Loesling to be very abundant in the south of Spain, always growing in low places, on a clay soil, where the water stands after much rain. The Spaniards call it *Abaradin*, or *Albaradin*, a name probably retained from the Moors. The root is creeping and perennial. Stems about a span high, erect, rushy, round, slender, smooth, nearly naked, with one joint, above which they are much extended after flowering. Leaves several, sheathing the lower part of the stem, and about equal to it in height, narrow, convoluted, taper-pointed, rushy, smooth; the upper or floral one shorter, with a longer sheath. *Stipula* thin, membranous, oblong, cloven, decurrent. Flower large, terminal, solitary, at first erect, inclining as the seeds ripen, with a knot at the base. Calyx smooth, delicately striped with green, at length opening and exposing the long dense hairs which clothe the base of the permanent corolla, investing the seed.

The error of Linnæus and Loesling, who supposed the germen to be inferior, and common to two florets, is properly corrected by Richard, who shews the supposed two-celled nut to be formed merely of the hardened combined bases of the corollas of the two florets. This is analogous to many other true grasses, (as this is,) whose hardened corolla becomes a husk or shell to the seed. In other points the description of Richard is scarcely, if at all, superior to that of Loesling.

This plant, being far inferior in tenacity, as well as length, to the true *Spartum* or Mat-weed, *Stipa tenacissima* of Linnæus, serves chiefly in Spain for stuffing mattresses. It flowers in May and June, ripening seed in autumn, and often retaining its empty sheath or calyx till the following summer. The parts of fructification are, on the whole, perhaps larger than those of any other grass.

LYGINIA, from *λεγις*, twiggy, alluding to its hard tough rushy habit. Brown Prodr. Nov. Holl. v. 1. 248. (*Schoenodum*; Labillard. Nov. Holl. v. 2. 79.)—Class and order, *Dincoia Monadelphica*. Nat. Ord. *Tripetaloideæ*, Linn. Jumi. Juss. *Rhizaceæ*, Brown.

Eff. Ch. Male, Spatha of one valve. Petals six. Filaments united lengthwise. Anthers three, didymous, cloven at each end.

Female, Spatha of one valve. Petals six. Style in three deep divisions. Capsule three-lobed, three-celled, bursting at the prominent angles. Seeds solitary.

The root is scaly, creeping, with thick downy fibres. Stems simple, round, leafless, with several sheathing scales, easily breaking at the joints. Spike terminal, of several crowded tufts of flowers, each accompanied by a common sheathing bractea, the female flowers sometimes solitary.

1. *L. imberbis*. Bracteas and spathas beardless. Male and female tufts many-flowered.—Native of the south part of New Holland.—This is *Schoenodum tenax*, the male plant, of Labillardiere, t. 229. f. 1. Mr. Brown observes, that

this supposed species of the French author is made up of two different genera; he therefore thinks it safer to reject the generic name entirely, than to retain it for either the male or female plant, which might lead to error. To this determination we gladly assent, especially as the said name, being composed of another established one, *Schoenus*, is absolutely inadmissible, and its termination being altered for the worse from *Schoenoides*, (which the author gives as his meaning) not in any manner removing the objection.

2. *L. barbata*. Bracteas and spathas bearded. Male tufts of few flowers; female ones single-flowered, nearly solitary. From the same country. These plants have much of the habit of *Reflexa*, *Elegia*, &c. See LEPYRODIA.

LYGISMOS, from *λεγειν*, to distort, in Surgery, a distortion of the limbs; sometimes a luxation.

LYGMOS. See HICKUP.

LYGODIUM, in Botany, from *λεγειν*, pliant, tough, and *στένδρ*, expressive of the habit of this elegant genus, which consists of ferns with twining stems. Swartz Syn. Fil. 152. Sim's and König's Annals, v. 2. 305. t. 10. f. 2. Sprengel Crypt. 176. t. 5. f. 39. Brown Prodr. Nov. Holl. v. 1. 162. Bernhardi in Schrad. New Journ. v. 1. fasc. 2. 39 t. 3. (Ugena; Cavan. Leccion. 551. Hydroglossum; Willd. Abhandl. 20. t. 1. 2. Odontopteris; Bernhardi in Schrad. Journ. for 1800. 127. t. 2. f. 4. Gifopteris; ibid 129. t. 2. f. 1. Ramondia; Mirbel Bull. des Sciences an 9. 179.)—Class and order, *Cryptogamia Filices*. Nat. Ord. *Filices*, Linn. Juss. *Filices Osmundaceæ*, Brown.

Gen. Ch. Capsules without a ring, ovate, reticulated with veins, pellucid, radiated with furrows at the top, bursting lengthwise, sessile, reversed, attached by their middle, in two rows, on narrow processes of the frond at its back, forming little, simple or forked, spikes. *Involucrum* consisting of separate scales, alternate with the capsules, originating from the veins of the frond, unconnected at their upper part.

Eff. Ch. Capsules sessile, ovate, attached by their middle, reversed, radiated at the top, in two rows on the back of narrow processes of the frond. *Involucrum* of solitary scales, separating the capsules.

Obs. Mr. Brown has first remarked the great peculiarity of the insertion of the capsules, they being attached by their middle, not by their base. The stem is long, twining, and climbing. Leaves in pairs, on one common cloven footstalk, each of them either divided or compound. Fructification either fringing their lobes in the form of minute, pale, chain-like spikes, or rarely composing the whole of certain leaves, transformed as it were into a compound forked assemblage of spikes. See Willd. t. 1. f. 2.

Swartz defines eleven species, to which Mr. Brown adds a twelfth, found in the tropical region of New Holland, which he calls *L. finikippinnatum*.

Beautiful specimens are

L. scandens. Sw. n. 1. (*Ophioglossum scandens*; Linn. Sp. Pl. 1518. *Ugena feminafastata*; Cav. Ic. v. 6. 74. t. 594. f. 1. *Adiantum volubile minus*; Rumph. Amb. v. 6. 75. t. 32. f. 2, 3. *Filix*; Petiv. Gazoph. t. 64. f. 11.)—Stem round. Fronds pinnate. Leaflets stalked, oblong; heart-shaped or lobed at the base: the barren ones finely serrated.—Native of the East Indies, and of Brazil. This rises to the height of several feet.—The fronds or branches spring in pairs from a woolly-topped knob, and are each a span long, of about eight or ten alternate, stalked, oblong leaflets, with an odd terminal one of larger size. Each is fringed with numerous short, rather hairy, spikes.

L. circinnatum. Sw. n. 6. (*Ophioglossum circinnatum*; Burm.

Burm. Ind. 228. *O. flexuosum*; Linn. Suppl. 443, not Sp. Pl. 1:10. *Adiantum volubile polypoides*, five majus; Rumph. Amb. v. 6. 75. t. 33.)—Stem round. Fronds palmate, in three or four lance late entire taper-pointed lobes; the fertile ones much contracted.—Native of the East Indies. We have it from Tranquebar.—The leaves are deeply palmate, smooth, entire, pale green. Spikes marginal, very short, almost round.

Linnaeus confounded this with the *Palli-panna*, Hort. Malab. v. 12. 63. t. 32, which seems to be his real *O. flexuosum*, and is *Lygodium flexuosum* of Swartz, n. 5.

LYGON and LYGUS, are used for *agnus callus*.

LYGUM, in *Geography*, a town of Denmark, in the duchy of Sleswick; 14 miles W. of Apenrade.

LYING-IN HOSPITAL. See HOSPITAL.

LYING-IN Women, Disorders of. See LABOUR, LOCHIA, FEVER, AFTER-PAINS, &c.

LYING-IN Women, Treatment of. See LABOUR.

LYING under the Sea, in *Sea Language*, is when, in a storm, the ship is a-hull, and the helm so fastened a lee, that the sea breaks upon her bow, or broadside.

LYING along, denotes the state of a ship, when pressed down sideways by a weight of sail in a fresh wind that crosses the ship's course either directly or obliquely.

LYING-to, or *Lying-by*, denotes the situation of a ship when she is retarded in her course, by arranging the sails in such a manner, as to counteract each other with nearly an equal effort, and render the ship almost immoveable, with respect to her progressive motion or head-way.

A ship is usually *brought-to* by the main or fore-top-sails, one of which is laid a-back, whilst the other is full; so that the latter pushes the ship forward, whilst the former resists the impulse, by forcing her a-tern. This is particularly practised in a general engagement, when the hostile fleets are drawn up in two lines of battle opposite to each other: it is also used to wait for some other ship, either approaching or expected; or to avoid pursuing a dangerous course, especially in dark or foggy weather, &c. Falconer.

LYING-to in a Storm. See TRYING

LYKSBORG, or LUXBURG, in *Geography*, a town of Denmark, in the duchy of Sleswick, on a promontory near the Baltic; 7 miles N.E. of Flensborg.

LYKSALE, a town of Sweden, in the Lapmark of Umea; 80 miles S.S.W. of Umea

LYMAN, a township of America, in Grafton county, New Hampshire, situated at the foot of a mountain on the east side of Connecticut river, between Littleton and Bath, 7 miles W. by N. of New Concord; incorporated in 1761, and containing 533 inhabitants.—Also, a town in the county of New York, Maine, north of Wells and east of Alfred, to each of which it adjoins.

LYME, a town of Grafton county, New Hampshire.—Also, a port-town in New London county, Connecticut, the "Nehamick" of the Indians, at the mouth of the Connecticut river, on its east side; settled about the year 1664, and incorporated in 1667; and containing, in three parishes, 4380 inhabitants.

LYME REGIS, a sea-port, borough, and market-town, in the hundred of Whitchurch, in Bridport division of Dorsetshire, England, is situated 23 miles distant from Dorchester, and 143 from London, on the little river Lyme, near the sea. Its situation, in a cavity between two rocky hills, on a declivity, makes it difficult of access; and that part of the town nearest to the sea is so very low, that at spring-tides the under-rooms and cellars are overflowed to the depth of ten or twelve feet. Lyme is mentioned in history in the eighth century, when Cenwulf, king of the West

Saxons, granted, in a charter to the church of Sherborne, "the land of a mansion near the west back of the Lim, so that salt for the said church should be boiled there." In the Domesday Survey we find the manor of Lyme as being in three divisions or parcels. Edward I. granted Lyme the liberties of an haven and borough; and from that period it increased in buildings, and became so prosperous, that it was able to furnish Edward III. with four ships, and fifty-two mariners, for the siege of Calais. In the reigns of Henry IV. and V., the southern coast of England was much annoyed by the incursions of the French: this town severely experienced their effects; and being also afflicted by other calamities, its trade declined considerably. It has since been occasionally retrieved and reduced; but is now recovering its importance through the residence of merchants, who have recently erected some handsome stone-houses; and as the harbour is considered one of the best in England, the town is capable of great improvement. During the civil war in the reign of Charles I., Lyme was a place of great consequence to the contending parties, especially to the royalists; great part of their dependence on the west of England arising from being in possession of this town. The siege of Lyme was one of the most remarkable that occurred during that eventful period. In the reign of James II., Lyme was distinguished by the landing of the duke of Monmouth here on his unfortunate contention for the kingdom, and by the sanguinary executions which took place on his defeat.

The privileges granted by Edward I. to this town have been confirmed and increased by several succeeding sovereigns. The corporation consists of a mayor, who acts as a justice in the years before and after his mayoralty, a recorder, town-clerk, and fifteen capital burgesses, of whom two with the mayor are justices. The royalty of the manor is vested in the corporation. Lyme has been represented in parliament ever since the twenty-third year of Edward I. The right of election is in the mayor, burgesses, and freemen; the voters being between thirty and forty. The church is a neat, though ancient edifice, but is not particularly worthy of notice. The custom-house is a modern brick building, supported on pillars, for the convenience of the corn-market, which is held beneath. The quay is commodious, though not spacious; and round the harbour are several small forts mounted with cannon for its defence. The principal public work, however, is the cobb, or pier, which, in its ancient state, was composed of vast pieces of rocks rudely piled on each other; but is now formed of stone. This is a fabric of the greatest utility on this coast, there being no other shelter for shipping between the Start point and the Portland road; and although at this place the south-west wind blows with extreme violence, vessels ride in the harbour in perfect security. The cobb has suffered very much by these winds: it was totally destroyed in the reign of Richard II.; and in the last century it sustained great injury by three storms, but was repaired by government at the expence of 6000*l*. Charles II. granted 100*l*. per annum towards its repair, out of the customs of the port, which is still continued; and the inhabitants annually choose two cobb wardens to superintend the improvement. The population of this town, in the year 1801, was stated to be 1451; the number of houses, which are chiefly constructed of blue rag-stone, and covered with slate, was 276. A market is held on Saturdays, and two fairs annually.

Lyme was the birth-place of Thomas Coram, the benevolent patron and contriver of the Foundling hospital in London. He died March 19, 1751, in his eighty-fourth year, and was buried in the vault under the chapel of the hospital.

hospital, where an inscription perpetuates his memory. *Beauties of England and Wales*, vol. iv. Hutchins' *History and Antiquities of Dorsetshire*, 2 vols. folio.

LYMFORD, or LYMFURT, a gulf of Denmark, near the west coast of North Jutland, communicating with the Cattegat, and running 80 miles inland, gradually widening, and separated from the North sea only by a narrow strip of land. *N. lat.* 56° 29'.

LYMINGTON, a borough and market-town in the parish of Boldre, in the New Forest of Hampshire, England, is situated on the declivity of a rising ground, on the eastern bank of the Lymington river, about a mile from its confluence with the sea; at the distance of 16 miles from Southampton, and 95 from London. It is of remote, though unknown origin: from a consideration of local circumstances, Mr. Warner supposes that a town or village was formed near this spot by the Britons. That the Romans were acquainted with it, is evinced by the contiguity of an encampment called Backfield Rings, or Cattle Field, and by the evidence of Roman coins, nearly 200 lbs. weight of which, of the Lower Empire, were discovered here in two urns in the year 1741. Lymington occurs in Domesday Book under the name of Lymtint; but it does not seem to have attained any considerable importance till it became the property of Baron de Redvers, in the time of Henry I.; when, a port being established, the wines of France, and other foreign commodities, were unshipped at its quays. It then also became famous for its salt-works; though this manufacture is, with great probability, supposed to have been established at a much earlier period. A very extensive manufacture of marine salt is now carried on here: the works are situated on the borders of the sea-shore, and reach nearly three miles in a south-west direction. The town consists principally of one long street, and is divided into the *new* and *old* town by the church, which, though originally a regular pile, consisting of a nave, chancel, and aisles, with a spire in the centre, is now, through successive alterations, become extremely informal. The town hall is a neat building: and here are two sets of baths, which are rendered very convenient, and are much frequented. Lymington was summoned as a borough to send representatives to parliament in the reign of Edward III.; but it does not appear to have complied with this precept till the 27th of Elizabeth. In the reign of James I. it was incorporated by charter, and from that period the returns have been regular. The right of election is vested in the mayor and burgesses, in number about eighty. The population was stated, under the act of the year 1800, to be 2378; the houses 402. A market is held on Saturdays; and two fairs annually. The situation of Lymington, on the banks of a navigable river, and so contiguous to the sea, is extremely favourable for trade; but this advantage was formerly much greater than at present, as, by the injudicious contraction of a causeway, the depth of the river has been considerably lessened, and its channel contracted. Previous to the making of this causeway, which was about the year 1730, vessels of upwards of 500 tons burthen could be brought up to the quay; though now one of 300 tons can scarcely be navigated. *Beauties of England and Wales*, vol. vi. Warner's *Account of Lymington*, 12mo.

LYMPHA, LYMPE, in *Anatomy*, a term given to the transparent fluid conveyed in the absorbing vessels of the body; also to a part of the blood. (See *ABSORPTION* and *BLOOD*.) It is often applied also to other animal fluids, chiefly when clear and nearly transparent.

LYMPHÆ DUCTUS, a name given sometimes to the lymphatic vessels.

LYMPHE, among the *Romans*, a kind of grottoes, or artificial caves, so called from *lymphæa*, water; because they were furnished with a great many tubes, canals, and secret passages, through which the water suddenly gushed upon the spectators, while busy in admiring the great variety and beautiful arrangement of shells, with which the grotto was adorned.

LYMPHATI, or LYMPHATICI, in *Antiquity*, a name given by the Latins to possessed or mad persons, because they were thought to be gifted with divination. *Plin. Nat. Hist. lib. xxv. cap. 5. p. 368. edit. Hard.* See *LARVATI*.

These answer to the *αμφοτερις* of the Greeks: the ancient Greeks called water *nymphæa*, which the Latins changed into *lymphæa*. The term *emphæ*, says Mr. Bryant, is of great antiquity, and denotes an oracular influence, by which people obtained an insight into the secrets of futurity: it was written *emphi* or *emphi*, and signified the oracle of Ham, who, according to the Egyptian theology, was the same as the sun, or Osiris: and as fountains were deemed sacred, they were styled by the Ammonians *Ain emphæ*, or the fountains of the oracle, from the divine influence with which they were supposed to abound, which terms were afterwards contracted by the Greeks into *emphæ*, a nymph, who supplied such a person to be an inferior goddess who presided over waters. In the same manner from *al emphæ* was derived *lymphæa*, which differed from aqua or common water, because it was of a sacred or prophetic nature. *Analysis of Ant. Myth. vol. i. p. 280.*

LYMPHATICS, in *Anatomy*, are the absorbing vessels. This system is an assemblage of numerous small vessels, arising from all parts of the body, carrying from them various fluids, which they pour into the venous system, after making them pass through certain small bodies called lymphatic glands, and forming part of the same system with them. The term lymphatics was applied to these tubes in consequence of their containing, in general, a transparent fluid or lymph; and it designates, therefore, properly speaking, only those absorbents, of which the contents resemble lymph. The vessels, which take up the chyle from the intestines, are called lacteals, from the appearance of their contents. As the structure and offices of the organs are the same in all parts, these distinctions might lead to erroneous views of the subject; and the term absorbents, which denotes their general function, seems the most appropriate. Names derived from the nature of the fluid absorbed are more particularly objectionable, because that is very imperfectly known to us. We cannot suppose that one and the same fluid is absorbed from ferous cavities, from the adipous cells, from muscles, glands, bones, &c.; yet in all these cases it goes under the common and very indefinite term lymph.

Like the termination of the exhalants, the origin of the absorbents cannot be demonstrated. They are so extremely delicate, that the eye, assisted even by the best optical instruments, cannot discern them: we must therefore infer their existence from phenomena, and conclude that absorbing vessels arise wherever absorption takes place. An attentive examination of absorptions shews us that they occur wherever there is exhalation; so that the same table may serve both for exhalants and absorbents. The following one represents the latter.

Absorbing vessels.	1. External, arising on	<ul style="list-style-type: none"> 1. The mucous surfaces. 2. The skin.
	2. Internal, arising on	<ul style="list-style-type: none"> 1. The serous surfaces. 2. The cellular system; and deriving from it <ul style="list-style-type: none"> 1. Serum. 2. Fat. 3. The medullary system <ul style="list-style-type: none"> 1. Of short and broad bones; and the extremities of long bones. 2. Of the middle of long bones. 4. The synovial system <ul style="list-style-type: none"> 1. Of the joints. 2. Of tendinous sheaths.
	3. Of nutrition, taking up the residual nutritive matter of each organ.	

The structure, properties, functions, and distribution of the absorbing systems, both the vessels and glands, are considered in detail in the articles **ABSORBENTS** and **ABSORPTION**.

LYMPHATICS of Birds and Fishes. See *Anatomy of BIRDS* and *FISHES*.

LYNCHBURG, in *Geography*, a post-town of Virginia, in Bedford county, on the S. side of James river, nearly opposite to Maddison, and one mile distant. It contains about 100 houses, and a large warehouse for the inspection of tobacco; 12 miles from London.

LYNCHET, among *Farmers*, a line of green sward, serving as a boundary to separate ploughed land, in common fields. See **BALKS**.

LYNCHVILLE, in *Geography*, a post-town of Marion county, South Carolina, 450 miles from Washington.

LYNCIS LAPIS, in *Natural History*, the name given by some of the writers of the middle age to the *lelemites*.

LYNCURIUM, or **LYNCURIVS**, in *Mineralogical Antiquities*, a mineral substance, respecting the nature of which several conjectures have been broached, from the time of Pliny down to the present day. The opinions of the present mineralogists appear to be divided between amber and hyacinth; but it is most probable that both these substances have been confounded under the name of lyncurium. Pliny, in speaking of the mineral in question, is inclined to deny its very existence: "De lyncuris," he says "maxime dici cogit auctorum pertinacia. Quippe etiam electrum id esset, lyncurium tamen gemmam esse contendunt. Fieri autem ex urina quidem lyncis, sed congelata terra proximus bellia aperiente eam, quoniam invidet hominum usui. Esse autem qualem in igneis succinis, colorem, scalpique. Nec folia tantum aut stramenta ad se rapere, sed etiam ac ferri laminas, quod Dioecles quidem et Theophrastus credidit. *Zepo falsum id totum arbitror, nec visum in reo nostro gemmam ullam ea appellatione.*" (Hist. Nat. xxxvii. 3.) It is remarkable that Pliny, whose incredulity upon other occasions was certainly not over great, should have treated the whole of what has been said of the lyncurium as a mere fable, when his scepticism might have more properly been confined to that part of the story which relates to the origin of the substance in question. Instead of this, in speaking of the lynx, he actually gives credit to what has been said of the extraordinary quality of its urine. "Lyncium humor (he says) ita red litus ubi gignatur glaciatur, arefactive in gemmas, carbunculis similes, et igneo colore fulgentes, lyncu-

rium vacatas, atque ob id succino a plerisque ita generari prodito." Ib. viii. 38.

Theophrastus, from whom Pliny has principally derived his information respecting lyncurium, mentions among its qualities that of attracting, like amber, particles of straw, and even thin laminae of copper or iron. Our hyacinth does not possess the quality of becoming electric by friction; a circumstance to which Sir John Hill does not advert in his observations on this stone, which he considers as the only one that can be said to answer the description given of the lyncurium by Theophrastus. On the other hand, it must be confessed that its remaining qualities, as mentioned by the Eresian philosopher, *viz.* the considerable hardness attributed to it, and the consequent use made of it for engraving seals on, do not exactly square with the well known characters of amber, which is moreover separately described in his work as a substance perfectly distinct from lyncurium.

It is more than probable, that in this case, as in many others, the qualities of two distinct substances have been erroneously combined by the ancients, who, in their attempt to identify natural bodies, were but too often strangely misled by a fancied similarity of characters, where the eye of a modern naturalist would scarcely discover traces of the most distant resemblance.

It would appear that the finest amber, and a particular deep-coloured variety of it, was formerly obtained from Liguria, where, indeed, it still occurs, though not in the same quantity in which it is found on the sea-coast of Prussia. If we may suppose the word *lyncurium* to have been derived from that part of Italy, it is certainly equally probable that ignorance and the love of the marvellous may afterwards have substituted that of *lyncurium*, implying the fabulous origin of this substance from the urine of the lynx. Similarity of colour appears to have been sufficient afterwards to affix the same appellation to the hyacinth; and it is probably this confusion which produced the description of Theophrastus above alluded to, and which is partly applicable to amber, and partly to the hyacinth, or any other hard stone of similar colour and transparency, such as yellow garnets, yellow calcedony, &c.

Among the authors who have considered amber to be the lyncurium of the ancients, are Geoffroy, G. Ser. Bel. Lion, and Napione; most of the other modern writers on mineralogy follow St. Epiphanius, Lefler, and Hill, who are decidedly of opinion that the hyacinth alone could have been meant by it. Sir William Watson supposes that Theophrastus

tus's description is applicable to the tourmalin, the electrical phenomena of which are however of a peculiar nature; not to mention other objections that may be urged against the identity of the two substances.

Of other opinions on this subject none deserve to be mentioned, except, perhaps, on account of its singularity, that of Woodward, and some writers before and after him, who supposed the lyncurium to be the calcareous petrification known by the name of *belemnites*. Indeed it is difficult to guess what can have given origin to this strange supposition, unless it be the circumstance that these belemnites, when burnt, are said to give out an unpleasant urinous odour.

In the Vulgate, mention is made of the ligurius, as one of the twelve precious stones in the breast plate of the high priest. In the version of the Septuagint, it is called *Λυγυρίων*. St Epiphanius, enumerating the same twelve gems, gives the following account of the stone in question: "Ligurius vel lyncurius gemma; de hujus inventione vel apud naturæ indagatores, vel apud alios veteres qui harum rerum meminerunt, nihil cognovimus. Invenimus tamen languriam gemmam vocatam, quam vulgari lingua ligurium appellant. Et forte puto hunc esse lygurium." (St Epiph. Opp. latine.) The same writer and Hieronymus suspect the lyncurium to be the hyacinth; but how unsettled the ideas of St. Epiphanius were respecting the latter gem, appears from the following account he gives of it: "Hyacinthus igitur diversas habet formas; quo enim reperitur colore profundior, eo cæteris præstantior est. Similis est lane quæ subpurpurascit aliquatenus." (i.e. pag. 110.)

LYNDEBOROUGH, in *Geography*, a township of America, in Hillsborough county, New Hampshire, about 70 miles from Portsmouth; incorporated in 1764, and containing 676 inhabitants.

LYNDHURST, a village in the parish of Minsted, in the New Forest of Hampshire, England, is situated nine miles from Southampton and 16 from London, nearly in the centre of the New Forest, of which it has been, from the formation of the forest, considered as a sort of capital; and here was exercised the jurisdiction of the chief justice in eyre for this forest, so long as he continued to exercise it, of which there are no traces subsequent to the reign of Charles II. All the Forest courts under the verderors are still held here; as well as those of attachment, &c. as the swanmote: the former are held on such days as the presiding judges appoint, three times in a year; the latter on the 14th of September annually. The king's house, in this village, though but an indifferent residence, is occupied by the lord warden whenever he visits the Forest. An ancient surrip is preserved here, said to have been worn by William Rufus at the time he was shot by sir Walter Tyrrell. The king's stables are very large, and were probably considered as magnificent when first erected, which appears to have been about the time of Charles II. From the hotel at Lyndhurst, which is entirely new built, and fitted up with every convenience, is a fine view of the sea, and of the Needle rocks at the west end of the Isle of Wight. Under the population act of 1820, Lyndhurst was returned as containing 181 houses, inhabited by 582 persons.

About one mile west of Lyndhurst is Cusnells, the seat of the right honourable George Rose, who has been here honoured with two visits from their majesties and the royal family in the years 1831 and 1834. Beauties of England and Wales, vol. vi. Gilpin's Observations on the New Forest, &c. 2 vol. 8vo.

LYNDON, a township in Caledonia county, Vermont,

N. of St. Johnsbury, and S. of Burke and Billymead; containing 622 inhabitants.

LYNN, *Sæcis* of the Indians, a maritime post-town of America, in Essex county, Massachusetts, on a bay, N.E. of Boston bay, and about nine miles N. by E. from the town of Boston. The township was incorporated in 1637, and contains 2837 inhabitants. In this township are two parishes, besides a society of Methodists, and a large number of Friends. The principal manufacture is that of women's silk and cloth shoes, which are sold for home use, and shipped to the southern states and to the West Indies. Lynn beach, which is a mile in length, connects the peninsula, called "Nahant" with the main land. In the summer season it is a place of great resort from neighbouring towns, and used as a race-ground.

LYNN River, a river of Norfolk county, in Upper Canada, which rises in Windham township, and discharges itself into lake Erie, affording a good harbour for batteaux.

LYNN Canal, an inlet on the W. coast of North America, and upper arm of Cross sound; extending about 60 miles N. from the N. extremity of Chatham Sound; so named by Capt. Vancouver, from Lynn, the place of his nativity. The entrance to the S. is in N. lat. 58° 12'. E. long. 225° 12'.

LYNNFIELD, a township of America, in Essex county, Massachusetts, N.E. of Salem, and 15 miles N. by E. from Boston; incorporated in 1782, and containing 468 inhabitants.

LYNNHAVEN LAKE, a bay at the S. end of Chesapeake bay, into which Lynnhaven river discharges its waters; lying between the mouth of James's river and cape Henry.

LYNN-REGIS, or KING'S LYNN, a large respectable sea-port, borough, and market town, in the hundred of Freebridge Lynn, in the county of Norfolk, England, is situated ten miles from the British ocean, on the eastern bank of the Great Ouse river, which at this place is nearly the breadth of the Thames above London bridge. Lynn is distant from Norwich 44 miles, and from London 96. It is written Lun and Lena in Domesday book; and appears to have been, at the time of that survey, a place of some consequence and trade. Previous to the reign of Henry VIII. it was called Bishop's Lynn, but falling into the possession of that monarch he changed its name to Lynn Regis. The town is nearly one mile and a quarter in length; its greatest breadth being half a mile. Four small rivers, called Fleets, divide it into several parts, which are connected by eleven bridges. The whole is encompassed on the land side by a deep wet foss, flanked by a wall, which was formerly defended by nine bastions, but is now in a dilapidated state. At the north end is a platform battery, called St Anne's port, mounted with ten eighteen pounders, which were planted here in 1627. Great improvements have been recently made in the streets and avenues of the town.

Lynn has had fifteen charters granted to it by various sovereigns of England. It was first incorporated by king John; and has sent two burgesses to parliament ever since the twenty-sixth year of Edward I. The right of election is vested in the freemen and free burgesses, in number about 350. The corporation consists of a mayor, recorder, twelve aldermen, and eighteen common council-men. By the population survey, made in the year 1800, the number of houses was 2012, occupied by 10,096 persons.

The town contains several public buildings, some of which exhibit curious specimens of architectural antiquity. The principal

principal is the church of St. Margaret, which, with a priory, was founded by Herbert, bishop of Norwich, in the time of William Rufus. It was a very spacious structure, and though now curtailed of its original dimension is still a large and noble pile. It consists of a nave with aisles, a chancel or choir with aisles, a transept, and two towers at the west end; the roof is supported by twenty-two columns, which separate the body from the aisles. At the eastern extremity of the town is an ancient edifice, called the Lady's or the Red Mount chapel; which consists of an octagonal wall of red brick, and is constructed on a very singular plan. Within this is a handsome cruciform chapel, seventeen feet in length, fourteen in breadth, and thirteen in height; the roof is formed of stone, with numerous groins, &c. exactly resembling the ceiling of King's college chapel, Cambridge. This curious structure is verging to decay. St. Nicholas's chapel, built about the time of Edward III., is 200 feet in length, 78 in breadth, and 170 feet from the foundation to the top of the tower. The body consists of a nave separated from the aisles by ten slender columns on each side, supporting an equal number of acutely pointed arches; the roof is groined, and the entrance doors are finely carved. A large monument of white marble commemorates sir Benjamin Keene, K.B. a native of this town, and many years ambassador to the court of Madrid, in which city he died, Dec. 15. 1757; his remains were brought here for interment. The east and west windows of this chapel are large, and are both adorned with numerous mullions and tracery. The southern porch is profusely ornamented with tracery, riches, &c. A view and plan of this porch, with plan, views, section, &c. of the Red Mount chapel, also historical and descriptive accounts of the two buildings, are published in Britton's Architectural Antiquities of Great Britain, vol. iii.

The chapel of St. James, after the dissolution, being in a ruinous condition, was rebuilt in 1682, and converted into an hospital for fifty poor people. Great additions have since been made to the building, and it is now the general workhouse for the town. The Exchange, or Custom house, which was erected in 1683 by sir John Turner, knt. is a neat freestone building, with two tiers of pilasters, the lower in the Doric, and the upper in the Ionic order; it occupies the site of an old religious house, which was appropriated to the Trinity guild. Several other religious establishments were founded here, of which few vestiges remain, except an hexagonal steeple, belonging to the monastery of the Grey friars, which serves as a good land-mark to vessels entering the harbour. Two markets are held on Tuesdays and Saturdays, in different places: the Tuesday market-place comprises an area of three acres, surrounded by some good houses; near the centre, on an ascent of four steps, stands a building, called the Market-cross, of freestone, erected in the year 1710; the lower part is encompassed by a peristyle formed by sixteen Ionic columns; the upper part is finished with a cupola, and the whole is seventy feet in height. The Saturday market is kept in a convenient area recently opened near St. Margaret's church-yard. The Guildhall is an ancient structure of stone and flint; it contains a large stone hall, courts for the administration of justice, and three spacious assembly rooms. On the first Monday in every month, the mayor, aldermen, magistrates and clergymen meet, to hear and determine all controversies between the inhabitants, in an amicable manner, for the prevention of law-suits. This laudable practice originated in the year 1558, and is called the Feast of Reconciliation. This town, not having any fresh springs, was formerly much distressed for water; but it is now supplied from a river near Gaywood, whence

the water is conveyed by small canals, to the conduits in the town.

Lynn harbour is deep, but the approach is bad, from the oozy bed of the river. It is capable of receiving three hundred sail of shipping. At present it is considered as a haven, and not an anchorage. It is the principal emporium of Henry III. Lynn attained to considerable importance, gradually rose from its primitive obscurity, and is now daily becoming a considerable port. Its situation, on the north-east coast, and the inland navigation connected with it, gives the town great commercial advantages. It is open to a communication with all the north of Europe; and, by means of the Ouse and its collateral rivers, can extend its navigation into eight counties, exclusive of other conveyances by land carriage and canals. It imports annually about 100,000 chaldrons of coals, and above 200 pipes of wine; in which two articles it exceeds all other ports in England, except London, Bristol, and Newcastle. It returns to the sea, and other heavy articles, with which it supplies the interior, it receives back for exportation corn and various manufactured articles. Beauties of England and Wales, vol. xi. Richard's History, &c. of King's Lynn, Svo. 1811. Parkin's History of Lynn, folio.

LYNX, in *Astronomy*, is a constellation of the northern hemisphere, made by Hevelius out of unformed stars: the number of stars in Hevelius's catalogue is nineteen, and in the Britannic is forty-four. See CONSTELLATION.

LYNX, in *Mythology*, was a fabulous animal consecrated to Bacchus. See FELIS LYNX.

LYNX, in *Zoology*. See FELIS LYNX.

LYNX, *Persian*. See FELIS CARACAL.

LYOE, in *Geography*, a small island of Denmark, near the S. coast of Funen. N. lat. 55° 3'. E. long. 10° 10'.

LYOENA, a town of Africa, in the kingdom of Algiers, where the independent Arabs lodge their riches as in a place of safety; as it is defended by a warlike tribe, who have withstood the power of the Turks; 106 miles S. of Constantina.

LYON, a river of Scotland, which rises in Loch Lyon, on the S.W. part of the county of Perth, and runs into the Tay; 2 miles E.N.E. of Kenmore.

LYONNET, PETER, in *Biography*, an eminent naturalist, was born at Maellricht in 1707. He acquired a good knowledge of modern and ancient languages, understood music, and was a good engraver and sculptor. He had been originally bred to the law, and became secretary to the states of Holland. In the latter years of his life he applied the whole force of his mind to the study of natural history, particularly to the science of entomology, on which he wrote several books. He died at the Hague in 1789: he had been elected a member of the Royal Society of London, and of several foreign academies.

LYONNOIS, in *Geography*, *Pagus Lugdunensis*, was, before the revolution, a province of France, bounded on the N. by Bourgogne and Maconnois, on the E. by the Saône and the Rhone, on the S. by Languedoc, and on the W. by Auvergne; lying between 45° 15' and 46° 15' N. lat. and between 3° 45' and 4° 50' E. long; being 24 leagues from N. to S. and 16 from W. to E. This province is watered by the Rhone, the Saône, and the Loire, and is moderately fertile, producing grain, wine, and fruits. It was annexed to the crown of France in 1563; and consisted of three small provinces, viz. Lyonnais Proper, Forez, and Beaujolais. The former, being thirteen leagues in length, and eight in breadth, is diversified with hills, gentle eminences, and plains. It yields little grain; but some districts furnish good wine, and excellent pasturage. It has a copper mine,

and a mineral spring. Forez consists principally of an extensive and fruitful valley, yielding grain, wine, hemp, and chequins, and is watered by the Loire and other streams. Beaujolais is a fertile district, twelve leagues in length, and seven in breadth. Lyons and Beaujolais are now included in the department of the Rhone and Forez in that of the Loire.

LYONS, in *Geography*, a small island in the East Indian Sea, near the E. coast of Oby. S. lat. $1^{\circ} 35'$. E. long. $128^{\circ} 14'$.

LYONS, *Lugdunum*, a city of France, and capital of the department of the Rhone; but, before the revolution, the capital of the province called Lyonnais, above described, situated at the conflux of the Rhone and the Saone; over the former there are two bridges, and over the latter three. This city was one of the places conquered by Cæsar; but a little after the death of this dictator, Munatius Plancus received orders from the Roman senate to re-assemble at Lugdunum the inhabitants of Vienno, who had been driven from this city by the Allobroges. In a little time this colony became very powerful, so that Strabo says it was not inferior to Narbonne, with respect to number of inhabitants. In the fifth century this city was taken by the Burgundians, whose king became feudatory to Clovis. The sons of Clovis, however, subdued the Burgundians, and took possession of Lyons. When the dominions of Lewis Debonnaire were divided, Lyons, with the greatest part of Burgundy, was transferred to Lothaire. Before the revolution, it was the see of an archbishop, who was primate of France, and was reckoned the second city of the kingdom in trade, manufactures, and commerce; and was supposed to contain 150,000 inhabitants. These were, in all periods, distinguished for industry, arts, and love of freedom. Under the Romans, as a municipium, it possessed valuable immunities; and when it became a colony, it was cherished and protected. Under the sovereigns of France, it has enjoyed peculiar privileges, being governed by its own magistrates, and guarded by its own militia. Four annual fairs, each of fifteen days, instituted in the reign of Lewis XI., have much contributed to the advancement of its traffic. Its good government naturally attracted citizens, whilst the troubles excited at various periods in the neighbouring states, more especially about the year 1200, between the contending factions of the Guelphs and Ghibelines, occasioned many from Italy and Florence to take refuge in a city where they could live in security and peace. The principal dependence of Lyons, and the source of its wealth, have been its manufacture of silk in all its branches. The trade of Lyons has been immense with Spain, Italy, Switzerland, Germany, Holland, England, &c. From Spain, the inhabitants received wool, silks, drugs, pialtres, and ingots of gold and silver, in return for cloth, linen, saffian, coffee, paper, &c. To Italy they sent cloth, linen, silk stuffs, lace, books, mercury, and salinery, receiving in return silk, velvet, damask, satin, taffeties, and rice. To Switzerland they sent coarse cloth, hats, sufficient wine, oil, soap, and mercury, and received from thence cheese, linen, and, in time of war, horses. The great towns of Germany purchase from Lyons, besides the same merchandise as the Swiss, stuffs of gold and silver. From Holland, Lyons took more merchandise than that which it sent in return. With the other parts of France it carried on a very considerable trade. Lyons reckoned eleven parishes, six gates, four faubourgs, and was divided into thirty-five districts, named "Parronages." The cathedral church was a magnificent Gothic building; the town-house is esteemed one of the most beautiful in Europe; and its other public buildings, before the revolution, were four abbeys, fifty con-

vents, three public schools, a college of physic, two general hospitals, &c.; and, besides these, an academy of sciences, instituted A. D. 1707, and an academy of fine arts, established in 1724, both which were united in 1758, a society of agriculture, a veterinary school, a theatre, a public library, seventy companies of tradesmen and artists, three forts, an arsenal well supplied and carefully arranged, an infirmary, five hundred feet in length, &c. to all which we may add magnificent quays. At an early period of the revolution, an union was formed between the towns of Lyons, Marseilles and Toulon, under the title of "Federal Republicanism," contrary to the sense of the nation, which inclined to favour a republic one and indivisible. Lyons contained a great number of disaffected persons, both Royalists and Girondists, and was declared to be in a state of rebellion. After a siege of two months, during which it is supposed to have lost 2000 men, and a great part of the city was reduced to ashes, Lyons surrendered, and many of the rebels who were not able to escape were taken and executed. By a decree of the convention, the walls and public buildings of Lyons were ordered to be destroyed, and the name of the city itself to be changed to that of "Ville Affranchie;" but this decree was afterwards repealed. It is stated to contain 179,570 inhabitants, and the six cantons, into which it is divided, to include 123,517, on a territory of 55 kilometres, in four communes. N. lat. $45^{\circ} 44'$. E. long. $4^{\circ} 50'$.

LYONS, a village of America, in Ontario county, and township of Phelps, in New York, at the junction of Mud and Canandarque creeks; 16 miles N. of Geneva, and about 25 S. of Sodus; situated in a fine country, and accommodated with excellent advantages for water-conveyance.

LYONSIA, in *Botany*, serves to commemorate Mr. Israel Lyons, born at Cambridge in 1739, being the son of a Polish Jew, settled there as a silversmith; who published "A Hebrew Grammar," and "Observations and Enquiries relating to various Parts of Scripture History." He was distinguished as a mathematician and botanist, and had the honour of instructing in the latter science the celebrated sir Joseph Banks, by whose recommendation he read a course of lectures on Botany at Oxford, where such a course was then much wanted. He died in London of the measles, about two years after he had accompanied Captain Phipps, afterwards lord Mulgrave, towards the north pole, in 1773. For some time he was employed as one of the calculators of the Nautical Almanac, for which he received an annual salary of an hundred pounds; and at the time of his death he was preparing for the press a complete edition of all the works of Dr Halley. Besides several mathematical works, among which we may reckon his "Fluxions," published in 1758; he had in contemplation a *Flora Cantabrigiæ*; but published only a "*Epitulus*" of plants discovered in that neighbourhood since the time of Ray, in 1763, in 8vo. Brown. Prodr. Nov. Holl. v. 1. 460. Wern. Transf. v. 1. 69.—Chais and order, *Pentstemon Monosylla*. Nat. Ord. *Centauræ*, Linn. *Aj. cinæ*, Just Brown.

Ess. Ch. Corolla funnel-shaped; its mouth and tube without scales; limb in five deep, recurved, equilateral segments. Stamens prominent; filaments thread-shaped, inserted into the middle of the tube; anthers arrow-shaped, enlarging with the stigma by the middle, their hind lobes void of pollen. Germen of two cells; style one, thread-shaped, dilated at the top; stigma somewhat conical. Scales at the base of the germen combined. Capsule cylindrical, of two cells, its valves like folicles, with a parallel distinct partition, bearing the seeds on each side upon fixed receptacles.

1. *L. pratincola*, the only species, gathered by Mr. Brown

at Port Jackson, and in Van Diemen's land. A climbing shrub, with opposite leaves. Cymes terminal, three forked. Flowers among the smallest of this tribe, their limbs bearded.

LYPERANTHUS, from *λυπερ*, sadness, and *ανθος*, a flower, because of the very dark-red gloomy hue of the blossoms, which is unusual in this tribe.—Brown Prodr. Nov. Holl. v. 1. 325.—Class and order, *Gynandria Monandria*. Nat. Ord. *Orchideae*.

Gen. Ch. Cal. Perianth superior, ringent, of three leaves, the upper one vaulted, the rest flattish. Cor. Petals two, nearly equal and similar to the flatter calyx-leaves. Nectary shorter, its edges ascending, hood-like, with a taper point, the disk glandular or papillary. Stam. Anther terminal, permanent, its cells close together; masses of pollen two in each cell, powdery. Pist. Germen inferior; style columnar, linear. Peric. Capsule. Seeds numerous.

Eff. Ch. Calyx ringent; its upper leaf vaulted. Lip shorter, hooded, glandular, with a taper point. Style linear. Anther vertical, permanent.

A genus of smooth *Orchideae*, growing on the ground. Bulbs naked, undivided, terminating the descending caudex, which throws out roots above them. Stem bearing a single leaf close to the root, and two bractees above, besides what accompany each flower. Flowers racemose, very dark red, mostly reversed.

1. *L. suaveolens*. Leaf linear, elongated. Petals ascending. Disk of the nectary bearing rows of sessile glands; its margin naked.—Found near Port Jackson, New South Wales.

2. *L. ellipticus*. Leaf lanceolate-elliptical. Disk of the nectary papillary; its margin naked.—Gathered by Mr. G. Caley in the same neighbourhood.

3. *L. nigricans*. Leaf ovate, somewhat heart-shaped. Petals divided. Lip fringed; its disk papillary.—Found by Mr. Brown near Port Jackson, as well as in the southern part of New Holland.

LYRA, in *Anatomy*, a name applied to a certain part of the brain. See **BRAIN**.

LYRA, in *Astronomy*, a constellation in the northern hemisphere.

The number of its stars, in Ptolemy's catalogue, is ten; in Tycho's, eleven; in Hevelius's, seventeen; and in the Britannic catalogue, twenty-one. See **CONSTELLATION**.

LYRA, **NICHOLAS DE**, in *Biography*, a learned French monk and commentator on the scriptures in the thirteenth and fourteenth centuries, was born in a small town in the diocese of Evreux, in Normandy. He was descended from Jewish parents, but becoming a Christian, he embraced a religious life in a monastery at Verneuil, in 1291. Having remained there some time, he was sent to Paris, where he applied with the greatest diligence to his studies, and was admitted to the degree of doctor. He died in this city in the year 1340. He was author of "Poeticals," or a compendium of the whole bible, which he began in 1293, and finished in the year 1330. The first edition of this work was published at Rome in 1472, in seven volumes folio, and is now become rare; but it has since undergone various impressions at Basil, Lyons, Doway, Antwerp, &c. of which the best is said to be that of Antwerp in 1634, in six volumes folio. De Lyra was also the author of "Moral Commentaries upon the Scriptures;" "A Disputation against the Jews;" and other pieces. Moreri.

LYRA, in *Ichthyology*, the name of a fish of the *trigla* kind, of which there are two varieties, reckoned by Artedi and Linnæus two different species. The one is the *piper* (see **TRIGLA Lyra**), the other, the *lyra cornuta*, or horned harp-fish. This last is a fish of an octangular form, covered

all over with bony scales; these are of a rhomboidal figure, and each has in its middle a sharp and strong prickle bending backwards: it is of a red colour, and its head is very large; its snout divides towards the extremity into two long horns, on which are placed two perpendicular spines, and a third above makes an acute angle with these; it has one very long fin on the back, and another answering to it behind the anus: also two large ones at the gills, and two smaller on the belly; it has only two filaments, called fingers, behind its gill-fins; its mouth is large, but has no teeth, and there are several beards on its under jaw; two of which are longer than the rest, and are branched: it is caught in the Mediterranean, and brought to market at Rome; it is a scarce fish in other places, and at Montpellier was once shewn to Mr. Ray for the remora. See **TRIGLA Cataphracta**.

LYRA is also a species of *Callionymus*; which see. See **DRAGONET**, under which article the other species of the *callionymus* are described.

LYRA is also the name of a beautiful sea-shell of the genus of the concha globosa, or dolium. There are three species of the lyra, or harp-shell. 1. The common lyra, which has thirteen rose-coloured ribs running along its body. 2. The eleven-ribbed lyra; and 3. The noble harp, or *lyra nobilis*. This is a most elegantly variegated shell; its ground colour is a deep brown, and its variegations very elegant and black. See **CONCHOLOGY**.

LYRE Lucida. See **LUCIDA**.

LYRATUM FOLIUM, in *Botany*. See **LEAF**.

LYRE, *Λύρα*, *Lyra*, in the *Ancient Music*, a musical instrument of the string kind, so dear to the Greeks, that they have by turns attributed its invention to Mercury, Apollo, Linus, Orpheus, and Amphion: making it the symbol of all excellence in poetry and music. The poets and historians of fabulous times, however, seem most to agree in ascribing the invention to Mercury. And among the accounts of the several writers of antiquity who have mentioned this circumstance, and confessed the invention to the Egyptian Mercury, that of Apollodorus (*Bibliotheca*, lib. ii.) seems the most intelligible and probable. "The Nile," says this writer, "after having overflowed the whole country of Egypt, when it returned within its natural bounds, left on the shore a great number of dead animals of various kinds, and, among the rest, a tortoise, the flesh of which being dried and waited by the sun, nothing was left within the shell but nerves and cartilages, and these being braced and contracted by desiccation, were rendered sonorous; Mercury, in walking along the banks of the Nile, happening to strike his foot against the shell of this tortoise, was so pleased with the sound it produced, that it suggested to him the first idea of a lyre, which he afterwards constructed in the form of a tortoise, and strung it with the dried sinews of dead animals."

Censorinus, however (*De Die Nat.* cap. 22.), attributes to Apollo the first idea of producing sound from a string, which was suggested to him by the twang of his sister Diana's bow. *Ψαλλειν* is strictly to twang a string, and *Ψαλλειν* the sound which the bow-string produces at the emission of the arrow. Euripides in *Bacch.* v. 782. uses it in that sense,

"Ψαλλειν τὴν νῆρον."
Ψαλλειν τὴν νῆρον.

"Who twang the nerve of each elastic bow."

Father Montfaucon says it is very difficult to determine in what the lyre, cithara, chelys, psaltery, and harp differed from each other; as he had examined the representations of six hundred lyres and citharas in ancient sculpture, all which

he found without a neck, and the strings open as in the modern harp, played by the fingers. (Antiq. Expl. tom. iii. lib. 5. cap. 3.) But though ancient and modern authors usually confound these instruments, yet a manifest distinction is made by Arist. Quintil. in the following passage, p. 101. After discussing the characters of wind-instruments, he says, "Among the stringed instruments, you will find the lyre of a character analogous to *masculine*, from the great depth or gravity, and roughness of its tones; the sambuca of a *feminine* character, *weak* and *delicate*, and from its great *acuteness*, and the fineness of its strings, tending to *dissolve* and *enervate*. Of the intermediate instruments, the polyphthongum *partakes* most of the *feminine*; but the cithara *differs* not much from the *masculine* character of the lyre." Here is a scale of stringed instruments: the lyre and sambuca at the extremes; the polyphthongum and cithara between; the one next to the sambuca, the other next to the lyre. He afterwards just mentions that there were others between these. Now it is natural to infer, that as he constantly attributes the manly character to gravity of tone, the cithara was probably the more acute instrument of the two: less loud and *rough*, and stringed with smaller strings. Concerning what difference there might be in the form and structure of the instruments, he is wholly silent. The passage, however, is curious as far as it goes, and decisive. The cithara may, perhaps, have been as different from the lyre, as a single harp from one that is double; and it seems to be clearly pointed out by this multiplicity of names that the Greeks had two principal species of stringed instruments; one, like our harp, of full compass, that rested on its base; the other more portable, and slung over the shoulder, like our smaller harp or guitar, or like the ancient lyres represented in sculpture.

Tacitus, Annal. xvi. 4. among the rules of decorum observed by public performers, to which Nero, he says, strictly submitted, mentions, "That he was not to sit down when tired." Ne fessus resideret. It is remarkable that he calls these rules, *Cithara Leges*, "The Laws of the Cithara;" which seems to afford a pretty fair proof of its being of such a size and form as to admit of being played on *standing*.

The use of the phorminx in Homer, leads rather to the rough, manly, harp-like character. But a passage in Orpheus, Argon. 580, seems to make phorminx the same as cithara, the lustful instrument of Mercury. It is there said of Chiron, that he "sometimes strikes the cithara of Apollo: sometimes the shell-resounding phorminx of Mercury,"

"Αλλ' οτε δ' αὖτε τὸν κίθαριν ἢ φάρμινχον ἀνέχετο,
ἢ φάρμινχον ἢ κίθαριν ἢ φάρμινχον ἢ κίθαριν."

This passage is curious; for though the Argonautics were not written by Orpheus himself, they have all the appearance of great antiquity.

The belly of a theorbo, or arch-lute, is usually made in the shell-form, as if the idea of its origin had never been lost; and the etymology of the word guitar seems naturally deducible from cithara; it is supposed that the Roman C was hard, like the modern K, and the Italian word *chitarra* is manifestly derived from *κίθαρη*, *cithara*.

In the hymn to Mercury, ascribed to Homer, Mercury and Apollo are said to play with the cithara *under their arm*, ver. 507. ὑπὸ τῷ ὤμῳ κίθαριν ἔχοντες, *sub ulna cithara habuit*, "played with the cithara *under his arm*." So in ver. 472. ὑπὸ τῷ ὤμῳ, *at his arm, should*, according to the critics, be *brachium*, as it is afterwards. This seems to point out a guitar more than a harp; but the ancients had lyres, citharas,

and testudos of as different shapes from each other, as our harp, spinnet, virginal, and pianoforte.

These passages in old authors are a kind of antique drawings, far more satisfactory than those of ancient sculpture; for we have seen the syrinx, which had a regular series of notes ascending or descending, represented with seven pipes, four of one length, and three of another, which of course would furnish no more than two different sounds. The cymbals too, which were to be struck against each other, are placed in the hands of some antique figures in such a manner, that it is impossible to bring them in contact with the necessary degree of force, without amputating, or at least violently bruising the thumbs of the performer. And it is certain that artists continued to figure instruments in the most simple and convenient form for their designs, long after they had been enlarged, improved, and rendered more complicated. An instance of this in our own country will confirm the assertion. In the reign of George II. a marble statue was erected to Handel, in Vauxhall gardens. The musician is represented playing upon a lyre. Now if this statue should be preserved from the ravages of time and accident 12 or 1400 years, the antiquaries will naturally conclude that the instrument upon which Handel acquired his reputation was the lyre; though we are at present certain that he never played on, or even saw a lyre, except in wood or stone.

In one of the ancient paintings at Portici, we saw a lyre with a pipe or flute for the cross bar, or bridge at the top. Whether this tube was used as a flute to accompany the lyre, or only a pitch-pipe, we know not; nor in the course of our enquiries has any similar example of such a junction occurred elsewhere.

Brossard seems to have abridged the history and progress of the lyre chronologically in the most short and clear manner, which Grassineau has spun out to great length by jumping from one century to another, and crowding together all the wild and incoherent stories relative to the lyre, its inventors and performers, that he could find. All that the diligent and generally accurate Brossard says on the subject is, that the lyre was a stringed instrument, upon which the whole musical system of the ancients has been built. It is pretended that Mercury first invented it by chance, and that it had only then three strings, which consisted of B C D; that Apollo added a fourth, Corcebus, a fifth, Hyagnis, a sixth, and Terpander, a seventh. It remained in this state till the time of Pythagoras, or, according to others, Lycaon added to it an eighth string, to render the extremities *consonant*. Timotheus afterwards added a ninth, tenth, and eleventh string. Others after him increased the number to sixteen, that is, fifteen principals, and one added, which will be explained in the articles PROSLAMEANOMINES and SYSTEM: which see.

Mr. Barnes, in the prolegomena to his edition of Anacreon, has an inquiry into the antiquity and structure of the lyre; of which he makes Jubal the first inventor. For the several changes this instrument underwent, by the addition of new strings, he observes, that, according to Diodorus, it had originally only three, referring to the three seasons of the year, as the Greeks counted them, *viz.* spring, summer, and autumn; whence it was called *τρίχορδος*. Afterwards it had seven strings; as appears from Homer, Pindar, Horace, Virgil, &c. Festus Avienus gives the lyre of Orpheus nine strings. David mentions an instrument of that sort stringed with ten, in *psalterio decachordo*. Timotheus of Miletus added four to the old seven, which made eleven. Josephus, in his Jewish Antiquities, makes mention of one with twelve strings; to which were afterwards added six others, which

which made eighteen in all. Anacreon himself says, p. 253, of Mr. Barnes's edition, *canto viginti totis chordis*. As for the modern lyre, or Welsh harp, it is sufficiently known. (See HARP.) From the lyre, which all agree to be the first instrument of the stringed kind in Greece, there arose an infinite number of others, different in shape and number of strings; as the psalterium, trigon, sambucus, pectis, magadis, barbiton, teltudo (the two last used promiscuously, by Horace, with the lyre and cithara), epigonium, simmicium, and pandura; which were all struck with the hand, or a plectrum. See PSALTERY, SAMBUCA, MAGADIS, BARBITON, and CITHARA.

LYRE, *Lydian*. See LYDIAN LYRE.

LYRE of the *Musevites*. This is a rude and coarse instrument, in the form of the ancient lyre of six strings, as thick as packthread, which are thrummed with the naked fingers after the manner of the lute.

LYRE, among painters, statuary, &c. is an attribute of Apollo and the Muses.

LYRIC, something sung or played on the lyre or harp.

LYRIC is more particularly applied to the ancient odes and stanzas; which answer to our airs or songs, and may be played on instruments. See the next article.

LYRIC Poetry, verses written for music; which, with the ancients, implied verses to be sung to the accompaniment of the lyre. In the supplement to the first edition of the folio Encyclopédie, there is a very long article on the subject. We have often admired the ingenuity, refinement, and apparent feeling, with which the French treat the subject of dramatic music. Even in the feuds and discussions of the Gluckists and Piccinists, many of the tracts and pamphlets seem to breathe the purest taste and most profound reasoning of which the theme is capable. The Italians, who have so long furnished models of perfection to the rest of Europe in composition and performance, have not half so much to say in defence of their talents as the French in attacking them.

The article Lyric Poetry in the supplement to the first edition of the Encyclopédie, written long before the firm adherents to Lulli and Rameau were extinct, is of great length, and seems to flow from a writer who had read, meditated, and felt, with enthusiasm, all the inspirations of the lyric bards of Greece. He has taken a wide range in treating the subject, and considered the union of poetry and music, not only with more enlarged views than any other modern, but perhaps than the ancients themselves. He begins in the following manner: "The lyric poetry of the Grecians was not only sung, but composed to the chords of the lyre. This was at first the characteristic distinction of all that was called lyric poetry by the Romans, and their descendants and imitators in later times. The poet was a musician, he called upon the god of verse, and animated himself with a prelude. He fixed upon the time, the movement, and the musical period; the melody gave birth to the verse; and thence was derived the unity of rhythm, character, and expression, between the music and the poem that was sung. Thus the poetry became naturally subservient to number and cadence, and thus each lyric poet invented not only the proper kind of verse, but also the strophe analogous to the melody which he himself had created, and to which he composed it.

"In this respect, the lyric poem or ode with the Latins and with modern nations, has been nothing more than a frivolous imitation of the lyric poem of the Greeks: they say, *I sing*, but never do sing; they speak of the chords of the lyre, but have never seen a lyre. No poet, since Horace inclusively, appears to have modelled his odes upon

a melody. Horace adopting, by turns, the different formulae of the Greek poets, seems so much to have forgotten that an ode ought to be sung, that he has often suspended the sense at the end of the strophe, where the air ought to repose, to the beginning of the next stanza."

This species of poetry was originally employed in celebrating the praises of gods and heroes; though it was afterwards introduced into feasts and public diversions: it is a mistake to imagine Anacreon, as the Greeks do, the author of it; since it appears from scripture to have been in use above a thousand years before that poet. Mr. Barnes shews how unjust it is to exclude heroic subjects and actions from this sort of verse, lyric poetry being capable of all the elevation and sublimity such subjects require; which he confirms by the examples of Alcaeus, Sappho, Anacreon, and Horace, and by his own essay, a triumphal ode inscribed to the duke of Marlborough, at the head of this edition: he concludes with the history of lyric poetry, and of those ancients who excelled in it.

The characteristic of lyric poetry, which distinguishes it from all others, is *dignity and sweetness*. As *gravity* rules in heroic verse; *simplicity*, in pastoral; *tenderness* and *softness*, in elegy; *sharpness* and *poignancy*, in satire; *mirth*, in comedy; the *pathetic*, in tragedy; and the *point*, in epigram; so in the lyric, the poet applies himself wholly to soothe the minds of men, by the sweetness and variety of the verse, and the delicacy and elevation of the words and thoughts; the agreeableness of the numbers, and the description of things most pleasing in their own nature. See ODE and POETRY.

LYRODI, among the *Ancients*, a kind of musicians who played on the lyre, and sung at the same time.

LYRODI was also an appellation given to such as made it their employment to sing lyric poems, composed by others.

LYS, in *Geography*, one of the 13 departments of the region of France, called the Reunited Country, formed of a part of Austrian Flanders; bounded on the N. by the sea, and on the E. by the department of the Escaut, in N. lat. 51°. It contains 3662½ kilometres, or 150 square leagues, and 470,707 inhabitants. It is divided into four circles or districts, 36 cantons, and 250 communes. Its circles are Bruges, containing 149,421 inhabitants, Furnes, 49,808, Ypres, 107,103, and Courtray, 164,375. The annual contributions amount to 4,915,251 fr. and the annual expenses for government, the administration of justice, and public instruction, amount annually to 358,916 fr. 66 cents. The capital of this department is Bruges. The soil, in general, is fertile, and produces all sorts of grain, flax, tobacco, and excellent pastures.

LYS, *Sz.*, a town of France, in the department of the Upper Garonne, and chief place of a canton, in the district of Muret; 7 miles W. of Muret. The place contains 1140, and the canton 5249 inhabitants, on a territory of 190 kilometres, in 11 communes.

LYSANDER, a township of America, in Onondago county, New York, incorporated in 1794, and comprehending the military towns of Hannibal and Cicero. The number of inhabitants is 121. It is distant 16 miles S.E. of lake Ontario.

LYSANDER, in *Biography*, an eminent Spartan commander in the last years of the Peloponnesian war, was the son of Aristoclitus, a descendant of the Heracleidae, but not of the royal line. About the year 406 B.C. Lysander was made the naval commander of the Lacedæmonians. His first measure was to draw off Ephesus from the interest of Athens, which he accomplished, and at the same time gained the friendship of Cyrus the younger. He gave battle to the Athenian fleet, consisting of 120 ships, at

Ægos-Potamos, in the Thracian Chersonesus, and wholly destroyed it except three ships, with which the enemy's general fled to Evagoras, king of Cyprus. In this celebrated battle, which happened 405 years before the Christian era, the Athenians lost 3000 men, and with them their empire and influence among the neighbouring states. Lyfander knew how to take advantage of this victory, and in the following year Athens, worn out by a long war of 27 years, gave itself up to the power of the enemy, and submitted, in every respect, to the power of Lacedæmon. The government of Athens was totally changed, and 30 tyrants were set over it by Lyfander. This success, and the honour of having put an end to the Peloponnesian war, rendered the conqueror extremely proud, and ambitious of higher distinctions than the constitution of his country would allow. He aimed at universal power, by establishing aristocracy in the Grecian cities of Asia, and he attempted to make the crown of Sparta elective, in order that he might seize it for himself, but was, in this respect, unsuccessful, and he was accused of gross corruption in endeavouring to accomplish his purposes. The sudden declaration of war against the Thebans saved him from the accusations of his adversaries, and he was sent with Pausanias against the enemy. The Spartan troops were defeated, and their general Lyfander killed in the year B.C. 394. His body was recovered by his colleague Pausanias, and honoured with a magnificent funeral. Lyfander was a brave man, but his ambition merited the severest censure. He was arrogant and vain in his public, as well as in his private conduct, and he received and heard with the greatest avidity the hymns which his courtiers and flatterers sung to his honour. But in the midst of all his pomp, his ambition, and his intrigues, he died extremely poor, and on account of his poverty his daughters were rejected by two opulent citizens of Sparta, to whom they had been betrothed during the life of their father. Plutarch. Cornelius Nepos. Anc. Univer. Hist.

LYSANDRIA, *Λυσανδρία*, in *Antiquity*, a Samian festival, celebrated with sacrifices and games in honour of Lyfander, the Lacedæmonian admiral. It was anciently called *heræa*, which name was abolished by a decree of the Samians.

LYSANO, in *Geography*, a town of Prussia, in the palatinate of Culm; 15 miles S. of Culm.

LYSE, a town of Norway; 8 miles S.S.W. of Bergen.

LYSEKIL, a sea-port town of Sweden, in the province of West Gothland; 16 miles W. of Uddevalla.

LYSERUS, POLYCARP, in *Biography*, a learned Lutheran divine, was born at Winendeen, in Germany, in 1552. He was educated at the expense of the prince of Wittemburg, and was distinguished as well for great industry as considerable talents. He became distinguished as a preacher, and received frequent applications to preach, on particular occasions, at Vienna, and in other parts of Austria. In 1576 he took his degree of doctor of divinity, and in the following year, Augustus, elector of Saxony, was induced, by the fame of his pulpit talents, to appoint him a minister of the church of Wittemburg. He was soon raised to the professorship of divinity in the university, and attained to other high honours. In the year 1594, he was appointed minister of the court of Dresden, where he spent the remainder of his life, occupied not only in literary labours, and in ministerial duties, but in the education of young princes. He died in 1601, in the forty-ninth year of his age. He was a very voluminous writer, particularly as a commentator on the scriptures. He wrote likewise several controversial treatises.

LYSERUS, JOHN, a Lutheran divine of the same family, distinguished for his vast zeal as a writer in defence of polygamy. The most considerable of his publications is entitled "Polygamia Triumphatrix," &c. He spent his fortune and his life in endeavours to maintain and propagate his favourite doctrine, and with incredible pains travelled through almost every country on the European continent, examining libraries for materials to confirm his system. At length, having spent all his property, and being reduced to great distress, he died in the neighbourhood of Paris in 1684. Moreri.

LYSIANTHUS, in *Botany*. (See LISIANTHUS.) The latter is, no doubt, the original reading in Browne's Jamaica. Lamarck adopts the former, apparently from *λύσις*, a dissolver, alluding to the deobstruent or purgative qualities of some of the species described by Aublet.

LYSIARCHA, an ancient kind of magistrate, being the pontiff of Lycia, or superintendant of the sacred games of that province.

Strabo observes, that the lyfiarcha was created in a council consisting of the deputies of twenty-three cities; that is, of all the cities in the province; some of which cities had three voices, others two, and others but one.

Cardinal Norris says, that the lyfiarcha presided in matters of religion; in effect, the lyfiarcha was nearly the same with the *afiarcha*, and *fyriarcha*; who, though they were all the heads of the councils, or states of those provinces, yet were they established principally to take care of the games and feasts celebrated in honour of the gods, whose priests they were inaugurated, at the same time that they were created *lyfiarcha*, *fyriarcha*, or *afiarcha*.

LYSIAS, in *Biography*, an eminent Greek orator, born at Syracuse about the year 459 B.C. He accompanied his father to Athens while he was very young, and was educated with great care in that city. In process of time he became himself a teacher of rhetoric, and composed orations for others, but does not appear to have been a pleader. He distinguished himself by the eloquence and purity of his orations, of which it is said by Plutarch, he wrote no less than 425, though the number may with more probability be reduced to 230; and of these only 34 remain, which are to be found in the collections of the Greek orators. He died in the 81st year of his age, and in the 378th year B.C. Lysias attained great reputation in his time, which his works afterwards supported, and he is mentioned with applause by Cicero and Quintilian. Lysias lived at a somewhat earlier period than Isocrates; and exhibits a model of that manner which the ancients call the "tenuis vel subtilis." He has none of the pomp of Isocrates. He is every where pure and attic in the highest degree; simple and unaffected; but wants force, and is sometimes frigid in his compositions. In the judicious comparison which Dionysius of Halicarnassus makes of the merits of Lysias and Isocrates, he ascribes to Lysias, as the distinguishing character of his manner, a certain grace or elegance arising from simplicity: "περί τε γὰρ ἡ Λυσίας λέγεται ἔχειν τὸ χαλεπὸν ἢ δ' ἱσοκράτης; βέλτερον: i. e. the style of Lysias has gracefulness for its nature; that of Isocrates seems to have it." In the art of narration, as distinct, probable, and persuasive, he holds Lysias to be superior to all orators; at the same time he admits, that his composition is more adapted to private litigation than to great subjects. He convinces, but he does not elevate nor animate. The magnificence and splendour of Isocrates are more suited to great occasions. He is more agreeable than Lysias; and in dignity of sentiment, far excels him. Blair's Lect. vol. ii. The best editions of Lysias's

Lyfias's orations is that by Taylor, London, in 1739, and Cambridge 1740.

LYSIA, in *Ancient Geography*, a town of Asia, in Syria, seated on the river Marfyas, W. of the river Orontes, and N.W. of the town of Apamea.—Also, a town of Asia Minor, in Caria, placed by Ptolemy in Phrygia Major.—Also, a town of the Peloponnesus, in Arcadia, called also *Lufias*.

LYSIMACHIA, in *Botany*, a very ancient generic name, and so called, according to Pliny and Ambrosinus, from Lysimachus, a favourite general of Alexander the Great, who was afterwards king of Thrace. The English name of this plant, *Loosestrife*, is evidently taken from *λυσις*, a dissolution of strife, or a peacemaker, but how this title could apply to the king on whom it was bestowed, and who appears to have been of a cruel and ferocious temper, we are at a loss to imagine, unless it were like the ludicrous derivation of *lucus*, a non lucendo. Linn. Gen. 83. Schreb. 109. Willd. Sp. Pl. v. 1. 816. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 227. Ait. Hort. Kew. ed. 2. v. 1. 314. Brown. Prod. Nov. Holl. v. 1. 428. Tournef. t. 59. Juss. 95. Lamarck Illustr. t. 101. Gartn. t. 50.—Class and order. *Pentandria Monogynia*. Nat. Ord. *Rotaceæ*, Linn. *Lysimachia*, Juss.

Gen. Ch. Cal. Perianth inferior, five-cleft, acute, erect, permanent. Cor. of one petal, wheel-shaped; tube none; limb in five, ovate-oblong, deeply cloven segments. Stam. Filaments five, awl-shaped, opposite to the segments of the corolla, mostly united at the base; anthers acuminate. Pist. Germen superior, roundish; style thread-shaped, the length of the stamens; stigma obtuse. Peric. Capsule globose, mucronated, of one cell and ten valves. Seeds numerous, angular. Recept. globose, very large, dotted.

Ess. Ch. Corolla wheel-shaped. Capsule globose, pointed, with ten valves.

Obf. L. *Linum-stellatum* has fruit with only five valves.

Nearly the whole of this genus is pretty well known in our gardens, whilst some of its species are found to grow spontaneously in our hedges and fields. It is divided into two sections, the first of these having many flowers on a stalk, the second composed of such as are single-flowered.—Of the first section are the following.

L. *vulgaris*. Yellow Loosestrife. Linn. Sp. Pl. 209. Engl. Bot. t. 761. Curt. Lond. fasc. 5. t. 19.—Panicked. Clusters terminal. Leaves ovate-lanceolate, acute.—A native of shady, watery places on the banks of rivers, flowering in July.—Root perennial, creeping. Stems erect, three feet high, leafy, many-flowered. Leaves opposite, often three or four together, spreading, veiny, smooth, sometimes downy. Clusters erect, each partial flower-stalk with an awl-shaped bractea at its base. Flowers yellow and handsome.

L. *thyrsiflora*. Tufted Loosestrife. Linn. Sp. Pl. 209. Engl. Bot. t. 176.—Flowers in lateral, pedunculated clusters.—This extremely rare plant, when it does occur, may be found in damp, watery situations, in particular parts of Yorkshire and Scotland. It flowers in July.—Root perennial, creeping. Stems erect, a foot and half high, perfectly simple, round, leafy, smooth, now and then woolly. Leaves opposite, sessile, acute, entire, smooth. Flowers in axillary, dense clusters, small, of a less brilliant colour than the last. Many parts of the herbage and inflorescence are prettily spotted with red.

Of the remaining species belonging to this section, as they are detailed in Willdenow, none are natives of Britain. They are called L. *decurrens*, *Ephemerum*, *atropurpurea*, *dubia*, and *stricta*.

The second section comprises, amongst others, the following:

L. *memorum*. Yellow Pimpernel, or Wood Loosestrife. Linn. Sp. Pl. 211. Engl. Bot. t. 527. Curt. Lond. fasc. 5. t. 18.—Leaves ovate, acute. Flowers solitary. Stem procumbent. Stamens smooth.—Found not unfrequently in groves and moist shady places, flowering from May to September.—Roots perennial. Stems procumbent, creeping, branched, square, reddish, shining, leafy. Leaves opposite, on footstalks, ovate, entire, smooth. Stalks axillary, solitary, single-flowered, slender. Flowers delicate, yellow.—This and the following species may be regarded as two of our most ornamental common plants, more especially as their myrtle-like herbage, when intermixed or entangled with ferns or moss, gives a pleasing variety to the verdure of rocks, and the banks of rivulets, or shady ponds.

L. *Nummularia*. Moneywort, or Herb Twopence. Creeping Loosestrife. Linn. Sp. Pl. 211. Engl. Bot. t. 528. Curt. Lond. fasc. 3. t. 14.—Leaves somewhat heart-shaped. Flowers solitary. Stem creeping. Stamens glandular.—A native of the banks of ditches and very moist meadows. It flowers copiously during the summer. Root perennial. Stems prostrate, square, compressed, generally simple. Leaves opposite, on footstalks, heart-shaped or roundish, waved, palish green. Corolla pale lemon-coloured, and, when magnified, clothed with small glands standing on footstalks, as are also the stamens.—The qualities both of this and the preceding are to the best of our knowledge perfectly unimportant either for medicinal or agricultural purposes.

The remaining species of *Lysimachia* are none of them natives. We therefore select two or three of the more interesting exotic ones.

L. *punctata*. Four-leaved Loosestrife. Linn. Sp. Pl. 210. Jacq. Austr. t. 366.—Leaves generally four together, almost sessile. Stalks verticillate, single-flowered.—Found amongst reeds in Holland, Austria, and other parts of Europe, flowering in July and August. Root perennial, somewhat creeping and fibrous. Stems two or three feet high, upright, downy, leafy, generally simple. Leaves ovate-lanceolate, entire, frequently spotted with black on the lower side. Flowers rather small, yellow. The segments of the corolla pointed, with tawny dots at their base.

L. *quadriflora*. Four-flowered Loosestrife. Ait. Hort. Kew. n. 7. Sims in Curt. Mag. t. 660.—Leaves opposite, sessile, linear, very long. Stalks four together, terminal, single-flowered.—Sent from North America to Kew garden by Mr. Francis Masson in 1798. It flowers like the last in July and August.—Root perennial. Stems quadrangular, much branched. "Leaves opposite, linear, quite entire, smooth, sessile, longer than the branches. Branches axillary to the leaves, similar, terminated with four leaves crossed, serving the office of bracteas; from the axils of each of these there rises a flower-stalk, bearing a solitary flower, nodding." The segments of the corolla are crenate and very sharply pointed, of a beautiful bright yellow colour; whilst the whole herbage is of a dark, blackish-green. It is a hardy perennial, requiring no particular treatment, even bearing the smoke of London without much injury.

L. *ciliata*. Ciliated or Fringed Loosestrife. Linn. Sp. Pl. 210. (*Lysimachia canadensis* lutea, folio Jalapæ: Walth. Hort. t. 12.)—Leaf-stalks fringed. Flowers drooping.—A native of North America, whence it was introduced by Mr. Philip Miller into this country in 1732. It flowers in July and August.—Root perennial, creeping. Stems about two feet high, erect. Leaves oblong, smooth, acuminate, veined

veined underneath. *Flowers* axillary, yellow, each on a long, slender, naked stalk. Linnæus in his *Système Végétal* reckons *L. ciliata* as a variety only of *las quadrifolia*, and in this he is followed by Willdenow, but on the authority of the *Species Plantarum* and *Hortus Kewensis*, we are inclined to consider them as distinct.

L. Linum-stellatum. Small Looselife. Linn. Sp. Pl. 211. (*Linum minimum stellatum*; Magnol. Bot. Mouss. t. 162.) —Calyx longer than the corolla. Stem erect, very much branched.—Not uncommon in France and Italy, where it flowers in the spring. Root annual, capillary, whitish. Stem about two or three inches high, very slender, much branched. Leaves sessile lanceolate, pointed, entire. Flowers small, of a pale green colour.

Mr. R. Brown, Prod. Nov. Holl. v. 1. 428, suggests that this genus ought certainly to be divided. He describes one species as found near Port Jackson, *L. maculata*, downy, with ovate leaves, and axillary flowers, whose stalks are shorter than the footstalks. There is no absolute certainty of this being distinct from *L. japonica* of Thunberg.

LYSIMACHIA, in *Gardening*, comprehends plants of the hardy, herbaceous, biennial, and perennial sorts, of which the species mostly cultivated are, the willow-leaved loosestrife (*L. ephemerum*); the purple flowered loosestrife (*L. dubia*); and the upright loosestrife (*L. stricta*.)

Method of Culture.—All these plants may be readily increased, either by sowing the seeds in the autumnal season, as soon as they become fully ripe, on a moist border which has an eastern aspect; or by parting the roots, and planting them out at the same season in similar situations. The plants should afterwards be kept perfectly clean, and where the first mode is used, removed into the places where they are to remain during the autumn.

But in the second kind the seeds should be sown upon a hot-bed.

The third sort is best increased by planting the bulbs thrown out from the axils of the leaves.

Each of these different plants may be employed by way of ornament and variety in the clumps, borders, and other parts of gardens and pleasure grounds.

LYSIMACHIA, in *Ancient Geography*, a town of Thrace, called in the time of Ptolemy *Xanthum*.

LYSIMACHIA *Worm*, in *Natural History*, a name given to an insect found very frequently feeding on the leaves of the *Lyfimachia*, or willow-herb. It has usually been esteemed a caterpillar, but is properly one of the faultless chenilles, having a rounded head, and twenty-two legs; this creature changes its skin several times, and finally changes its colour with it; it is at first of a blueish-grey, but on its last change in the worm-state it becomes of a yellowish-green; when it has lived a week, or thereabout, after this last change, it becomes a chrysalis, from which there afterwards comes out a four-winged fly.

LYSIMACHIE, in *Botany*, an elegant Natural Order of plants, named from the *Lyfimachia*, which is one of them; see that article. This order is the first in Jussieu's eighth class. See LABIATÆ and GENTIANÆ.

The *Lyfimachia* is thus defined.

Calyx divided. *Corolla* generally regular, its limb divided, mostly into five lobes. *Stamens* definite, mostly five, rarely either more or fewer, being equal in number to, and placed against, the segments of the corolla. *Style* solitary; style simple, or rarely clove. *Fruit* of one cell with many seeds, often capsular, the receptacle of the seeds central, unconnected with the valves. *Stem* herbaceous. *Leaves* either opposite or alternate.

Section 1, consisting of plants whose flowers are borne on

a leafy stem, contains *Centunculus*, *Anagallis*, *Lyfimachia*, *Hottonia*, *Coris*, *Sheffieldia*, *Limofella*, *Tricentalis*, and *Arctia*.

Section 2, comprehends plants whose flower-stalks spring directly from the root, as well as the leaves, and are generally umbellate, with a many-leaved involucre; sometimes however they are simple and single-flowered. The genera are *Androsace*, *Primula*, *Cortusa*, *Soldanella*, *Dodecatheon*, and *Cyclamen*.

Jussieu subjoins a 3d Section, of plants akin to the *Lyfimachia*. These are *Gibbularia*, surely misplaced here; *Conoclea* of Aublet; *Tozzia*, which two last we should rather have referred to the order of *Pedicularis*; *Samolus*, *Utricularia*, *Pinguicula*, and *Mentyanthes*.

M. Ventenat has chosen to call this order *Primulaceæ*, and he is followed by Mr. Brown. The latter name is perhaps preferable, and there seems to be nothing fixed as yet amongst the students of natural orders, as to names or their terminations. The science is new and experimental at present, and rigid laws should not prevent improvements. It is far otherwise with names of genera and species, which are the current coin, not the paper currency, of the botanical realm.

LYSIMACHUS, in *Biography*, king of Thrace, one of the captains of Alexander the Great, rose from a very mean condition to the favour of that prince. At the partition of the empire of Alexander, in the year 323 B.C., Thrace, the Chersonese, and the countries adjacent to the Euxine, were allotted to Lyfimachus. When Antigonus had rendered himself formidable to all the other sharers, Lyfimachus joined in the league against him, with Seleucus, Ptolemy, and Cassander. By a subsequent treaty, Thrace was confirmed to him; and in imitation of other captains, he took the title of king. He founded the city of Lyfimachia in 309 B.C., and made it his capital. In conjunction with Seleucus, he gained the great battle of Ipsus. He afterwards seized upon Macedonia, having first expelled Pyrrhus from the throne; but his cruelty rendered him truly odious, and the murder of his son Agathocles so offended his subjects, that the most opulent and powerful revolted from him, and abandoned the kingdom. He pursued them into Asia, and declared war against Seleucus, who had given them a kind reception. He was killed in a bloody battle, in the 28th year B.C., and in the 80th of his age. His body was found in the heaps of slain by the fidelity of his dog, which had carefully watched near it. With great courage and abilities, he was characterized by a cruel and ferocious disposition, which rendered him unworthy of his high fortune. Justin mentions a curious fact concerning him, viz. that having offended Alexander, he was, as a punishment, thrown into the den of a furious lion; and when the ravenous animal darted upon him, he wrapped his hand in his mantle, and boldly thrust it into the lion's mouth, and by twisting his tongue, killed an adversary ready to devour him. This act of courage in self-defence recommended him to the monarch, who pardoned and took him into his favour. Univ. Hist.

LYSINE, in *Ancient Geography*, a town of Asia, in Pamphylia, between Comana and Cormasa, according to Ptolemy.

LYSINEMA, in *Botany*, from *λυσιν*, *separation*, and *μαζ*, *a thread or flamen*, because the flaments are unconnected with the corolla, proceeding from the receptacle, below the germen, by which character alone the genus is distinguished from *Eparis*, their habit being exactly the same. The tube of the corolla however is generally divided, more or less deeply, into five parts in *Lyfinema*. Brown Prodr.

Nov.

Nov. Holl. v. 1. 552.—Class and order, *Pentandria Monogynia*. Nat. Ord. *Epacridae*, Brown.

Gen. Ch. Cal. Perianth inferior, of many erect, imbricated, coloured, permanent leaves; the inner ones gradually larger. Cor. of one petal, salver-shaped; its tube generally splitting into five parts; limb in five smooth beardless segments, obliquely twisted to the right. Nectary of five glands, surrounding the base of the germen. Stam. Filaments five, thread-shaped, equal, inserted into the receptacle; anthers incumbent, oblong, bursting lengthwise, rising just above the tube. Pist. Germen superior, roundish, with five furrows; style thread-shaped; stigma obtuse. Peric. Capsule of five cells and five valves. Seeds numerous, minute. Receptacles five, attached to the central column.

Eff. Ch. Calyx of many imbricated coloured leaves. Corolla salver-shaped; its limb five-cleft, beardless. Stamens inserted into the receptacle, the length of the tube. Capsule of five cells, with many seeds.

1. *L. pentapetalum*. Corolla divided to the bottom; its claws unconnected, longer than the calyx, externally smooth.—Found by Mr. Brown in the southern part of New Holland.

2. *L. ciliatum*. Corolla divided to the bottom; its claws cohering at the top, externally smooth, the length of the calyx.—Native of the same country. We have seen neither of these.

3. *L. lasianthum*. Corolla divided to the bottom; its claws externally woolly, rather longer than the calyx.—Gathered by Mr. Menzies at King George's Sound, on the south-west coast of New Holland. The stem is shrubby, as in all the rest, its branches very slender, smooth, round, leafy. Leaves scattered, about a quarter of an inch long, elliptic-oblong, narrow, obtuse, entire, smooth; flat above; convex beneath. Footstalks short, smooth. Flowers few, in a terminal simple spike, leaning one way, apparently tawny or bluish-coloured, each near half an inch long. Calyx-leaves blunt, with a membranous edge; the inner ones fringed. Petals obtuse.

4. *L. conspiciuum*. Tube of the corolla five-cleft above, longer than the calyx. Leaves lanceolate-awl-shaped, close-pressed.—Found by Mr. Brown in the south of New Holland.

5. *L. pungens*. (*Epacris pungens*; Cavan. Ic. v. 4. 26. t. 346.)—Tube of the corolla undivided, the length of the calyx. Leaves spreading, ovate, sharp-pointed.—Native of the country about Port Jackson, New South Wales, from whence specimens were sent in 1791 by Dr. White. The stem is woody, with many straight rigid branches, thickly beset with sessile, rigid, smooth, entire, ribbed, spinous, and taper-pointed leaves; their base ovate or heart-shaped, close-pressed, and partly clasping the stem; the rest spreading nearly horizontally, very pungent. Flowers white and fragrant, very elegant, in dense, leafy, terminal spikes. Segments of the corolla pointed, somewhat plaited when dry. Style prominent, hairy. We have already spoken of this shrub as *Epacris pungens*. (See *EPACRIS*.) Mr. Brown subjoins Dr. Sims's red-flowered plant, Curt. Mag. t. 1199, as a variety, and he adds that this *L. pungens* is an intermediate species, as it were, between *L. sinema* and *Epacris*. It agrees with the latter in its corolla, but has the insertion of the filaments proper to the former.

LYSIPPUS, in *Biography*, a celebrated sculptor and statuary, was born at Sicyon, and flourished in the time of Alexander the Great. He was originally a worker in brass, and then applied himself to painting, till his talents and inclination led him to fix on the profession of a sculptor. He worked with such extraordinary diligence and facility, that

he is said to have left 1500 performances, all of such excellence, that any one of them singly might have conferred celebrity on him as an artist. He attained to so high a reputation, that Alexander forbade any sculptor but Lysippus to make his statues. Lysippus improved the art of statuary by a better imitation of the hair, and by an attentive study of symmetry, in which he considered how the human figure appeared to the eye, not what were its exact proportions. The most admirable of his works were the statues of Alexander, of which he executed a series, beginning from his childhood; one of a man coming out of a bath, placed by Marcus Agrippa before his public baths; and being removed by Tiberius into his own chamber, the Roman people were so clamorous for its restitution, that the emperor thought it prudent to comply with their wishes. A chalet of the sun at Rhodes was one of his great works, which was, however, surpassed by a colossus at Tarentum 40 cubits high. His statue of Socrates, and those of the twenty-five horsemen who were drowned in the Granicus, were so highly valued, that, in the age of Augustus, they were sold for their weight in gold.

LYSIS, a Pythagorean philosopher, who flourished in the fifth century before Christ, was a native of Tarentum, who, according to Jamblichus, was instructed in his philosophy by Pythagoras himself. Being well initiated and excelling in the doctrines of his master, he opened a school for the purpose of instructing others, but would never admit persons of bad character among his auditors. He even refused, on that account, entrance to Cylon, one of the wealthiest people of the city. Cylon was exasperated at the neglect, as he thought it, and resolved on revenge. He caused the house of Milo, in which Lysis and forty other Pythagoreans were assembled, to be set on fire; meaning by the violence of a hired mob to assassinate those, by bludgeons or missile weapons, who should escape burning. Excepting Lysis and Archippus, they were every one burnt or floned to death. The philosopher now retired, first into Achaia, and afterward to Thebes, where he opened a school, and remained an useful instructor to the Grecian youth till he died. Among other famous disciples he could, it has been said, mention Epaminondas; though others seem to doubt the fact, and to be desirous of referring that honour to another person of the same name. Lysis is celebrated for having been a most exact and punctual performer of his promises, even on the most trivial occasions. He composed Commentaries on the philosophy of Pythagoras, which have not come down to our times. Some writers have attributed to him the "Golden Verses;" while others have given them to Philolaus, or Empedocles. There is still extant, under the name of Lysis, a letter addressed to Hipparchus, in which the latter is reproached for having divulged the secrets of the Pythagorean philosophy. It may be found in the "Opuscula Mythologica et Philosophica" of Dr. Thomas Gale.

LYSKO, in *Geography*, a town of Lithuania, in the palatinate of Novogrodek; 52 miles S.W. of Novogrodek.

LYSOBYKI, a town of Poland, in the palatinate of Lublin; 20 miles N.N.W. of Lublin.

LYSSA, *Λυσσα*, a word used by medical authors to express that species of madness which is peculiar to dogs and wolves, but is communicated by their bite to man and other animals. Hence persons labouring under the dismal effects of such a bite, are called also *lyssodactyl*.

LYSENDORF, in *Geography*, a town of France, in the department of the Sarre, and chief place of a canton, in the district of Prüm. The place contains 117, and the canton 1962 inhabitants, in 25 communes.

LYSTRA,

LYSTRA, a small town of America, in Nelson county, Kentucky, situated on a west water of Rolling Fork, a fourth branch of Salt river. N. lat. $37^{\circ} 25'$.

LYSWIK, a town of Sweden, in the province of Warmeland; 34 miles N. of Carlstadt.

LYTHRUM, in *Botany*, the *λυθρον* of Dioscorides, most probably received its name from the purple tinge of its flowers: *λυθρον* signifying *clotted*, or *gore blood*, to which substance this plant is similar in colour. Linn. Gen. 240. Schreb. 323. Willd. Sp. Pl. v. 2. 865. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 509. Art. Hort. Kew. ed. 2. v. 3. 149. Juss. 332. Lamarek Illustr. t. 408. Gertn. t. 62. (Salicaria; Tournef. t. 129.)—The *Cuphea* of Brown, in his history of Jamaica, united to *Lythrum* by Linnæus, is now by general consent separated, on account of its irregular flower, and capsule with a single cell.—Class and order, *Dodecandria Monogynia*. Nat. Ord. *Calycanthemæ*, Linn. *Salicaria*, Juss.

Gen. Ch. Cal. Perianth inferior, of one leaf, cylindrical, striated, with twelve teeth, the alternate ones less. Cor. Petals six, oblong, rather obtuse, spreading, inserted into the base of the segments of the calyx. Stam. Filaments twelve, thread-shaped, the length of the calyx; the upper ones shorter than the lower; anthers simple, somewhat ascending. Pist. Germen superior, oblong; style awl-shaped, the length of the filaments, declining; stigma orbicular, ascending. Peric. Capsule oblong, pointed, covered by the calyx, of two cells. Seeds numerous, small.

Eff. Ch. Calyx inferior, with twelve teeth. Petals six, inserted into the calyx. Capsule with two cells and many seeds.

Obs. In some species of *Lythrum*, one-sixth of the parts of fructification is found to be deficient; in others only six filaments are to be seen.—We describe the following principal species as a sufficient illustration of the genus.

L. Salicaria. Purple Lythrum. Linn. Sp. Pl. 640. Engl. Bot. t. 1061. Curt. Lond. fasc. 3. t. 28.—Leaves opposite, lanceolate, heart-shaped at the base. Flowers spiked. Stamens twelve. A native of marshes and the banks of rivers, flowering in July and August.—Root perennial, woody, throwing up many stems. Stems three feet high, erect, wand-like, quadrangular (occasionally hexangular) leafy. Leaves opposite, sometimes, though rarely, three or four together, still more rarely alternate, sessile, smooth above, downy at the margin and underneath. Flowers in a whorled spike, purple.—One of our most showy wild plants, and extremely ornamental to the banks of ditches, ponds, and rivers, though occasionally to be met with in drier situations.

L. virgatum. Fine-branched Lythrum. Linn. Sp. Pl. 642. Jacq. Austr. t. 7. Curt. Mag. t. 1003.—Leaves opposite, lanceolate. Panicle straight. Flowers three together.—Originally found by Clusius in Austria, and in the isles of the Danube. It was introduced by Jacquin into the gardens at Kew in 1776, where it flowers from June to September.—Root perennial, thick. Stems upright; at the bottom, round, pale-brown mixed with green, generally leafless; towards the top square, leafy and branched. Leaves opposite, thickish, nearly sessile. Flowers six in a whorl, the lower ones more remote, all axillary, of a deep purple colour.—Linnæus notices a variety of *L. virgatum* which has fewer flowers in the whorl, and whose leaves are alternate.

L. hyssopifolium. Hyssop-leaved Lythrum, or Grafs-poly. Sm. Fl. Brit. 510. Engl. Bot. t. 292. (*L. Hyssopifolia*; Linn. Sp. Pl. 642. Jacq. Austr. t. 133.)—Leaves alternate, linear-lanceolate. Stamens six.—A rare English plant,

to be met with occasionally in moist places where water has stagnated through the winter. Common in many other parts of Europe, flowering in August.—Root annual, simple, attenuated. Stem a span high, branched at the base, erect. Leaves smooth, varying in breadth; the lower ones only, opposite. Flowers axillary, almost sessile, solitary, small, purple, hexandrous, though occasionally five-cleft and pentandrous.

LYTHRUM, in *Gardening*, contains a plant of the hardy, herbaceous, perennial kind, of which the species cultivated is the common or purple willow-herb (*L. Salicaria*.)

Method of Culture.—This sort and varieties may be readily increased by parting the roots in autumn, and planting them out in the situations where they are to remain. They may likewise be raised from seed sown at the same time, but the first is the readiest method. They delight in rather moist soil.

All of them are highly ornamental in the larger borders, clumps, and other parts of pleasure-grounds, being placed towards the back parts, from their full growth.

LYTTA, or LYTTA *Vesicatoria*, in the *Materia Medica*, the name given to the Blistering Fly.

The *Ceratum Lyttæ*, or *Ceratum Cantharidis* of P. L. 1787, is composed of spermaceti cerate, and blistering flies, in a very fine powder, in the proportion of six drachms of the former to a drachm of the latter, and is prepared by softening the cerate by heat, adding the flies, and mixing them together.

LYTTE, *Emplastrum*. See EMPLASTRUM.

LYTTÆ, *Tinctura*, *Tinctura Cantharidis*, P. L. 1787, tincture of blistering fly, is prepared by macerating for 14 days three drachms of blistering flies bruised, in two pints of proof spirit. In order that this preparation may be certain in its effects, it is necessary that the insects should be fresh and perfect: for want of attention to this circumstance, large doses have been given without any sensible effect. See BLISTER and CANTHARIDES.

LYTTA, in *Natural History*, a genus of insects, of which there are thirty-two species enumerated in Gmelin's edition of the Syst. Nat. The generic character is antennæ filiform; four unequal feelers, the hind ones clavate; thorax roundish; head inflexed gibbous; shells soft, flexible, as long as the abdomen. All the species of this genus are exotics, and scattered through the globe, as will be seen in the following enumeration: many of them reduced to powder are capable of vesicating the skin on application to the surface of the body.

Species.

VESICATORIA; Blister-fly. Green; antennæ black. This is the common *Cantharis vesicatoria*, or Spanish-fly of the shops: though the insect has been usually ranked under the genus *Meloe*, and has, indeed, been so referred to from the article BLISTER in our own work: it is found to have no claim as belonging to that genus, and we have accordingly restored it to its proper place. It inhabits many parts of Europe, on ash and elder trees. It is used for various purposes in pharmacy, but chiefly for raising blisters; it multiplies greatly, and has a nauseous smell. The odorous particles are extremely corrosive. The female insect, after impregnation, deposits her eggs in the ground, where they remain till they have undergone the various changes that are to bring forth the winged insects.

SEGETUM. Golden; shells green. This is a less species than the *Vesicatoria*; is found in Barbary among corn. The antennæ are black; head and thorax sometimes golden,

sometimes green with a gloss of gold; body golden; legs dusky.

NITIDULA. Green bronzed; shells testaceous; antennæ black. This species has been sometimes described as belonging to the English insects; but Gmelin describes it as inhabiting the Cape only.

COLLARIS. Black; crown, thorax, and legs ferruginous, the shells are of an azure colour. This is a large insect, and is found in the southern parts of Russia. The antennæ are ferruginous; edge of the thorax a little black. The male is as small again as the female.

GIGAS. Azure; breast ferruginous; it inhabits Guinea. The size of this insect is about the same as that of the *L. venicatoria*; one sex has the shells friate, but in the other they are smooth.

SYRIACA. Vilous, green-blue; thorax rounded and ferruginous. It inhabits the southern parts of Europe.

RUFICOLLIS. An inhabitant of the East Indies. Glabrous, green-gold; thorax rufous, tapering before.

TESTACEA. Above testaceous; shells with a large oblong black spot near the tip. It inhabits Tranquebar. The head is testaceous; mouth and antennæ black; thorax punctured and testaceous; shells smooth; body black.

FESTIVA. Shining brassy-green; shells testaceous with spots of brassy-green. The body is entirely green bronze; spot on the shells varying. Inhabits Siberia.

MARGINATA. Black; margins of the shells pale cinereous; inhabits the Cape of Good Hope; above opaque, beneath cinereous.

VITTATA. Shells black, with a yellow margin; an inhabitant of America. By some entomologists this is described as the *Cantharis vittata*. Head yellowish; crown with two black spots; thorax black, with three yellow lines; abdomen and legs black.

ATRATA. Body black, immaculate; inhabits Barbary, and is the *Meloe pennsylvanica* of some writers. About half the size of the *Vittata*, and entirely of a deep black.

ERYTHROCEPHALA. Black; head testaceous; thorax and shells with cinereous lines. This species is found in several parts of Austria; the head is testaceous, with a black line down the middle; mouth black; thorax channelled.

OCULATA. Black, with a yellow callous dot behind the eyes; inhabits Guinea. Body entirely black immaculate; behind the eyes on each side is a large raised yellow dot. Female apterous, shells abbreviated.

DURIA. Black; crown fulvous; thorax and shells immaculate. Inhabits Siberia; and is the *Meloe alpinicus* of some entomologists.

ASRA. Black; thorax rufous; this species is found in Africa; and is the *Cantharis asra* of Olivier.

HEMORRHODALIS. Blackish blue; end of the abdomen rufous; the antennæ are black; head and thorax vilous; body smooth.

QUADRIMACULATA. Black, glabrous; breast downy; shells yellowish-grey, with two black and almost square spots. A native of the northern parts of Asia; is found among flowers; and it exudes a very pleasant smelling oil from its legs. This is a circumstance attending likewise to the

FENESTRATA, which is glabrous, pale testaceous; thorax depressed; shells grey tipped with black, have two squarish yellow spots; found also in the Asiatic parts of Siberia, chiefly among flowers.

CLEMATIDIS. Black, with a steel-blue gloss; shell pale testaceous immaculate; found on the clematis in Siberia.

URALENSIS. Black, opaque, glabrous; this is often con-

founded with the *Atrata* above described, and is not sufficiently distinct from it. An inhabitant of Siberia.

SINICA. Black, opaque, glabrous; shells edged with white; head red; eyes, mouth and antennæ black. Is found on the lotus in divers parts of Sibiria. The joints of the antennæ, in the male, compressed and armed with a tooth.

LOBATA. Black, woolly; shells ventriferæ, fulvous, spotted, pale yellow with six black dots. Inhabits Siberia.

OMBLATA. Black, woolly; legs testaceous; thorax rufous, and shell yellowish, the latter with six obsolete black spots in the middle. Inhabits the Caspian sea, and has been described particularly by Pallas. Like the "*Punctipennis*" and "*Punctifrons*" it exudes an agreeable oil from its legs.

PECTINATA. Antennæ pectinate; body black; front red. It inhabits Siberia.

CINNABARINA. Black; thorax above, shells, and head on each side red. Inhabits Carniola.

RUBA. Black; head rufous. Inhabits Carniola.

SUBVILLOSA. Yellowish subvilous; antennæ tapering. Is found in many parts of France.

BICOLOR. Testaceous; shells tipped with black. Inhabits France.

FORMICARIA. Brown; the fore-part of the elytra, and the thorax, which is elongated, are red. This is found in France and other parts of Europe.

PUBESCENS. Black; head and thorax pubescent; shells yellow, with a ferruginous spot on each side behind; this insect has been found only in museums by modern naturalists.

FERRUGINEA. Ferruginous; head and thorax rufous; shells brown testaceous at the base. Inhabits various parts of Europe.

LYTTELTON, GEORGE, Lord, in *Biography*, was the eldest son of Sir Thomas Lyttelton, bart. of Hagley, in Worcestershire, where he was born in January 1708-9. He was educated at Eton, from which place he was removed to Christ-church college, Oxford. He was from an early age distinguished for his proficiency in classical learning, and some of his poems were the fruit of his youthful studies. When he had completed his course at Oxford, he set out upon a tour to the continent, and his letters to his father during his absence are replete with remarks displaying solid judgment and sound principles, while, at the same time, they afford a most pleasing example of filial affection and duty, joined with the unreserved confidence of intimate friendship. During his residence abroad, he wrote a poetical epistle to Dr. Aylough, which is thought to be one of the best of his works, and another to Pope, elegantly complimentary of that great poet. Upon his return from the continent, he was chosen representative, in parliament, for the borough of Oakhampton. At this time his father was a supporter of the existing ministry under Walpole. The son, animated with that patriotic ardour, which scarcely ever fails to inspire the bosom of virtuous and liberal youth, and which it is almost incredible for a young man not to feel, took a contrary part, and distinguished himself among the opposers of administration. His name is to be found among those of the minority in almost every important debate, and he zealously concurred in every measure adopted by Pultney, Pitt, and other leaders of that party. In 1735 he published his "*Persian Letters*," of which it appears, by the testimony of Dr. Warton, he was rather ashamed at the close of life. Mr. Lyttelton obtained the notice and friendship of Frederic prince of Wales, and was appointed secretary to his royal highness; by his instigation it is imagined the prince assumed

the patronage of letters, the beneficial effect of which Mallet, Thomson, and others experienced. It was probably on this account that Pope gave him the praise of pure patriotism, rather than from any regard to his political principles :

“Free as young Lyttelton her cause pursue ;
Still true to virtue, and as warm as true.”

On the death of Thomson, who left his affairs in a very embarrassed condition, Mr. Lyttelton took that poet's sister under his protection. He revised the tragedy of *Coriolanus*, and brought it out at the theatre-royal Covent-garden, with a prologue of his own writing, in which he so affectingly lamented the loss of that bard, that not only Quin, who spoke the lines, but the whole audience, spontaneously burst into tears. He had married, in 1742, Lucy, daughter of Hugh Fortescue, esq. and enjoyed in her society the most unalloyed happiness, which was miserably interrupted by her death in 1746, leaving him one son, Thomas, the late lord, and a daughter, Lucy, who married lord Valentia. On the monument of his beloved lady, he inscribed the following lines.

“Made to engage all hearts, and charm all eyes :
Tho' meek, magnanimous ; tho' witty, wife ;
Polite, as all her life in courts had been ;
Yet good, as she the world had never seen :
The noble fire of an exalted mind,
With gentlest female tenderness combin'd.
Her speech was the melodious voice of love
Her song the warbling of the vernal grove.
Her eloquence was sweeter than her song,
Soft as her heart, and as her reason strong.
Her form each beauty of her mind express'd
Her mind was virtue by the Graces dress'd.”

Besides these lines, her affectionate husband wrote a monody on her death, which displays much natural feeling amidst the more elaborate strains of a poet's imagination.

On the expulsion of Walpole from the ministry, Lyttelton, in 1744, was appointed one of the lords of the treasury. He was always assiduous in his parliamentary attendance, and a vigorous supporter of the measures in which he partook, but never attained the station of leader. He spoke with ease and fluency, but was not eloquent in the usual sense of the word. In early life, he seems to have entertained strong doubts of the truth of revelation, probably from the corruptions of it, which he had witnessed on the continent, but upon serious and impartial inquiry he became a firm believer in Christianity, and wrote in its defence, “*A Dissertation on the Conversion of St. Paul*,” which has ever been regarded as a masterly performance. This piece was written at the desire of Gilbert West, esq. in consequence of Mr. Lyttelton's asserting, that, besides all proofs of the Christian religion, which might be drawn from the prophecies of the Old Testament, from the necessary connection it has with the whole system of the Jewish religion, from the miracles of Christ, and from the evidence of his resurrection by all the other apostles, he thought the conversion of St. Paul alone, was of itself a demonstration sufficient to prove Christianity to be a divine revelation.

In 1749 he married again, but the conduct of his second

wife proved so little to his satisfaction, that a separation by mutual consent ensued in a very short time. By the death of his father in 1751, he succeeded to the title and estate. His taste for rural ornament he displayed at Hagley, which he rendered one of the most delightful places in the kingdom. He occupied several posts under government, but at the dissolution of the ministry in 1759 he went out of office, and was, as a reward for his services, raised to the honour of a peerage, under the style and title of baron Lyttelton, of Frankley, in the county of Worcester.

From this period he chiefly devoted himself to the pursuits of literature, and to an extensive correspondence with the pious and learned. In 1760 he published “*Dialogues of the Dead*,” a work abounding in good sense and sound morality, and which was well received by the public. In 1767 and 1771 he gave the world his “*History of Henry II.*,” in three vols. 4to. a valuable work, which had occupied a great portion of the latter part of his life, and on which he probably placed his chief expectations for future fame. He has given an accurate and comprehensive view of the English constitution, as it existed at the early period of our history with which his book is concerned, and of the changes subsequent to the Norman conquest. The style of the history is good ; its sentiments are judicious and liberal, favourable to the best interests of mankind. The poems of this nobleman preserve a place among the select productions of the British muse, rather on account of the correctness of their versification, the elegance of their diction, and the delicacy of their sentiments, than as exhibiting any uncommon poetical powers. As a politician, his speeches on the Scotch and mutiny bills, in 1747 ; on the naturalization of the Jews in 1753 ; and on the privilege of parliament in 1763, hold him out to public estimation. He died in August 1773, in the 64th year of his age. His miscellaneous works were published after his death in one volume 4to. His lordship, among other qualities, had a remarkable facility of striking out an extemporary compliment, which obtained for him a considerable share of reputation ; an instance is recorded, when lord Cobham, in a large company, mentioned his design of putting up a bust of lady Suffolk in his beautiful gardens at Stowe, he turned to his friend Lyttelton and said “*George, you must furnish me with a motto for it.*” I will, said he, and instantly produced the couplet ;

“Her wit and beauty for a court were made,
But truth and goodness fit her for a shade.”

Johnson's *Lives of the Poets*.

LYTTLETON, CHARLES, an English prelate, brother of the above, was educated at Eton in grammar learning, from whence he entered himself at University college, Oxford, and afterwards studied the law in the Temple and was called to the bar. He, however, soon quitted the profession, entered into holy orders, and in 1747 was appointed chaplain to the king. The year following he was made dean of Exeter, and in 1762 promoted to the bishopric of Carlisle. He was several years president of the Society of Antiquaries, and contributed several articles to their Transactions. He died in 1768.

M.

M A A

M, A liquid consonant, and the twelfth letter in the alphabet.

It has one unvaried sound, and is pronounced by striking the upper lip against the lower; in which the pronunciation of this letter agrees with that of *b*; the only difference between the two consisting in a little motion made in the nose in pronouncing *M*, and not in *b*: whence it happens, that those who have taken cold, for *M* ordinarily pronounce *b*; the nose, in that case, being disabled from making the necessary motion.

All consonants are formed with the aid of vowels; in *em* the vowel precedes, in *be* it follows: and *M* is never mute.

Quintilian observes, that the *M* sometimes ends Latin words, but never Greek ones; the Greeks always changing it in that case into *n*, for the sake of the better sound.

M is also a numeral letter, and among the ancients was used for a thousand; according to the verse,

“*M* caput est numeri, quem scimus mille teneri.”

When a dash is added at the top of it, as \overline{M} ; it signifies a thousand times a thousand.

M, as an abbreviation, stands for *Manlius*, *Marcus*, *Martius*, and *Mucius*: *M.A.* signifies *magister artium*, or master of arts; *MS.* manuscript, and *MSS.* manuscripts.

M, in *Astronomical Tables*, and other things of that kind, is used for *Meridional*, or southern; and sometimes for *Meridian*, or mid-day.

M, in *Medicinal Prescription*, is frequently used to signify a maniple, or handful: and it is sometimes also put at the end of a recipe, for *misce*, *mingle*; or for *mixtura*, a *mixture*. Thus, *m. f. julapium*, signifies *mix*, and *make a julep*.

M, in *Law*, the brand or stigma of a person convicted of man-slaughter, and admitted to the benefit of his clergy.

It is to be burnt on the brawn of his left thumb.

M, in *Music*. This letter in old psalm-tunes, harmonized, stands for *mean*, or middle part, the second treble, and sometimes the counter-tenor. In Scarlatti's lessons composed in Spain, it implies *mano manca*, or left hand.

MA, in *Hindoo Mythology*, is a name of Parvati, the consort of Siva, as noticed under those articles.

MAA, in *Geography*, a town of Hindoostan, in Dowlatabad; five miles N.E. of Beder.

MAAB, a settlement of West Greenland. N. lat. 62° 6'. W. long. 48° 30'.

MAACAH, *MACAATH*, or *Beth-Maacha*, in *Ancient Geography*, a little province of Syria, E. and N. of the sources of Jordan, toward Damascus. We learn from Joshua (xiii. 13.) that the Israelites would not destroy the Maachathites, but permitted them to dwell in the land; and from Deut. iii. 14. and Josh. xii. 5, that the lot of the half tribe of Manasseh beyond Jordan extended to the country.

M A A

Hence the small canton, near the head of Jordan, on the E. side of it, in the way to Damascus, was called Maachonitis, or Machonitis.

MAADEN AL NOCRA, in *Geography*, a town of Arabia Felix, in the province of Hedjas; 140 miles E. of Hagiaz.

MAADEN Uzzumurud, the *Mine of Emeralds*, a mountain of Egypt, on the coast of the Red sea; 90 miles S. of Cosseir.

MAADIE', denoting *Passage*, is the name of a village consisting of two or three houses, upon the E. bank of the Nile, so called because they stand at the place facing the usual *passage* to the Delta. Dr. Shaw conceived this to be the site of the ancient Heraclea, but Sonnini made diligent examination on this spot, and could perceive no vestiges of buildings of a remote time, but half a league further, he remarked upon the coast old walls and ruins, which may be traced a long way into the sea, and which are probably the remains of Heraclea or Heracleum. Maadié is distant about six leagues from Alexandria, on a lake of the same name, which is the extremity of the Canopic branch of the Nile. The lake communicates with the Mediterranean by a narrow opening, at which the French raised a block-house, from which they were driven by the British, under lieut. Brown. Maadié is five miles E. of Aboukir.

MAAGRUNNI, two islands on the E. side of the gulf of Bothnia. N. lat. 65° 25'. E. long. 24° 56'.

MAALMORIE, a cape of Scotland, on the S.E. part of the island of Ha.

MAALUM, a town of Bengal; eight miles E. of Toree.

MAAN, JOHN, in *Biography*, a French ecclesiastical historian, was born at Tours, where he probably received the elements of a learned education, being designed for the ecclesiastical profession: in due time he was admitted doctor by the faculty of the Sorbonne, and became canon and precentor of the church of Tours. He zealously devoted his talents and learning to the service of that religion in which he had been brought up. In 1667 he printed at his own house a work entitled “*Sancta et Metropolitana Ecclesia Turonensis, Sacrorum Pontificum suorum orata virtutibus, et sanctissimis Conciliorum Institutis decorata.*” This work is highly esteemed by the French, who represent it as replete with erudition and curious researches, and as reflecting high honour on the church of Tours and its author. Moreri.

MAANA, in *Geography*, a town of Africa, in the kingdom of Kajanga, the residence of the king, bordering on a branch of the river Senegal, and within a short distance of the ruins of Fort St. Joseph.

MAANINGA, a town of Sweden, in the government of Kuopio; 20 miles N.N.W. of Kuopio

MAAR, a small island in the East Indian sea, near the South coast of the island of Ceram. S. lat. 3° 30'. E. long. 13° 25'.

MAARABAI, a harbour on the W. coast of the island of Ulitea, in the South Pacific ocean. S. lat. 16° 53'. W. long. 151° 27'.

MAARRA, a town of Asiatic Turkey, in the government of Aleppo; the residence of an aga; 45 miles S.S.E. of Aleppo.

MAAS DRUK, in *Biography*, a painter, born at Haerlem in 1656. He at first painted still life, after that he studied with and imitated Berchem, but is best known by pictures of battles, processions, and cavalcades of horses, somewhat in the style of Vander Meulen, though not wrought so free as the works of that artist.

There were two other painters of this name, Arnold van Maas, a disciple of Teniers, who died young, and Nicholas Maas, who was born at Dort in 1632, and was educated in the school of Rembrandt. He practised portrait painting with considerable success. He lived to the age of 61, and died in 1693.

MAASEYCK, in *Geography*, a town of France, in the department of the Lower Meuse, and chief place of a canton, in the district of Ruremonde. The place contains 2205, and the canton 14,704 inhabitants, on a territory of 2574 kilometres, in 13 communes.

MAASIN, a town on the W. coast of the island of Leyta. N. lat. 10° 12'. E. long. 124° 49'.

MAASS, in *Commerce*. See MAAS.

MAAT, a superficial measure of land in Holland, containing 500 square rutes, of which 600 are equal to a morgen or acre. A single square rute contains 169 square feet, each foot being = 121 square inches = 124 English inches.

MAATTAN, in *Geography*, a town of Hindoostan, in Bahar; 34 miles N.N.E. of Durbunga.

MAATZ, NICHOLAS, in *Biography*, an eminent German organ-builder in the sixteenth century, celebrated by Praetorius, and in Werckmeister's organ-grunning, rediv. In 1543 he erected an organ at Stralsund with 43 stops, and afterwards was engaged in the service of the king of Denmark.

MAB. See MOAB.

MABA, in *Botany*, is the vernacular name of this genus amongst the islanders of the South Seas. It was first described by Forster, and afterwards taken up by Linnaeus, Schreber, and other authors. Forst. Gen. 61. Linn. Suppl. 65. Schreb. 1758. Mart. Mill. Dict. v. 3. Juss. 418. Lamarck Illustr. t. 83.—Class and order, *Diccia Triandra*. Nat. Ord. uncertain.

Gen. Ch. Male. Cal. Perianth inferior, cloven half way down into three acute, villous segments. Cor. of one petal, tubular, hairy on the outside; tube cylindrical, longer than the calyx; limb in three, ovate, thickish, erect divisions. Stam. Filaments three, thread-shaped, shorter than the calyx; anthers erect, ovate. Pist. Rudiment globose, nearly sessile in the middle of the flower.—Female. Cal. Perianth inferior, permanent as in the male. Cor. and Pist. unknown. Peric. Deupa superior, ovate-oblong, of two cells, each containing two oblong, triangular seeds or nuts, somewhat convex at their base, flat on each side.

Eff. Ch. Male. Calyx three-lobed. Corolla externally hairy. Pist. three-lobed. Female. Calyx as in the male. Deupa superior, of two cells.

1. M. *Spila*. Forst. Gen. t. 61. Linn. Syst. Veg. ed. 14. 881. Suppl. 426.—A native of the Friendly Islands, more particularly of Tonga Tabu and Namoka.—This is a *shrub* whose general herbage is extremely smooth,

its young shoots and early leaves alone being hairy. *Leaves* alternate, on short footstalks, elliptical, veined, very smooth. *Stalks* axillary, short, mostly three-flowered. *Flowers* small, and curious as Linnaeus remarks for having the outside of the calyx and corolla extremely hairy.

Forster, in his work on esculent plants, p. 54, mentions another species, or variety, of this genus, which he calls *Maba major*; the fruit of which is three times as big as that of *elliptica*, the kernels tough and insipid. The same author says that the natives eat the nuts of it, and that they were offered for sale to our people.

MABANOWEA, in *Geography*, a town of Poland, in Volhynia; 12 miles S. of Berdyczow.

MABBY, a kind of wine made from potatoes. It is said to be used in Barbadoes.

MABEA, in *Botany*, is derived from the Caribbee name of this plant, *Piriri Mabé*. Aublet first described the genus in his *Plante Guianeses*, and says it is called *Bois à Calumet* by the French, because the negroes use its smaller branches as pipes for smoking. Aubl. Guian. 867. Schreb. 641. Willd. Sp. Pl. v. 4. 404. Mart. Mill. Dict. v. 3. Juss. 388. Lamarck Illustr. t. 773.—Class and order, *Monacia Polyantha*. Nat. Ord. *Tricocco*, Linn. *Euphorbia*, Juss.

Gen. Ch. Male. Cal. Perianth inferior, of one leaf, five-toothed, acute. Cor. none. Stam. Filaments from nine to twelve, inserted into the bottom of the calyx; anthers roundish.—Female. Cal. Perianth of one leaf, erect, five-toothed, acute. Cor. none. Pist. Germen superior, oblong, somewhat triangular, longer than the calyx; style long; stigma three, thread-shaped, revolute. Peric. Capsule enclosed in a thick coat, roundish, of three lobes and three cell, each cell two-valved, bursting with elasticity. Seeds solitary, roundish, reddish, variegated with grey spots.

Eff. Ch. Male. Calyx five-toothed. Corolla none. Stamens from nine to twelve inserted into the calyx.—Female. Calyx five-toothed. Corolla none. Stigmas three. Capsule three-lobed, of three cells. Seeds solitary.

Obs. Jussieu remarks that in the description of the female flowers of *Maba* instead of "a single style," it should rather be "styles three, closely united or glued into one."

1. M. *Piriri*. Aubl. Guian. t. 334. f. 1.—Leaves ovate-oblong, attenuated at the base, pointed.—Found in Guiana and Cayenne, where it flowered and bore fruit in May.—The *trunk* of this plant rises to about five feet in height, and puts forth numerous, twiggly *branches* very long, spreading and entangling themselves among the neighbouring trees, covered with an ash-coloured *lark*. *Leaves* alternate, on short footstalks, entire, green above, whitish beneath. *Stipules* two, long, narrow, deciduous. *Flowers* copious, in long panicles; the males three on a common stalk, with two glands and a bractea at the base: female flowers beneath the male, solitary. Every part of the plant when wounded abounds with a milky secretion.

2. M. *Tapari*. Aubl. Guian. t. 334. f. 2.—Leaves oblong, rounded at each end, pointed, somewhat heart-shaped at the base.—Native of Guiana, flowering with the last. This *shrub* differs from the last in having the *bark* of its trunk and branches of a reddish colour. The *leaves* are larger, less elongated, and terminated by a short point, curiously veined with red underneath. The *fruit* is also larger, but in other respects it entirely accords with the preceding.

MABER, in *Geography*, a town of Persia, in Chusilan; 48 miles S.S.W. of Satter.

MABERIA, a lake of Africa, in the country of *Nigala*, which see; the same with the lake of Dibbi; formed by

by the river Joliba, which runs to the *ea*, but mistaken by d'Anville and Delisle for the head of the river Senegal, which runs to the *sw*.

MABEUSE, or MABEUGE, JOHN DL, in *Biography*, one of the early laborious practitioners in the art of painting after the use of oil became known in Flanders. He was born at Maubeuge, in Hainault, in 1499.

He was invited by Henry VIII. to England, and employed by him to paint the portraits of his children. By his neat mode of finishing, and the smoothness and high polish of his works, he gained in this country, where the art of painting was then almost unknown, a very considerable reputation, and in consequence his paintings are not unfrequent among us.

They are known by their dry, stiff, and formal manner; both of action in the figures and in the foldings of their draperies, by a total lack of chiaro-scuro, and yet possessing much ingenious taste in colour: great care in the faces, which always appear to have been portraits; and an almost boundless labour in the finishing; particularly of all the ornamental parts, such as gems, pearls, &c. &c. which he was fond of bestowing lavishly.

He is said to have been immoderately addicted to drinking, though he lived to the age of 63.

MABILLON, JOHN, a very learned French Benedictine monk, was born at Pierre-mont, a village belonging to the diocese of Rheims, in the year 1632. He was instructed in grammar learning by one of his uncles, who afterwards sent him to the college of Rheims, where he soon distinguished himself by the vivacity of his genius, and an uncommon application to study. Hence he was taken into the seminary of the cathedral, in which the young persons designed for the service of the diocese were educated. He continued here three years, and took the habit in an abbey belonging to the Benedictines of the congregation of St. Maur in 1653, and in the following year he made his profession. The highest expectations were formed of him; but an incessant and almost perpetual head-ache rendered him incapable of application, and he was sent to different places in the country for the recovery of his health. In the year 1660 he was ordained priest at Amiens, and as he still laboured under so much indisposition, as to render it unfit for him to apply to his studies, he was accordingly employed in such temporal affairs of the congregation as were more adapted to his enfeebled constitution. In 1663, in order to restrain him from close studies, he was sent to St. Dennis, and was employed in the low office of exhibiting to strangers the various treasures and ancient monuments of the abbey. The duties of this servile post were ill adapted to his mind, and an accident which occurred shortly relieved him from the burden which was become almost intolerable. He broke a mirror, which it was pretended belonged to the pret Virgin; this so enraged his superiors, that they gladly allowed him to make his retreat. His vacant hours he employed in reading the fathers, and in laying up large stores of theological, ecclesiastical, and critical learning. In 1764 he went to Paris to assist d'Achery in compiling his *"Spicilegium,"* and took a large share in the business. The zeal and talents which he manifested in this work caused him to be appointed to superintend the publication of a complete edition of the works of St. Bernard, which he executed with much correctness, judgment, and learning. This work was published, in 1767, in two folio volumes, and also in nine volumes octavo. Immediately after the publication of this great work, he was employed in completing the lives of the saints, for which d'Achery and Chantouin had been

collecting and digesting materials. The first volume was published in 1668, under the title of *"Acta Sanctorum Ordinis S. Benedicti, &c."* this was followed at different periods by eight others, of which the last was published in 1702. The work was regarded by the journals of the day, "not as a simple collection of records relating to monastic history, but as a valuable compilation of ancient monuments, which being illustrated by learned notes, threw much light on the most obscure part of ecclesiastical history. The prefaces themselves would secure to the author an immortal reputation. The manners and usages of those dark ages are examined with great care, and an hundred important questions are discussed by an exact and solid critique." The prefaces were reckoned so valuable, that they were published separately in 1732, in quarto. In 1674 he published *"De Pane Eucharistico azimo et fermentato Dissertatio,"* intended to prove that the Latin church made use of leavened bread in the consecration of the Eucharist for many ages, and that the use of unleavened bread was not introduced till after Pharisæus's schism. In the following year he published *"Vetus Analactorum, &c."* but the work which has done most honour to the memory of Mabillon appeared in 1681, entitled *"De Re Diplomatica Libri sex, &c."* So high was the opinion generally entertained of his extraordinary merit, that the celebrated Colbert was desirous of bestowing on him a pension of two thousand livres, but his unambitious and disinterested spirit led him to decline that generous offer. In 1682, Colbert engaged him to take a journey into Brandenburg, for the purpose of examining some ancient titles relating to the royal family; after which he sent him into Germany, to search into the archives and libraries of the ancient abbies in that country, for such documents as might contribute to illustrate the history of France, and that of the church in general, and of the church of France in particular. The results of his enquiries into these subjects were given in the fourth volume of his *"Analactorum."* In 1685, he published *"De Liturgia Gallicana Libri tres, in quibus veteris ritus, quæ ante annos mille apud Gallos in usu erat, forma ritusque erantur ex antiquis monumentis, &c."* In the same year Mabillon was sent at the king's expence into Italy, with the same view as he had been formerly sent into Germany, and was received at Rome with great respect; he had free access granted him to all the archive, and to all the libraries, from which he collected a vast number of interesting and important papers, adapted to the design of his journey. On his return to France he carried with him a fine collection of books and rare MSS. which he placed in his majesty's library; and in 1687 he published an account of his journey, and of the pieces which he had discovered, under the title of *"Museum Italicum, seu Collectio veterum Scriptorum ex Bibliothecis Italicis eruta, &c."* in two volumes 4to. In 1688, father Mabillon engaged in a dispute between the Benedictines of Burgundy, and the canons regular, on the subject of the precedence of those orders in the choir, and, in 1701, he entered into a controversy with father Rance, abbot of La Trappe, who maintained, that learning and the sciences were foreign to the monastic profession, and who had prohibited the monks almost all sorts of reading excepting that of the scriptures and certain moral treatises. In 1695 he published a work, which involved him in much controversy and a very serious difficulties, entitled *"Eusebii Romani ad Theophilum Galum Epistolæ de Cultu sanctorum Ignotorum."* It was received by the superstitious and interested, particularly at Rome, in a most unfavourable manner. For some time it was attacked only by complaints, murmurs, and criticisms published

published in Germany, France, and Italy; but in 1701 it was brought before the congregation of the *Index*, by whom the author would unquestionably have been censured, if he had not agreed to reprint it with such alterations, emendations, and omissions as should be suggested to him. In the same year Mabillon was chosen honorary member of the Academy of Inscriptions, and published the first volume of the last great work to which he devoted his labours, entitled "*Annales Ordinis S. Benedicti in quibus non modo res Monasticæ, sed etiam Ecclesiasticæ Historiæ non minima pars continetur.*" The second, third, and fourth volumes succeeded, and the fifth was composed by Mabillon, but not published till after his decease. Mabillon died in December 1707, soon after he had completed his seventy-fifth year. In speaking of his great merit, Dupin says, "The voice of the public, and the general esteem of all the learned, are a much better commendation of him than any thing which we can say. His profound learning appears from his works; his modesty, humility, meekness, and piety, are no less known to those who have had the least conversation with him. His style is masculine, pure, clear, and methodical, without affectation or superfluous ornaments, and suitable to the subjects of which he has treated." In 1724 the posthumous works of our author were published in three volumes 4to. by Thuillier. Moreri. Dupin.

MABLY, BENNET DE, abbé, an eminent political writer, was born at Grenoble in 1709. He was brother of the abbé Condillac, whom he resembled in acuteness and penetration. He devoted himself to the study of literature, and died at Paris in 1785. His principal works are "Observations on the Greeks;" "Observations on the Romans;" "Parallel of the Romans and French;" "Observations on the History of France;" "Discourses on History." All the writings of this author display deep thinking, sound moral principles, and a great regard for the good of mankind. He is, however, thought to be too much of a panegyrist of the ancients, and too fond of applying their political maxims to the very different circumstances of modern states. The work of his old age, entitled "*Sur les Constitutions des Etats Unis de l'Amerique,*" gave offence by some sentiments adverse to civil liberty and religious toleration.

MABOUJAS, the *Devil-lizard*, in *Zoology*, a species of American lizard, so called from its ugliness and disagreeable aspect. It grows to six or seven inches long, and to the thickness of a thumb, and is found in the trunks of rotten trees, and in marshy places, where the sun-beams seldom reach; it is all over of a glossy black colour, and looks as if smeared over with oil.

MABOUL, JAMES, in *Biography*, an eminent French prelate, distinguished for his pulpit eloquence, and particularly for his orations delivered in praise of deceased persons of merit, was descended from a family of high rank. He obtained considerable eminence in the church, and was employed by the duke of Orleans, the regent, in a fruitless attempt to reconcile the hostile parties who were contending about the bull *Unigenitus*. His funeral discourses were published in one volume 12mo. in 1749: they are said to be distinguished by that sweetness of style, that nobleness of sentiment, that elevation, that unction, and that touching simplicity, which are the characteristics of a good mind, and of true genius. Moreri.

MABRA, in *Geography*, a town of Algiers, in the gulf of Bona; 10 miles W. of Bona.

MAC, an Irish word signifying *son*; frequently prefixed to surnames; as *Macdonald*, for Donald's son; *MacLaurin*, for Laurence's son, &c.

MACA, in *Geography*, a town of Africa, in Hoval; 20 miles from the mouth of the Senegal.

MACABALAR BAY, a bay on the N.W. coast of the island of Mindanao.

MACABRA, a town of Africa, in Sennaar; 40 miles S.S.W. of Meroe.

MACACO, in *Zoology*. See LEMUR *Macaco*.

MACADRA, in *Geography*, a town of Arabia, in Yemen; 32 miles S. of Chamir.

MACÆ, in *Ancient Geography*, a people of Africa, E. of the Nufamones and near the sea. Some have supposed they are the same with those called Syrtites by Ptolemy, because they inhabited towards the Great Syrtis. The Cinyps watered their country, and hence Silius Italicus denominates them Cinyphii Macæ.

MACAENS de Caminho, in *Geography*, a town of Portugal, in Estremadura; 33 miles S.S.E. of Coimbra.

MACAIRE, ST., a town of France, in the department of the Gironde, and chief place of a canton, in the district of La Reole. The place contains 1483, and the canton 9980 inhabitants, on a territory of 102½ kilometres, in 15 communes.

MACALLESTER'S BAY, a bay on the E. coast of the island of Mull. N. lat. 56° 30'. W. long. 5° 45'.

MACALUNGO, a town of Africa, in Mozambique. S. lat. 17°. E. long. 39°.

MACAM, *Indian apple*, in *Natural History*, the name of a common East Indian fruit: it is of a round shape, and about the size of our common wild crabs which grow in the hedges: instead of the several small seeds, which our crabs and apples contain, this fruit has only one hard kernel; it is of an acid taste, and of a raw and not very agreeable smell; the tree which produces this fruit does not grow to any height: it resembles the quince tree in its leaves, except that they have a yellowish cast. Mem. Acad. Par. 1699.

MACAN, in *Geography*, a town of Persia, in Khorasan; 60 miles W. of Meru-Shahighian.

MACANAO, a small island in the Caribbean sea, near the W. coast of Margarita. N. lat. 11°. W. long. 64° 40'.

MACANEA, in *Botany*, is a name adopted by Jussieu for the *Macabanea* of Aublet described in the supplement of his Plants of Guiana, and figured in t. 371 of that work. Neither of those authors had seen any of the parts of fructification except the *berry* and *seeds* which are thus described. *Peric.* Berry large, pear-shaped, of one cell, pulpy within; its outside leathery, sprinkled with red spots. *Seeds* from four to six, ovate, leathery, covered with a membrane and lying in a white pulp. Aublet, who found this plant in fruit in June, calls it by the specific name of *guianensis*, with the following description.—*Shrub* putting forth numerous *branches*, twisting themselves about the neighbouring trees. *Leaves* opposite, on footstalks, toothed, ovate, acute, smooth. *Fruit* axillary, in clusters.—From the imperfect state in which *Macanea* is known, we cannot pronounce to what class it belongs. Jussieu ranks it amongst the Natural Order of *Guttifera*, and says that it is nearly allied to *Mammea* and *Singana*.

MACANNA, in *Geography*, a kingdom of Africa, S. of Bambouk.

MACAO, a town of Portugal, in Estremadura; 12 miles N.E. of Abantes.

MACAO, a sea-port town of China, in the province of Quang-tong, situated at the mouth of the Tigris, in the entrance of the bay of Canton, and built on a peninsula, or rather a small island, because it is separated from the land by a river, where the ebbing and flowing of the sea are sensibly felt. This tongue of land is joined to the rest of the island only by a small neck, about 100 yards across. The Portuguese obtained this port from the emperor Camly, as a reward for the assistance they gave to the Chinese in destroying the pirates, who from the islands in the vicinity of Canton infested the seas and ravaged all the coasts of China. Some writers pretend, that this city had no inhabitants but pirates when the Portuguese formed an establishment in it; and that they were only permitted to build huts covered with straw. However this be, their whole extent of territory, bounded by a wall, is not more than eight miles in circumference. In this small spot, the Portuguese carried on, for a long time, almost exclusively, a considerable traffic with the Chinese empire, and with other countries in Asia, particularly Japan, Tonquin, Cochin-China, and Siam. But by the luxury occasioned by increase of wealth and the injurious oppression of the Chinese, the enterprising spirit of the Portuguese declined, and the inhabitants of Macao became enervated by a tropical climate. Their trade to Japan failed; their other speculations became precarious; and this once prosperous settlement is now very much reduced. The houses at Macao are built after the European manner, but they are low, and make little show. Here are 13 churches and chapels, and 50 priests, to minister to the devotion of between four and five thousand laity. Of the two pagan temples at Macao, belonging to the Chinese, one is curiously situated among a confused heap of immense masses of granite. This temple is comprised of three separate buildings one over the other; the only approach to which is by a winding flight of steps hewn out of the solid rock. The cave of Camoens, situated a little above the loftiest eminence in the town, was constructed, probably, in the same manner as the temple above described, by bringing together a vast number of rocks. This cave, from a tradition current in the settlement, belonged to Camoens, a Portuguese poet, who resided a considerable time at Macao, and in which cave, it is said, he wrote the celebrated poem of the *Lusiad*. The whole population of Macao, according to the statement of La Perouse, may be computed at 20,000, of whom 100 are Portuguese by birth, 2000 metis, or half Indians and half Portuguese, with as many Caffre slaves, their domestics. The rest are Chinese, who employ themselves in commerce and different trades, by which they lay the Portuguese under contribution to their industry. These last, though almost all Mulattoes, would think themselves disgraced, if they supported their families by exercising any mechanic art, though their pride is not above continually soliciting charity, with importunity, from every one that passes by them.

The road-head of Macao is sufficiently spacious to contain 60 gun-ships at the entrance of Typa; and in its harbour, which is below the town, and communicates with the river up to the eastward, ships of seven or eight hundred tons, with half their lading. The mouth of this harbour is defended by a fortress of two batteries, which must be kept within pistol-shot in entering. Three small forts, two of which are mounted with twelve guns, and the third with six, protect the south side of the town from every attempt of the Chinese. These fortifications, which are in the worst possible state, would be far from formidable to Europeans, but they may easily overawe all the maritime forces of the

Chinese. A mountain also commands the road, where a detachment of troops could hold out a very long siege. The Portuguese of Macao, more devout than warlike, have built a church on the ruins of a fort, which covered this mountain, forming, at that time, an impregnable post. The side next the land is defended by two fortresses, one of which is mounted with 40 guns, and capable of containing a garrison of 1000 men. It is provided with a cistern, two springs of running water, and casemates for laying up warlike ammunition and provisions. The other, which mounts 30 guns, cannot receive above 300 men, and has a very abundant spring that never fails. These two citadels command the whole country. The Portuguese frontiers extend nearly a league from the town, and are bounded by a wall guarded by a mandarin and a few soldiers. This mandarin is the true governor of Macao, whom all the Chinese obey, though he is not allowed to sleep within these limits. But he may examine all the fortifications, inspect the custom-houses, &c.; and on these occasions the Portuguese are obliged to give him a salute of five guns: but no European can make a single step on the Chinese territory, beyond the wall, which would subject him either to imprisonment or a heavy contribution. The palace of the Chinese mandarin is in the middle of the city; and the Portuguese are constrained to pay a tribute of 100,000 ducats for the liberty of choosing their own magistrates, exercising their religion, and living according to their own laws. The viceroy of Goa nominates to all civil and military offices at Macao, and appoints the governor and all the senators, who participate in the civil authority. He has lately fixed the garrison at 180 Indian seapoys, and 120 militia-men, whose service consists in patrols at night. The soldiers are armed with sticks, and the officer alone has the privilege of wearing a sword: though he can on no occasion employ it against a Chinese. The senate of Macao is composed of the governor, who is president, and three "verendores," who are the auditors of the city finances. The revenue consists of the duty laid on merchandize, which can only be imported in Portuguese vessels. If Macao were made a free port, and had a garrison capable of defending commercial property, when deposited there, the revenue of their custom-house would be doubled, and would be adequate to all the expences of the government. But a trifling interest pertaining to the viceroy of Goa, from selling Portuguese commissions to merchants of various nations who carry on a coasting trade in the East Indies, and presents from ship-owners to the senate of Macao, raise an insurmountable obstacle to the establishment of a free trade; though this would render Macao one of the most flourishing cities of Asia, and inconceivably superior to Goa, whose utility to its mother-country will never be considerable. Besides the "verendores," there are two judges of orphans, whose department includes the administration of the property of minors, the execution of wills, the nomination of tutors and guardians, and every thing relating to successions. From their decision an appeal lies to that of Goa. Other civil or criminal causes are also cognizable, in the first instance, by two senators, who are nominated as judges. A treasurer receives the produce of the customs; and his disbursements, above a certain amount, must be sanctioned by an order of the viceroy of Goa. The most important magistracy is that of the procurator of the city, which is an intermediate office between the Portuguese government and that of China. This office is for life; that of the governor is triennial; and the other magistrates are replaced every year. An appeal lies to Goa from all the decisions of the senate, which their notorious incapacity renders

renders indispensable. This city is rendered pleasant in appearance by the fine houses occupied by the supercargoes of the different companies, obliged to winter here; and their society enlivens the place. N. lat. 22° 12' 40". E. long. 129°. Grofier. De la Perouse.

In the folio volume annexed to Sir George Staunton's "Authentic Account of an Embassy from the King of Great Britain to the Emperor of China," there is a plan of the city and harbour of Macao; containing references to all the forts, colleges, convent, and other public buildings, and places of resort; and also the depth of water, and nature of the ground, in every part of the inner harbour, as well as in the bay between the peninsula and the northern entrance into the River; taken from an accurate survey made by a gentleman who is resident on the spot.

MACAO, *Alca*, a large town of Tonquin, at the bottom of a large bay, full of islands. N. lat. 21° 30'. E. long. 107°.

MACAO, *Macaca*, in *Ornithology*. See *PSITTACUS Macao*.

MACAPÁ, in *Geography*, a town of South America, in the government of Para, on the north bank of the river of the Amazons, nearly on the equinoctial line. W. long. 52°.

MACAQUO, in *Zoology*, the name of a large species of monkey called by Mr. Ray *Cercopithecus Angolensis major*, the great Angolan monkey. See *SIMIA Cynomolgus*.

They have another species of this kind also about Angola, which may be called the black macaquo. Its only colour is black; but on many parts of the back and sides, there is a greyish cast along it: this has a tail of remarkable length, being more than two feet long. See *SIMIA*.

MACAREGUA, in *Geography*, a town of the island of Cuba; 45 miles N.W. of Havana.

MACARAUX, in *Ornithology*. See *ALCA Arctica*.

MACARIA, in *Geography*, a town on the west coast of the island of Metelin; 10 miles W. of Metelin.

MACARIANS, in *Ecclesiastical History*, the followers of Macarius, an Egyptian monk, who was distinguished, towards the close of the fourth century, for his sanctity and virtue. In his writings there are some superstitious tenets, and also certain opinions that seem tainted with Origenism. The name has been also applied to those who adopted the sentiments of Macarius, a native of Ireland, who, about the close of the ninth century, propagated in France the error afterwards maintained by Averroës, that one individual intelligence or soul performed the spiritual and rational functions in all the human race.

MACARIUS, Sr., in *Biography*, a famous anchorite of the fourth century, was a native of Alexandria. He spent sixty years in a monastery, and is said to have been a disciple of St. Anthony, the first institutor of a monastic life. He died in the year 391, when he was about ninety years of age. Fifty homilies have been attributed to him: these were first published in Greek, at Paris, in 1559. He is supposed to have been the author of many smaller tracts, "On Prayer," "Watching the Heart," "Perfection of the Mind," &c. The best edition of his pieces is that published at Leipzig in 1608. Moreri.

MACARIUS, *St.*, the *Franger*, a celebrated monk, likewise a native of Alexandria, who had 5000 monks under his direction. Of his sanctity, virtues, and abstinence, wonders are related by Palladius. He was banished by the Arians to an island inhabited by heathens, whom he converted to, what was called at that period, Christianity. He died about the year 404, when he was nearly 100 years of age. To him have been attributed "Rules for Monks,"

in 30 chapters, first published in Latin by Peter Roverius the Jesuit. Moreri.

MACARIUS, *St.*, *Desert of*, in *Geography*, a desert on the west part of Egypt, denominated in honour of a saint, to whose honour a convent of monks has been founded, anciently called "Nitria." The convent is about 50 miles N.N.W. of Cairo.

MACARON, the name of a sort of vermicelli, a paste made of flour and water, and formed in the shape of the barrel of a large quill, or the guts of small fowls.

MACARONIC, or MACARONIAN, a kind of burlesque poetry; consisting of a jumble of words of different language, with words of the vulgar tongue latinized, and Latin words modernized.

Macaron, among the Italians, as has been observed by Cælius Rhodigianus, signifies a coarse clownish name; and because this kind of poetry, being patched out of several languages, and full of extravagant words, is not so polite and smooth as those of Virgil, &c. the Italians, among whom it had its rise, gave it the name of Micaronian or Macaronic poetry. Others choose to derive it a *Macaronibus*, from *Macaro* or *Macare*, a kind of confection made of most not bolted, sweet almonds, sugar, and the whites of eggs; accounted a great dainty among the country people in Italy; which, from their being composed of various ingredients, occasioned this kind of poetry, which consists of Latin, Italian, Spanish, French, English, &c. to be called by their name.

Theoph. Folingius, a Benedictine monk of Mantua, was the first who invented, or at least cultivated, this kind of verse: for though we have a Macaronea Ariminensis in a very old letter, beginning, "Eli auctor Typhis Leoniceus atque Parafus;" yet it seems to have been the work of Guarinus Capellus Sarnas, who, in the year 1256, printed six books of Macaronic poetry, in Cabrinum Gagamonæ Regem; but as both those came out after the first edition of Folingius, which was published under the name of Merbicus Coccejus in 1520, so they were likewise much inferior to his in the style, invention, and episodes, wherewith he has enriched the history of Baldus; which makes the subject of his poem. The famous Rabelais first transferred the Macaronic style out of the Italian verse into French prose, and on the model thereof formed some of the best things in his Pantagruel.

We have scarce any thing in English in the Macaronian way, except some little loose pieces collected in Camden's *Remains*; which is no discredit to our authors: for one may say, of such pieces in general,

"Turpe est difficiles habere nugas,
Et nullus labor est ineptiarum."

But the Germans and Netherlanders have had their Macaronic poets: witness the "Certamen Catholicum cum Calvinistis" of one Martinus Hancinius Frisius, which contains about twelve hundred verses, all the words whereof begin with the letter C.

MACAROON. See MACARONIC.

MACAROWA, in *Geography*, a town of Poland, in the palatinate of Kiev; 24 miles N.W. of Kiev.

MACARACA, a town of Dalmatia, and see of a bishop, suffragan of Spalatro; situated in a territory, formerly pleasant and fertile, and convenient for commerce, but more lately deteriorated, and supposed to have arisen out of the ruins of the ancient Retinaum or Retinum; 36 miles E.S.E. of Spalatro.

MACARTNEY,

MACARTNEY, GEORGE, *Earl of*, in *Biography*, the son of George Macartney, esq. of Auchinleck in Scotland, was born in Ireland in 1737, and was educated as a fellow-commoner in Trinity-college, Dublin, where he took his degrees in 1759. Shortly after this, he travelled with the sons of the late lord Holland. This, perhaps, was his introduction to court. His education had been liberal, and he had improved the advantages which he possessed from a fortunate train of circumstances. He had an aspiring mind, and excellent talents, and was ambitious of some public employment. His own wishes were seconded by the zeal of his friends, and he was, in 1764, appointed envoy extraordinary to the empress of Russia. The object of this mission, and of the appointment of this young man, was the great importance of the commercial and political relations between Great Britain and the empire of Russia; and it was necessary, at that period, to counteract the influence of France at the Russian court.* The character and policy of that court required to be particularly studied: and hence the embassy from this country included an office that required much penetration, vigilance, and discretion, as well as insinuating manners, and an agreeable address. These qualifications were thought, by the most discerning judges, to be united in Mr. Macartney. The principal business of his mission was to negotiate a commercial treaty, for the benefit of the Russian merchants trading to Russia. Of the interests of the Russian trade he was well informed. His address surmounted every difficulty of access to the empress and her ministers: he knew how to seize the proper moment for negotiation; and he had coolness and patience to conquer every obstacle which might be opposed to his views by the artifices of others. He in a short time procured the Russian court to agree to a treaty satisfactory to the wishes of the British merchants at Petersburg, and suitable to the instructions which he had received at home. An address from the merchants of the British factory at St. Petersburg; the honour of the knighthood of the Polish order of the White Eagle, conferred by a monarch who was himself at once a man of fashion, taste, and pleasure, and a man of political talents; and the elevation to the character of ambassador extraordinary and plenipotentiary from the British court, in which he finally concluded the treaty of commerce, were, among the testimonies of approbation and respect which sir George Macartney obtained by his conduct in this diplomatic mission to the north. Thus successful and distinguished, he returned to the British court about the close of the year 1767. Early in the following year he married lady Jane Stuart, second daughter of the earl of Bute. By this marriage he had contracted a relationship to sir James Lowther, afterwards the earl of Lonsdale; and by that gentleman's interest with, or influence over, the electors, he was chosen, in the same year, one of the representatives of the borough of Cockermouth; after which we find him chosen a representative in the Irish parliament for the borough of Armagh. In 1769 sir George was nominated principal secretary to the late marquis Townshend, in the high office which he then filled of lord lieutenant of Ireland. In 1772 he was nominated by his sovereign knight of the Bath, and in 1775 went out as governor of Grenada and Tobago. He continued there till 1779, when, on the capture of those islands by the French, he was taken prisoner, and sent to France. In 1776 he had been made an Irish peer by the title of lord Macartney, baron Liffanoure, in the county of Antrim. As the loss of Grenada had not occurred from any misconduct in him, but the defence of it had indeed been signalized by the most illustrious display of all his great qualities, he met with a very gracious reception from his

sovereign on his return. In 1780 he was chosen to represent Beeralstone in the British parliament; and in the following winter he was appointed governor and resident of Fort St. George at Madras, in the East Indies: and he went without delay to discharge the functions of his appointment, where his conduct obtained such universal approbation, that, in 1785, he was appointed to the high office of governor-general of Bengal; which honour, however, after due consideration, he chose to decline, and returned to England. In 1786 he received a flattering testimony of respect from the court of directors of the East India company, who granted him an annuity for his life of 1500*l. per annum*, which was bestowed as a reward for the important services which this illustrious nobleman had rendered to the company. The same year he fought a duel with general Stuart, whom he had superseded in India. In 1788 he took his seat for the first time in the Irish house of peers; and about the same time was appointed one of the trustees of the linen manufacture for the province of Ulster, and also custos rotulorum for the county of Antrim. He was promoted likewise to the command of a regiment of dragoons in the Irish militia. In 1792 he was selected as the fittest person for ambassador from the king of Great Britain to the emperor of China. He was on the same day nominated a privy-counsellor; and in a few weeks he was raised to the rank of an Irish viscount, under the title of viscount Derwock, in the county of Antrim. He now proceeded, without delay, on his embassy, attended by sir George Staunton as his secretary, and a great train of followers and servants. A ship of war, under the command of sir Erasmus Gower, was, with smaller vessels, assigned for his voyage. Many rich presents were sent from the British to the Chinese sovereign. He arrived in safety in the Indian seas; and when his approach was announced at the Chinese court, the emperor and his minister agreed, though not without some hesitation, to receive the ambassadors and presents. In his approach to Peking, the northern capital of the empire, his lordship was obliged to direct his voyage round the South sea coast of China, by a tract hitherto almost unknown to European navigators. The opportunity of exploring that tract was regarded as almost sufficient to compensate for all the difficulties and expence of the embassy. As soon as he landed, mandarins of the highest rank were appointed to conduct him to the imperial court. His presents were accepted, and he, with all his train, were treated in a hospitable, and even sumptuous manner: but the main object of the mission was completely frustrated, *viz.* to obtain permission for the permanent residence of a British ambassador at the court of China. This was absolutely refused, and lord Macartney and his train returned over land. His lordship entered Canton in December 1793; and from thence he proceeded to Macao; and in March 1794, he sailed from that port to Europe. He arrived in England in the following September, after an absence of almost two years. On his return he was created an Irish earl; and in 1796 he was farther advanced to the dignity of a British peer, by the title of baron Macartney of Parkhurst, in Suffex. After this, he was called to the administration. In this high station, as in the other offices which he filled, lord Macartney displayed qualities which are honourable to his talents as a statesman, and his feelings as a man. His lordship died on the 31st of March 1806. Monthly and European Magazines. British and Irish Peerages.

MACAS, in *Geography*, a province of the viceroyalty of New Granada, in South America, bounded on the east by the government of Maynas, south by that of Bracamoros and Yaguafongo, and on the west the east Cordillera of the Andes

divides it from the jurisdiction of Rio Bamba and Cuenca. Its chief town bears the splendid title of the city of Macas; and this is better known than its proper ancient name of Sevilla del Oro. It lies in S. lat. $2^{\circ} 30', 40'$ E. of Quito. Its houses, which do not exceed 130, are built of timber, and thatched. Its inhabitants are reckoned at about 12,000, who, as well as those of the whole district, are generally Mestizos with Spaniards. The other towns belonging to this jurisdiction are San Miguel de Narbaes, Barahonas, Yuquipa, Juan Lopez, Zuna, Payra, Copuena, and Aguayos. The spiritual government of all these towns is lodged with two priests; one of whom, residing in the city, has the care of the four first; and to the latter, who lives at Zuna, belongs that town and the three others. At the conquest, and for some time after, this country was very populous, and, in honour of the great riches drawn from its capital, was distinguished by the name of Sevilla del Oro; but at present only the memory of its former opulence remains. The proximity of Macas to the Cordillera of the Andes occasions a sensible difference betwixt its temperature and that of Quixos adjoining to it. The winter here begins in April, and lasts till September, which is the time of summer betwixt the Cordilleras; and at Macas the fine season is in September, and is the more delightful on account of the winds, which are then mostly northward. In grains and other products, which require a hot and moist temperature, the country is very fruitful; but one of the chief occupations of the country people here is the culture of tobacco, which, being of an excellent kind, is exported in rolls all over Peru. Sugar-canes also thrive well, and likewise cotton. Among the infinite variety of trees, which crowd the woods of this country, one of the most remarkable is the florax, distinguished by the exquisite fragrant of its gum. The territory belonging to Macas also produces cinnamon trees of an excellent quality. Great quantities of copal are brought from Macas, and also wild wax of little value, because it never indurates, and the smell of it, when made into candles, and these are lighted, is very strong and disagreeable. Juan and de Ulloa's Voyage to South America, vol. i.

MACAS, a town of Africa, in the kingdom of Hoval, near the mouth of the Senegal.—Also, a river of Portugal, which runs into the Atlantic, N. lat. $38^{\circ} 51'$. W. long. $9^{\circ} 25'$.

MACASIN, a town on the S. coast of the island of Midnao. N. lat. $7^{\circ} 45'$. E. long. $124^{\circ} 16'$.

MACASSAR, or MACASSER, a sea-port town of the island of Celebes, and the principal settlement of the Dutch in this island. It gives name to one of the two great kingdoms into which the island is divided, and the island itself is sometimes distinguished by this appellation. Under the article CELEBES, the reader will find a particular account of it. Of the town captain Carteret, who visited it in 1768, gives the following account. (See Hawkesworth's Voyages, vol. i.) It is built upon a kind of point or neck of land, and is watered by a river or two, which either run through or very near it. It seems to be large, and there is water for a ship to come within half cannon-shot of the walls: the country about it is level, and has a most beautiful appearance: it abounds with plantations and groves of cocoa-nut trees, with a great number of houses interspersed, by which it appears to abound with people. At a distance inland, the country rises into hills of a great height, and becomes rude and mountainous. The town lies in S. lat. $5^{\circ} 1'$, or $5^{\circ} 12'$. E. long. by account, $117^{\circ} 28'$.

MACASSAR, *Straight of*, a passage between the islands

of Borneo and Celebes. There is in this passage a remarkable point, called by captain Carteret "Hummock Point," but in the French charts denominated "Stroomen Point." N. lat. $1^{\circ} 20'$. E. long. $121^{\circ} 39'$. This point is a good mark for those to know the passage that fall in with the land coming from the eastward, who, if possible, should always make this side of the passage. To the southward of this point there is a deep bay, full of islands and rocks, which appeared to Carteret to be very dangerous. Just off the point there are two rocks, which, though they are above water, cannot be seen from a ship till she is close to the land. To the eastward of this point, close to the shore, are two islands, one of them very flat, long, and even, and the other swelling into a hill, but both were covered with trees. Hawkf. Voy. vol. i.

MACASSAR *Poison*, in *Natural History*, called *ippo*, or *upas*, in the Macassar and Malayan tongue, is the gum of a certain tree, shining, brittle, black, and every way like stone-pitch, growing in the island of Celebes, in the South Seas; with which all the natives arm themselves in travel, having a long hollow trunk of a hard red-wood like Brazil, accurately bored, and at one end is fixed a large lance-blade of iron. Then they make a small arrow very straight, and somewhat bigger than a large wheat straw: at one end they fix it into a round piece of white, light, soft wood, like cork, about the length of the little finger, just fit for the bore of the trunk, to pass clear by the force of one's breath, and to fill it so exactly, that the air may not pass by, but against it, in order to carry it with the greater force. At the other end they fix it either in a small fish-tooth for that purpose, or make a blade of wood of the bigness of the point of a lancet, about three-quarters of an inch long, and making a little notch at the end of the arrow, they strike it firm therein, which they anoint with poison. The poisonous gum, when gathered, is put into hollow bamboos or canes, stopped up very close, and thus brought to Macassar. When they fit it for use, they take a piece of smooth turtle shell, and a stick cut flat and smooth at the end: then they take green galangal root, grate it, and with the addition of a little fair water, press the juice into a clean china dish: then with a knife, scraping a little of the poison upon the shell, dip the end of the stick in the fore-mentioned liquor, and with this dissolve the poison, to the consistence of a syrup: when this is done, they anoint the fish-tooth or wooden blade with the same stick and lay them in the sun, so that it may be baked hard. The pointed arrows thus prepared are put in hollow bamboos, close shut, and in this state they retain their virtue for a month. Birch's Hist. of the Royal Society, vol. ii. p. 44.

Rumphius, a respectable author in *Natural History*, of the 17th century, mentions a tree growing at Macassar, to which he gives the name of *Toxicaria*; and relates, that not only the red resin contained a deadly poison, but that the drops falling from the leaves upon the men employed in collecting this resin from the trunk, produced, unless they took particular care in covering their bodies, swellings and much illness; and that the exhalations from the tree were fatal to some small birds attempting to perch upon its branches. But many of the particulars of this account, though far removed from that of the supposed Upas, or poison-tree of Java by Foersch, who had been for some time a surgeon in Java, and who had travelled into some parts of the interior of the country, are given not upon the author's own observation, and may have been exaggerated. Foersch's relation of a tree so venomous as to be destructive, by its exhalations, at the distance of some miles, is compared

compared at Java to the fictions of Baron Munchausen, or as a bold attempt to impose upon the credulity of persons at a distance. Foerch's account, however, was admitted in a note to Darwin's celebrated poem of the Botanic Garden, and this circumstance led Dr. Gillan, and others belonging to Macartney's Embassy to China, to make inquiries into the fact: and the result was as we have above stated it. It is, indeed, a common opinion at Batavia, that there exists, in that country, a vegetable poison, which, rubbed on the daggers of the Javanese, renders the slightest wounds incurable; though some European practitioners have of late asserted that they had cured persons stabbed by those weapons; but not without the precaution of keeping the wound long open, and procuring a suppuration. One of the keepers of the medical garden at Batavia, assured Dr. Gillan, that a tree distilling a poisonous juice was in that collection; but that its qualities were kept secret from most people in the settlement, lest the knowledge of them should find its way to the slaves, who might be tempted to make an ill use of it. Staunton's Embassy, vol. i. p. 273. See POISON.

MACATES, in *Geography*, a town of South America, in the province of Carthage; 25 miles S.E. of Carthage.

MACAULAY, CATHARINE, in *Biography*, a distinguished writer in history and politics, the youngest daughter of John Sawbridge, esq. of Ollantigh, in the county of Kent, was born in the year 1733. She appears to have imbibed, from a very early period, a zealous attachment to the principles of liberty, which the historians of Greece and Rome had infused into her heart. The impressions made upon her mind in her youth were never obliterated. In 1760 she married Dr. George Macaulay, a physician of London. Soon after this, she commenced her career in literature, and in 1763 published the first volume, in quarto, of her "History of England, from the accession of James I. to that of the Brunswick Line." This work was completed in eight volumes in 1783: it was read with great avidity at the period of its publication, but has since fallen into so much disrepute, as scarcely ever to be enquired after. It was written in the pure spirit of republicanism, but it unquestionably had too much of party spirit in it to admit of that partiality which ought to be the characteristic of true history. While in the height of her fame, Mrs. Macaulay excited the admiration of Dr. Wilson, rector of St. Stephen's, Wallbrook, who conferred on her the unprecedented honour of placing her statue, while living, in the chancel of his church, which his successor thought himself justified in removing. Having been left a widow, Mrs. Macaulay, in 1778, married Mr. Graham, a step, in which the great disparity of years exposed her to some ridicule. In 1785 she went to America, for the purpose of visiting the illustrious Washington, with whom she had before maintained a correspondence. She died in the year 1791. Her works, besides the history already referred to, which may be regarded as the principal, are "Remarks on Hobbes's Rudiments of Government and Society;" "Loose Remarks on some of Mr. Hobbes's Positions;" the latter being an enlarged edition of the former: the object of these is to shew the superiority of a republican to a monarchical form of government. In 1770, Mrs. Macaulay wrote a reply to Mr. Burke's celebrated pamphlet entitled "Thoughts on the Causes of the Present Discontents:" and in 1775 she published "An Address to the People of England, Scotland, and Ireland, on the present important Crisis of Affairs." She wrote also "A Treatise on the Immutability of Moral Truth:" which she afterwards re-published, with much other original matter, under the title of "Letters

on Education." This work was published in 1790, at a period when men's minds were ready to admit bold theories on almost any subject, and it obtained much attention from the public. The author shewed herself an animated writer, and a shrewd and acute reasoner. It will unquestionably repay any one, interested in the subject, the labour of a careful perusal.

MACAW, MACCAW, or *Macao*, in *Ornithology*, the name of a large species of parrot, distinguished also by the length of its tail. See PSITTACUS.

MACAW Tree, in *Botany*. See COCOS.

MACAY, in *Geography*, a town of Africa, in the kingdom of Damel. N. lat. 15° 10'. W. long. 15° 55'.

MACBETH. This admirable tragedy of our matchless dramatist, Shakspeare, from the songs of the witches, as set by Matthew Lock in the time of Charles II., was regarded as a kind of opera. See DRAMATIC Music.

MACBETH, in *Biography*, an usurper and tyrant, whom the immortal Shakspeare has consigned to everlasting infamy, flourished in Scotland about the middle of the 11th century. At this period Duncan was king, a mild and humane prince, but not at all possessed of the genius and disposition for governing a country so turbulent, and so infested by the intrigues and animosities of the great. Macbeth, a powerful nobleman, and nearly allied to the crown, not contented with curbing the king's authority, carried still farther his mad ambition: he murdered Duncan at Inverness, and then seized upon the throne. Fearing lest his ill-gotten power should be stripped from him, he chased Malcolm Kenmore, the son and heir, into England, and put to death Mac Gill and Banquo, the two most powerful men in his dominions. Macduff next becoming the object of his suspicions, he escaped into England, but the inhuman usurper wreaked his vengeance on his wife and children, whom he caused to be cruelly butchered. Siward, whose daughter was married to Duncan, embraced, by Edward's orders, the protection of this distressed family. He marched an army into Scotland, and having defeated and killed Macbeth in battle he restored Malcolm to the throne of his ancestors. The tragedy founded upon the history of Macbeth, though contrary to the rules of the drama, contains an infinity of beauties with respect to language, character, passion, and incident, and is thought to be one of the best pieces, of the very best master in this kind of writing, that the world ever produced. "The danger of ambition," says Dr. Johnson, "is well described; and the passions are directed to their true ends." And the author of the *Philosophic Arrangements* says, "it is not only admirable as a poem, but one of the most moral pieces existing." Hume's Hist. Biog. Dramatica: Shakspeare Illustrated.

MACBRIDE, DAVID, M.D. a distinguished physician, was born at Ballymony, in the county of Antrim, on the 26th of April, 1726. He was descended from an ancient family of his name in the shire of Galloway, in Scotland; but his grandfather, who was bred to the church, was called to officiate at Belfast to a congregation of Presbyterians, and his father became the minister of Ballymony, where David was born. Having received the first elements of his education at the public school of this place, and served his apprenticeship to a surgeon, he went into the navy, first in the capacity of mate to an hospital-ship, and subsequently in the rank of surgeon, in which station he remained for some years preceding the peace of Aix-la-Chapelle. At this period he was led, from the frequent opportunities of witnessing the attacks of scurvy, which a seafaring life afforded him, to investigate the best method of cure for that disease, upon which he afterwards published a

treatise. After the peace of Aix, Mr. Macbride went to Edinburgh and London, where he studied anatomy under those celebrated teachers Doctors Monro and Hunter, and midwifery under Smellie. About the end of 1749, he settled in Dublin as a surgeon and accoucheur; but his youth and remarkable bashfulness occasioned him to remain a number of years in obscurity, little employed; although he was endeared to a small circle of friends by his great abilities, amiable dispositions, and his general knowledge in all the branches of polite literature and the arts. In 1764, he published his "Experimental Essays," which were every where received with great applause, and were soon translated into different languages; and the singular merit of this performance induced the university of Glasgow to confer the degree of doctor of physic on its author. The improvement introduced by Dr. Macbride in the art of tanning, by substituting lime-water for common water in preparing ooze, procured him the honour of a silver medal from the Dublin Society, in the year 1768, and of a gold medal of considerable value from the Society of Arts and Commerce in London.

For several years after Dr. Macbride obtained his degree, he employed part of his time in the duties of a medical teacher, and delivered, at his own house, a course of lectures on the theory and practice of physic. These lectures were published, in 1772, in one vol. 4to., under the title of "An Introduction to the Theory and Practice of Medicine," and a second edition appeared in 1777. It was translated into Latin, and published at Utrecht, in 2 vols. 8vo. in 1774. This work displayed great acuteness of observation, and very philosophical views of pathology, and contained a new arrangement of diseases, which was deemed of so much merit by Dr. Cullen, that an outline of it was given by that celebrated professor, in his Compendium of Nosology. Of the five classes, however, into which Dr. Macbride distributed diseases, the genera and species of the first only were detailed.

The talents of Dr. Macbride were now universally known, his character was duly appreciated, and his professional emoluments increased rapidly; for the public, as if to make amends for former neglect, threw more occupation into his hands, than he could accomplish either with ease or safety. Although much harassed both in body and mind, so as to have suffered, for some time, an almost total incapacity for sleep, he continued in activity and good spirits until the end of December 1778, when an accidental cold brought on a fever and delirium, which terminated his life on the 13th of that month, in the 53d year of his age: his death was sincerely lamented by persons of all ranks. See Edin. Med. Commentaries, vol. vii. p. 105. Cullen, Synops. Nosol. Method. vol. i.

MACCABÆUS, **JUDAS**, a valiant leader of the Jews, was the third son of Mattathias, of the Asmonæan family, whom he succeeded as general of his nation in the year 166 B.C. At this period the Jews were in a state of revolt against Antiochus Epiphanes, and Judas, with a small body of men, harassed the Syrians, Samaritans, and apostate Jews, and filled the country with the terror of his name. After some important successes, and being left master of the field, Judas marched to Jerusalem, where he purified the city and temple, the latter of which was again dedicated, and a commemorative festival, on this occasion, was instituted, which was ordered to be perpetual. The death of Antiochus gave the Jews some respite, but hostilities were soon renewed, and Judas displayed his usual vigour and military prowess. Lyfias, the commander of the Syrians, was now his chief antagonist: him he defeated and obliged to

seek terms of peace. After this the Syrian general invaded Judea a second time, and obliged Judas to take refuge in Jerusalem. He besieged the city, which would, probably, notwithstanding the valour of its defender, have been obliged to surrender for want of provisions, had not the hostile army been hastily recalled by a rebellion in their own country. After Demetrius Soter had obtained the crown of Syria, the war with the Jews was renewed: Bacchides, marching with the flower of his army, surprised Judas at the head of a small body of men, of whom, all but eight hundred, deserted at the approach of the enemy. With these he made a desperate resistance, till he fell upon a heap of slaughtered enemies. This was in the year 161 B.C.: the news of his death caused the utmost grief and consternation at Jerusalem, where a general mourning was made for him, and he was celebrated in songs, as one of the greatest heroes of the nation. His body was recovered, and interred in the sepulchre of his father at Modin. Books of Maccabees. Josephus.

MACCABEES, two apocryphal books of Scripture, containing the history of Judas and his brothers, and their wars against the Syrian kings in defence of their religion and liberties, so called from Judas, the son of Mattathias, (see **MATTATHIAS**,) surnamed *Maccabeus*, as some say from the word מַכְבִּי, formed of the initials of **מַלְכֵּנוּ יְהוֹדָה**, *q. d. Who is like unto thee, O Lord, among the Gods* (Exod. xv. 11.); which was the motto of his standard: whence those who fought under his standard were called Maccabees, and the name was generally applied to all who suffered in the cause of the true religion, under the Egyptian or Syrian kings. This name, formed by abbreviation according to the common practice of the Jews, distinguished Judas Maccabæus by way of eminence, as he succeeded his father B.C. 166 in the command of those forces, which he had with him at his death, and being joined by his brothers, and all others that were zealous for the law, he erected his standard, on which he inscribed the above-mentioned motto. Those also who suffered under Ptolemy Philopater of Alexandria, fifty years before this period, were afterwards called Maccabees; and so were Eleazar, and the mother and her seven sons, though they suffered before Judas erected his standard with the motto, from which the appellation originated. And therefore, as these books which contain the history of Judas and his brothers, and their wars against the Syrian kings, in defence of their religion and liberties, are called the *first* and *second* books of the Maccabees; so that book which gives us the history of those, who, in the like cause, under Ptolemy Philopater, were exposed to his elephants at Alexandria, is called the *third* book of the Maccabees, and that which is written by Josephus of the martyrdom of Eleazar, and the seven brothers and their mother, is called the *fourth* book of the Maccabees.

The *first* book of the Maccabees is an excellent history, and comes nearest to the style and manner of the sacred historians of any extant. It was written originally in the Chaldee language, of the Jerusalem dialect, and was extant in this language in the time of Jerom, who had seen it. From the Chaldee it was translated into Greek, from the Greek into Latin, and also into English. Theodotion is conjectured to have translated it into Greek; but it was probably more ancient, as we may infer from its use by ancient authors, as Tertullian, Origen, and others. It is supposed to have been written by John Hyrcanus, the son of Simon, who was prince and high priest of the Jews near thirty years, and began his government at the time where this history ends. It contains the history of forty years, from

from the reign of Antiochus Epiphanes, to the death of Simon the high priest; that is, from the year of the world 3829, to the year 3869; 131 years before Christ. The *second* book of the Maccabees begins with two epistles sent from the Jews of Jerusalem to the Jews of Egypt and Alexandria; to exhort them to observe the feast of the dedication of the new altar erected by Judas, on his purifying the temple. The first was written in the 169th year of the era of the Seleucidae, *i. e.* before Christ 144; and the second in the 188th year of the same era, or 125 before Christ; and both appear to be spurious. After these epistles follows the preface of the author to his history, which is an abridgment of a larger work, composed by one Jason, a Jew of Cyrene, who wrote in Greek the history of Judas Maccabæus, and his brethren, and the wars against Antiochus Epiphanes, and Eupator his son. The two last chapters contain events under the reign of Demetrius Soter, the successor of Antiochus Eupator, and contain such varieties in their style, as render it doubtful whether they had the same author as the rest of the work. This second book does not, by any means, equal the accuracy and excellency of the first. It contains an history of about fifteen years, from the execution of Heliodorus's commission, who was sent by Seleucus to fetch away the treasures of the Temple, to the victory obtained by Judas Maccabæus over Nicanor; that is, from the year of the world 3828, to the year 3843, 157 years before Christ. Culmet.

There are in the Polyglot bibles, both of Paris and London, Syriac versions of both these books; but they, as well as the English versions which we have among the apocryphal writers in our bibles, are derived from the Greek. For a further account of Judas Maccabæus, and of his brothers, whose history is recorded in the first and second books of the Maccabees, and also by Josephus in his *Antiquities*; we refer to the article *JEWS*, and also to the biographical article *JUDAS MACCABEUS*. The *third* book of the Maccabees contains the history of the persecution of Ptolemy Philopater against the Jews in Egypt, and their sufferings under it; and seems to have been written by some Alexandrian Jew in the Greek language, not long after the time of Siracides. This book, with regard to its subject, ought to be called the first, as the things which are related in it occurred before the Maccabees, whose history is recorded in the first and second books; but as it is of less authority and repute than the other two, it is reckoned after them. It is extant in Syriac, though the translator did not seem to have well understood the Greek language. It is in most of the ancient manuscript copies of the Greek Septuagint, particularly in the Alexandrian and Vatican, but was never inserted into the vulgar Latin version of the bible, nor consequently into any of our English copies. The first authentic mention we have of this book is in Eusebius's *Chronicon*. It is also named with two other books of the Maccabees in the 85th of the apostolic canons. But it is uncertain when that canon was added. Grotius thinks that this book was written after the two first books, and shortly after the book of Ecclesiasticus, from which circumstance it was called the *third* book of Maccabees. Moreover, Josephus's history of the martyrs that suffered under Antiochus Epiphanes, is found in some manuscript Greek bibles, under the name of the *fourth* book of the Maccabees. This book, ascribed to Josephus, occurs under the title "Concerning the Empire or Government of Reason;" but learned men have expressed a doubt whether this was the book known to the ancients as the *fourth* book of the Maccabees. Philostratus, Eusebius, and St. Jerom, knew the book "Concerning the Government of Reason;" and ascribed it to

Josephus, by the name of the book of the Maccabees. St. Gregory Nazianzen, St. Ambrose, and St. Chrysostom, in the characters they have given of the seven Maccabees, and of old Eleazar, have plainly followed what we find in this book. The author has enlarged and adorned the history of Eleazar, and of the seven brothers the Maccabees, who are said to have suffered martyrdom with their mother, as it has been said, chiefly on the authority of Rufinus, who has given the names of the seven brothers, and of their mother, at Antioch. (2 Mac. vi. vii.) Others, however, have supposed, that the scene of the martyrdom of the seven brethren was at Jerusalem. As it was designed for an example of terror to the Jews of Judæa, it would have lost its force, if it had been executed any where else besides that country. Those who maintain that they suffered at Antioch, allege, that their tombs were shewn there in the time of St. Jerom, and that a church, dedicated under their name, was found there in the time of St. Austin. The first of the seven brethren, as the story is related, having declared to the king that he would die sooner than violate the laws of God, was seized by the executioners, who cut out his tongue, and the extremities of his hands and feet, and tore off the skin of his hand. While still alive, after being thus mangled, he was thrown into a burning pan, heated over a fierce fire. Such is the account in 2 Mac. vii. 2. The "Government of Reason" declares, that the executioner, having stripped off his clothes, tied his hands behind his back, and whipped him with scourges, without his indicating the least sign of pain. Afterwards they fixed him upon a wheel, where, after having had his limbs shattered to pieces, he expostulated with Antiochus, reproached him for his barbarity, and insulted him on account of all his unsuccessful attempts. Then the executioner, raising the wheel upon which he was extended, and lighting a fire under it, thus consumed him by a new torture. He died, exhorting his brethren to manifest a similar constancy. The other brothers also suffered by the most cruel tortures which the king could inflict; but it is needless to recount them. The mother of these martyrs also suffered death, as some say, by throwing herself into the fire, to evade the cruelty practised on her sons, and threatened to herself. The church of Rome has celebrated a feast, August 1, in honour of these martyrs; who were the first, and for a long time the only martyrs of the Old Testament, in honour of whom altars and temples were erected; and they are the only saints of that kind, for whom there remains an office or breviary commemorative in the Roman Breviary. The sufferings of these seven brethren, and likewise of Eleazar, related 2 Mac. c. vi. are entirely omitted in the first book of Maccabees; although the author of it there writes of the Jewish affairs, and of the sufferings of the Jews in the time of Antiochus. We add that there is not any notice taken of this Eleazar, or these seven brethren, or their mother, by Josephus, in any of his authentic writings; though he had twice a fair occasion of mentioning them, once in his "History of the Jewish War," l. i. and again in his "Antiquities," l. xii. cap. 5. It is presumed that he would have mentioned a fact so remarkable, if it had really occurred. As to the work above-mentioned, "Of the Empire of Reason," which has been ascribed to him, many learned men, as Cave says, deny it to be his; and Mr. Whiston, in his English translation of all the genuine writings of Josephus, has omitted this. Dr. Lardner thinks that it was the work of some Christian. This history wants certain internal characters of credibility. The fact itself is very extraordinary, inasmuch that it is very improbable, and almost incredible. The whole story has the appearance of

a contrived fiction. The sufferers are not described so particularly as they ought to be, and the relations generally are incredible. Besides, it is improbable that these seven brothers should have been examined, tortured, and slain, one after another, in the presence of king Antiochus; for such examinations and executions are generally delegated to officers: nor is it said, or even hinted, where these persons suffered. It has been said, however, that the writer of the epistle to the Hebrews refers to this history, and thus assures us of its truth. (Heb. xi. 35.) But it is very far from being clear or certain, that there is a reference to this history in that text. Hallet, Lardner, and others, deny it. See Lardner's Works, vol. xi. p. 269, &c.

MACCHERINI, LA SIGNORA, in *Biography*, a female Italian singer, engaged as first woman at the Opera-house in 1780, on a false report of her great abilities by her countrymen in London, disappointed every hearer.

MACCHIAVELLI, NICHOLAS, a celebrated political writer and historian, was born of a good family, at Florence, in 1469. He first distinguished himself as a dramatic writer, and produced plays that were acted with great applause at Rome. Soon after he had entered public life, he was supposed to have participated in a conspiracy against the house and family of Medici; but being "put to the question" on the subject, he had the fortitude to endure the torture without uttering the slightest confession, and was set at liberty. He was afterwards raised to high honours in the state, and became secretary to the republic of Florence, the duties of which high office he performed with great fidelity. He was likewise employed in embassies to king Lewis XII. of France; to the emperor Maximilian; to the college of cardinals; to the pope, Julius II., and to other Italian princes. Notwithstanding the revenues which must have accrued to him in these important situations, he left a large family at his death in a state of indigence, a circumstance that proves he had acted with integrity, and that the love of money had no influence on his mind. He died in 1530. Besides his plays, his chief works are, 1. "The Golden Age," in imitation of Lucian and Apuleius; 2. "Discourses on the first Decade of Livy;" 3. "A History of Florence;" 4. "The Life of Castruccio Castracani;" 5. "A Treatise on the Military Art;" 6. "A Treatise on the Emigration of the Northern Nations;" 7. A Treatise, entitled "Del Principe," *the Prince*. This famous treatise was first published in 1515, and was intended as a sequel to his discourses on the first decade of Livy, which discourses are replete with just and profound reflections on the principles of popular government, and exhibit him as a warm friend of liberty; but "The Prince" has been generally regarded as the manual of a tyrant; all its maxims and counsels being directed to the maintenance of power, however acquired, and by any means. It was dedicated to a nephew of pope Leo X., was printed at Rome, republished in other Italian cities, and was long read with attention, and even applause, without censure or reply. The practice of politicians at that time was so much in unison with its maxims, that neither surprise nor detestation seems to have been excited by an open exposure of the usual arts of government. The writer's intention in this work has been a matter of much controversy; some have held him up as an abandoned promoter of tyranny, and others have maintained that he was its concealed but decided enemy, who meant to put "the people" on their guard against its machinations. A modern critic, however, thinks it probable, from the character of the man, that he wrote it without any moral purpose whatever; and merely, like a mathematician demonstrating a problem, investigated the

principles by which usurped power might be maintained, leaving the application to princes or subjects, as chance should direct. It has, nevertheless, affixed to his name a lasting stigma, and Machiavelism is become a received appellation for perfidious and infamous politics. When once the system was exposed, a multitude of opponents to it started up, in almost every enlightened country on the globe; among whom, and one of the latest, was Frederic the Great, king of Prussia, before he commenced those plans of aggrandizement, that he pursued very much in the spirit of the work which he had ably answered. Of the historical writings of Machiavel, the "Life of Castruccio Castracani" is considered as partaking too much of the character of a romance; but his "History of Florence," comprising the events of that republic, between the years 1205 and 1494, is a very valuable performance, and one of the earliest of the good Italian histories. It was written while the author sustained the office of historiographer of the republic. He has been charged with misrepresentation; but his character, as an historian, has been ably vindicated, and his style and composition, as a prose writer, are held in high estimation. His verses do not rank among the first, or even the second rate productions of Italian poetry; and his comedies, however they might appear in public representation, are not formed on the purest models. The works of this writer were collected in two volumes 4to. in 1550, and they have been republished in Amsterdam, London, and Paris. Gen. Biog. See MACHIAVELISM.

MACCLESFIELD, called in ancient records *Maxfield*, in *Geography*, a populous, corporate, and borough-town of Cheshire, England, is built on the side of a steep hill, at the distance of 18 miles from Manchester, and 166 from London. It is part of the parish of Prestbury, in the hundred of Macclesfield. Radal, earl of Chester, first constituted it a borough; and in or near the year 1261, the prince of Wales, afterwards king Edward I., made it a free borough, and granted the burghesses a mercatorial guild, and other privileges. By the conditions of the charter thus obtained, the burghesses were required to grind only at the earl's mill, and to bake at his oven. This oven, or bakehouse, is still vested in the crown, and a lease of it was granted, in 1791, for twenty-four years and a half. By a charter of queen Elizabeth's, the corporate body was to consist of 24 capital burghesses; but a later charter, from king Charles II., names a town-clerk, a coroner, two sergeants at mace, &c. as part of the corporation. Among other articles delivered into the custody of the sergeants at mace, in the year 1620, was "a bridle for a curst queane." The market, which is held on Mondays, was formerly very considerable for corn, but has declined. The annual fairs are five, principally for cloth, cutlery, toys, and pedlars' ware. The silk and cotton trade is carried on in this town to a considerable extent, there being nearly thirty silk mills, some of them on a large scale, and about ten cotton factories: a great quantity of goods of both sorts is also manufactured in private houses; there are several muslin, silk-weaving, and twist factories. The weaving of silk handkerchiefs, and the making of ferret and calico, are increasing manufactures: here are five or six dye-houses, principally for silk, a tape manufactory, and a bleaching ground. According to the returns made to parliament under the population act of 1800, the number of houses was then 1527, the number of inhabitants was stated to be 8743, of whom 8509 were said to be employed chiefly in trade, manufactures, or in handicraft. The population has since that period been considerably increased. In the year 1791, an act was passed for inclosing the commons and waste grounds within the borough and manor

manor of Macclesfield. By this act, all encroachments within the manor (except such as had occurred within sixty years, and had no buildings), were secured on certain terms to their respective possessors; the manorial rights of the crown, with respect to the soil, mines, and minerals of the several waste-grounds within the manor and borough were extinguished, with the reserve of coal-mines: as a compensation for which concessions, an allotment of 118½ acres was made to his majesty, which allotment, and the right of digging coal, were sold in 1803, under the land-tax redemption act to Charles Cooke of this town. The corporation are entitled to all springs and water-courses for supplying the town with water, from which sources, with the tolls of the market and fairs, a considerable emolument is derived. A court of record is held once a month for the liberty of the hundred, and another for the manor and forest; a court leet is also held for these jurisdictions. In former times the justices of Chester sat as justices in eyre at Macclesfield, and prisoners for felony and other crimes were tried there, and suffered the sentence of the law. After this practice was discontinued, courts were held by the king's steward or his deputy. Two sessions are now held in May and November, besides the monthly courts before-mentioned.

In a street, called Backwall-Gate, are some remains of a mansion of the dukes of Buckingham. Smith, in his description of Cheshire (1585), describes it as "a huge place, all of stone, in manner of a castle, which belonged to the duke of Buckingham, but now gone to decay." Webb, writing in 1622, says, "in this towne are yet seen some ruines of the ancient manor-house of the renowned duke of Buckingham, who (as yet report goeth) kept there his princely residence, about the time of king Edward IV., of whose great hospitality there, much by tradition is reported."

Other ancient mansions of this town were formerly occupied by families of distinction: among these was Stapleton-hall, belonging to the Stapletons of Upton; Beate-hall, inhabited by the earl of Courtown, is now a public-house; Worth-hall was the town residence of the family of Worths: and is traditionally said to have been the birth-place of archbishop Savage.

The parochial chapel of this town was originally built by king Edward I. in the year 1278; it was almost rebuilt, and greatly enlarged, in 1740. On the south side of this chapel is an oratory, or burial chapel, which belongs to the Savage family: several of whom were interred here. It now belongs to the earl of Cholmondeley. In the Legh chapel are some sepulchral memorials of the family of Legh of Lyme.

A new chapel was erected at Macclesfield in the year 1755, by Charles Roe, esq. and an act of parliament was obtained in 1779, when it was called Christ's-church, or chapel, and the living was made a perpetual cure, or benefice, to be subject to the bishop of Chester. In the chancel is a handsome marble monument by Bacon, for the founder, who died in 1781.

In this town are two meeting-houses for Methodists, and one for each of the following sects: Presbyterians, Quakers, and Independents. A grammar-school was founded here by sir John Percival, knt., and not by king Edward VI., as commonly stated. This monarch increased its revenues, by giving lands and houses in and near the city of Chester. An act of parliament was obtained, in 1768, to regulate the management, and define the constitution of this noted seminary. Four miles S.S.E. of the town is the township of Macclesfield forest. Lysons's *Magna Britannia*, vol. ii. part 2. 4to. 1810.

MACDONALD, ANDREW, in *Biography*, was born at Leith, where he was educated, chiefly by the assistance of bishop Forbes. For some time he had the charge of a chapel at Glasgow, in which city he published a novel, entitled "The Independent." He afterwards came to London, and wrote for the newspapers. His works were lively, satirical, and humorous, and were published under the signature of Matthew Bramble. He naturally possessed a fine genius, and had improved his understanding with classical and scientific knowledge; but for want of connections in this southern part of the united kingdom, and a proper opportunity to bring his talents into notice, he was always embarrassed, and had occasionally to struggle with great and accumulated distresses. He died in the 33d year of his age, at Kentish Town, in Aug. 1790, leaving a wife and infant daughter in a state of extreme indigence. A volume of his "Miscellaneous Works" was published in 1791, in which were comprised; "The fair Apostate," a tragedy; "Love and Loyalty," an opera; "Princess of Tarento," a comedy; and "Vimonda," a tragedy. Biog. Dramatica.

MACDOWAL'S BAY, in *Geography*, a bay on the W. coast of the island of Java.

MACDUFF, a considerable sea-port town situated on the banks of the Moray frith, in the parish of Gamvie, and shire of Banff, Scotland, at the distance of two miles from the county-town. Previous to the year 1732, it was merely a trifling village, composed of a few fishermen's huts, with no other harbour for their boats but a sandy creek. It is now, through the exertions of the earl of Fife, on whose property it stands, a very thriving place. The houses, which are estimated at about 300 in number, are generally built with much neatness, and arranged into regular streets of a commodious width. The population exceeds twelve hundred persons, a great proportion of whom is engaged in the extensive fisheries which have been established on this part of the coast. There are several ships belonging to this town employed in the Baltic and London trade. Many vessels from other ports likewise resort thither; the harbour, formed at the expence of the nobleman already mentioned, being considered one of the safest and most commodious in the Moray frith. As this place lies at some distance from the parish church, the same noble individual has also erected a chapel of ease here, and pays a suitable salary to the clergyman settled in it. A great variety of little fishing villages lie along the shore on both sides, and on the opposite bank of the river Doveran.

MACE, in *Ancient Armoury*, a weapon formerly much used by the cavalry of all nations, and likewise by ecclesiastics, who, in consequence of their tenures, frequently took the field, but were, by a canon, forbidden to wield the sword. The mace is commonly of iron; its figure much resembles a chocolate-mill. Many specimens may be seen in the Tower of London, and other armouries. It was not out of use long after the invention of hand-guns; for we read of its having been used by most nations more than 100 years ago; and in a medley, it is said, they may be more serviceable than swords; for when they are guided by a strong arm, we find that the party struck with them was either felled from his horse, or, having his head-piece beat close to his head, was made to reel on his saddle, with the blood running plentifully from his nose. This kind of mace, which is the same as that used by the Turks, is improperly called by some military writers the club of Hercules; the club given to that demi-god by the Grecian statuary, being a huge knotty limb of a tree. Father Daniel has engraved two weapons, shewn in the abbey of Roncevaux,

as the maces of those famous heroes of romance, Roland and Oliver, who are said to have lived in the time of Charlemagne. One is a large ball of iron, fastened with three chains to a strong truncheon, or staff, about two feet long; the other is of mixed metal, in the form of a channelled melon, fastened also to a staff by a triple chain: these balls weigh eight pounds. At the end of both the staves are rings for holding ends or leathers to fasten them to the hand. Contrivances like these, except that the balls were armed with spikes, were long carried by the pioneers of the trained bands, or city militia: they are generally called "Morning Stars." The morning star, or Morgan stern, was a weapon formerly used for the defence of trenches. It was a large staff, banded about with iron, like the shaft of a halbert, having an iron ball at the end, with cross iron spikes.

At present the mace is generally made of the precious metals, and highly ornamented and used as an emblem of the authority of the officers of state before whom it is carried.

MACE, THOMAS, in *Biography*, one of the clerks of Trinity college, Cambridge, in the seventeenth century, of quaint and singular memory, published in folio, 1676, a treatise, entitled "Musick's Monument; or, a Remembrance of the best practical Musick, both Divine and Civil, that has ever been known in the World;" a work that must not be forgotten among the curiosities of this period. It is impossible to describe the style of this original book by any choice or arrangement of words, but the author's own. The work is divided into three parts; the first treats of psalm-singing and cathedral music; the second, of the noble lute, "now made easy, and all its occult, locked-up-secrets, plainly laid open; shewing a *general way* of procuring *invention* and playing voluntarily upon the lute, viol, or any other instrument, with two pretty devices, &c. In the third part the *generous viol*, in its *rightest use*, is treated upon; with some *curious observations*, never before handled, concerning it, and music in general."

In psalm-singing the author recommends *short-square-even and uniform ayres*, and is "bold to say that many of our old psalm-tunes are so *excellently good*, that art cannot mend them or make them better." In speaking of the difficulty of singing in tune, even with a good voice, he observes, that "with an *unskillful-inharmonious-coarse-grained-harsh-voice*, it is impossible. 'Tis *sad* to hear what *avbining, toling, yelling, or screeking* there is in our *country congregations*, where, if there be no organ to compel them to harmonical unity, the people seem *affrighted* or *distracted*."

The liberal use of compounds by the ingenious master Mace gives his language a very Grecian appearance. He doubts not but that there are "many *rational-ingenious-well-composed-willing-good-Christians*, who would gladly *serve God* aright, if possibly they knew but how;" and therefore he advises the purchase of an organ of thirty, forty, fifty, or sixty pounds; and then, "the clerk to learn to *pulse* or *strike* the psalm-tunes, which he offers himself to teach for thirty or forty shillings; and the clerk afterwards may instruct all the boys in the parish for a shilling or two a-piece to perform the business as well as himself. And thus by *little and little*, the parish will *swarm* or abound with organists."

The lute and viol are master Mace's favourite instruments, concerning the effects of which, and, indeed, of music in general, he is a great rapturist. On the lute, though "he had occasion to *break both his arms*, by reason of which he could not make the *nerve-shake well*, nor strong; yet, by a certain *motion of his arm*, he had gained such a *contentive*

shake, that his scholars asked him frequently how they should do to get the like?"

We shall not attempt to recreate our readers with more extracts from this matchless, though not scarce, book; but recommend its perusal to all who have taste for excessive simplicity and quaintness, and can extract pleasure from the sincere and undissembled happiness of an author, who, with exalted notions of his subject and abilities, discloses to his reader every inward working of self-approbation in as undisguised a manner, as if he were communing with himself in all the plenitude of mental comfort and privacy. We shall, however, present such readers with an advertisement from good master Mace, that was written on his arrival in London, 1690, fourteen years after the publication of his book. We found it in the British Museum, N^o 5936, in a collection of title-pages, devices, and advertisements.

An Advertisement.

"To all Lovers of the best Sort of Musick."

"Men say the times are strange—'tis true:

'Cause many strange things hap to be.

Let it not then seem strange to you

That here one strange thing more you see."

"That is, in Devereux-court, next the Grecian coffee-house, at the Temple back gate, there is a deaf person teacheth music to perfection; who, by reason of his great age, v. 77, is come to town, with his whole stock of rich *musical furniture*, v. instruments and books to put off, to whomsoever delights in such choice things; for he has nothing light or vain, but all *substantial* and solid music. Some particulars do here follow:

"1. There is a late invented ORGAN, which (for private use) excels all other fashioned organs whatever; and for which, *substantial-artificial reasons* will be given; and (for its beauty) it may become a nobleman's dining-room.

"2. There belongs to it a pair of fair, large-sized *confort-viol*s, chiefly fitted and suited for That, or confort use; and 'tis great pity they should be parted.

"3. There is a *pedal harpsicon* (the absolute best sort of *confort harpsicons* that has been invented); there being in it more than twenty *varieties*, most of them to come in with the foot of the player, without the least hindrance of play (exceedingly pleasant). And

"4. Is a single *harpsicon*.

"5. A new invented instrument, called a *dyphone*, v. a *double lute*; it is both *theorbo* and *French-lute* complete; and as easy to play upon as any other lute.

"6. Several other *theorbos*, *lutes*, and *viols*, very good.

"7. Great store of choice collections of the works of the *most famous composers*, that have lived in these last hundred years, as Latin, English, Italian, and some French.

"8. There is the *publisher's own Musick's Monument*; some few copies thereof he has still by him to put off; it being a subscribed book, and not exposed to common sale. All these will be sold at very easy rates, for the reasons aforesaid; and because (indeed) he cannot stay in town longer than four months (exactly)."

He farther adds, "if any be desirous to partake of his experimental skill in this *high-noble-art*, during his stay in town, he is ready to assist them; and (happy) they may obtain that from him, which they may not meet withal elsewhere. He teacheth these five things, v. the *theorbo*, the *French-lute*, and the *viol*, in all their excellent ways and uses; as also *composition*, together with the *knack* of procuring *invention* to young composers (the general and greatest difficulty they meet withal), this last thing not being attempted

tempted by any author (as he knows of), yet may be done; though some has been so wise (or otherwise) to contradict it:

"Sed experientia docuit."

"Any of these five things may be learned so understandingly, in this little time he stays (by such general rules as he gives, together with *Musick's Monument*, written principally to *such purposes*), as that any aptly inclined, may (for the future) teach themselves without any other help."

MACE, FRANCIS, a learned French priest, was born at Paris about the year 1640, and being designed for the church, he pursued his studies with that view at the university of his native city, where he took his degrees. His first public employment was that of secretary to the council for managing the domains and finances of the queen, consort to Lewis XIV. It was not till the year 1685 that he took holy orders, when he was immediately appointed canon, vestry-keeper, and rector of the royal collegiate and parochial church of St. Opportune, at Paris. He was a very diligent student as well in profane as in sacred literature, and was celebrated for his popular talents as a preacher. He died in 1721, leaving behind him a great number of works that do honour to his memory, of which we shall mention "A Chronological, Historical, and Moral Abridgment of the Old and New Testament," in 2 vols. 4to.; "Scriptural Knowledge, reduced into Four Tables;" a French version of the apocryphal "Testaments of the Twelve Patriarchs;" of which Grosseteite, bishop of Lincoln, gave the first Latin translation, Grabe the first Greek edition, from MSS. in the English universities, and Whittan an English version; "The History of the Four Ciceros," which abound in learned and curious enquiries, and intended to prove, from the testimony of Greek and Latin historians, that the sons of Cicero were as illustrious as their father. Moreri.

MACE, in *Commerce*, a small gold coin, current in Sumatra, and some other East India islands. It weighs nine grains, and is worth about 14d. sterling. Sixteen mace are equal 64 copangs = 4 pardows = a tale: and 2500 small pieces of tin or lead, called cashes, usually pass for a mace.

MACE, *Macis*, is a pretty thick, tough, unctuous membrane, reticular or variously chapt, of a lively reddish-yellow colour, approaching to that of saffron, enveloping the shell of the fruit, whose kernel is the nutmeg. The mace, when fresh, is of a blood-red colour, and acquires its yellow hue in drying. It is dried in the sun, upon hurdles fixed above one another, and then, as it is said, sprinkled with sea-water, to prevent its crumbling in carriage.

Mace has a pleasant aromatic smell, and a warm, bitterish, moderately pungent taste; it is a thin and flat membranaceous substance, of an oleaginous nature, and of a yellowish colour. We meet with it in flakes of an inch or more in length, which are divided into a multitude of irregular ramifications; it is of an extremely smooth surface, and of a tolerably close texture, yet friable, and very easily cut to pieces. It is of an extremely fragrant, aromatic, and agreeable smell, and of a pleasant, but acrid and oleaginous taste; it is to be chosen new, not dry, and of a fragrant smell, tough, oleaginous, and of a good yellow. The people who collect the nutmeg fruit cut it open, and throw away the pulpy substance, or external coat; they then see the mace covering the nutmeg, wrapping itself every where round its outer woody shell. The mace is at this time of a red colour; they take it carefully off from the nutmeg, and lay it in the sun for the whole day. In this time its colour, from a strong blood-red, becomes dusky; it is after this

carried to another place, where the sun has less power, and there exposed again to its rays, the few hours they reach thither. By this means it dries gently, and remains tough, and retains its fragrant and colour in a great degree: if it were dried more hastily, it would be whitish, brittle, and would lose much of its smell; after this, it is slightly sprinkled over with sea-water, and then put up into bales in which it is pressed down firm and close, by way of preserving its fragrance and confidence.

It is of an astringent and drying nature, and is used as a corrector in cardiac and cathartic compositions. In its general quality it is nearly similar to the *nutmeg*, which see; the principal difference consists in the mace being much warmer, more bitterish, less unctuous, and sitting easier on weak stomachs; in its yielding by expression a more fluid oil, and in distillation with water a more subtle volatile one. Lewis's Mat. Med.

MACE, *Oil of*, is a kind of sebaceous matter, said to be expressed from the nutmeg, and appearing to be a mixture of the gross sebaceous matter of the nutmeg, with a little of the essential or aromatic oil; both which may be perfectly separated from one another by maceration or digestion in rectified spirit, or by distillation with water. The best sort of this oil is brought from the East Indies in stone jars, and is somewhat soft, of a yellow colour, and of a strong agreeable smell, much resembling that of the nutmeg itself. There is another sort brought from Holland in solid masses, generally flat, and of a square figure of a paler colour, and much weaker smell. Lewis.

MACE, *Reed*, in *Botany*. See TYPHA.

MACEDA, in *Geography*, a town of Spain, in the province of Galicia; five miles S.E. of Santiago.

MACEDO, FR. FRANCISCO DE SANTO AGOSTINHO, in *Biography*, a learned Portuguese, was born at Coimbra in 1597, and at a very early age discovered premature and extraordinary proofs of memory and imitation. At the age of eleven he could repeat the whole of the *Aeneid*, and compose good Latin verses. He joined the company of the Jesuits, which he quitted, and entered the Franciscan order in the reformed province of St. Antonio. When the Braganzan revolution broke out, Macedo espoused the patriotic side, was called to political exertions, and visited Rome, Paris, and London with ambassadors of Joam IV. As he advanced in years he retired to Rome, where he obtained the professorship of ecclesiastical history, and other offices in the college De Propaganda Fide; for some time he performed all the high duties attached to his several stations with credit, and to the entire satisfaction of the pope, whose favour he forfeited for refusing to expunge a word in an epitaph written upon a servant of his holiness. At Rome, and also at Venice, he engaged in many learned disputes with characters of the first literary reputation. To all his opponents Macedo replied most readily and without the smallest embarrassment, correcting their false quotations, and confuting their arguments; and he is said to have crowned the whole by reciting a thousand extempore verses, and an epigram in praise of the city of Venice, which epigram was by order of the republic written under his picture, and placed in the library of St. Mark. From the wonderful powers of his memory he obtained the title of the walking Cyclopaedia. He died in 1681, at the great age of eighty-five. He left a vast multitude of works either in manuscript or in print; he estimated the number of verses which he had made at a million and a half. Of this prodigious number, says Mr. Southey, nobody now reads a single line. Gen. Biog.

MACEDONIA, in *Ancient Geography*, a country of Europe, distinguished by various appellations, belonging to one or other of its districts, according as the people who inhabited those districts happened to prevail. In the most ancient times it took its name from *Æmathia*, a denomination derived from *Æmathus*, a prince of great antiquity; but afterwards the Greeks called it Macedonia, either from king Macedo, a descendant, as some pretend, from Deucalion, or, as others say, by an easy change of Mygdonia, the name of one of its provinces, into Macedonia. Its boundaries have been very various. Sometimes more extended and sometimes more confined, according to the good or bad fortune of its reigning princes. It was bounded originally on the E. by the *Ægean* sea, on the S. by Thessaly and Epirus, on the W. by the Adriatic, or the Ionian sea, and on the N. by the river Strymon and the Scardian mountains, afterwards by the river Nestus, or Nestos. Pliny says, that no less than 150 different nations were seated within its territory, and *Mela* tells us, that it had as many nations as cities; but in the time of Ptolemy, it appears from his geography, that this number was very considerable. Livy (c. xxx.) comprehends the federal divisions of Macedonia under four principal parts, which he describes as follows: "Parva pars, Bitabæ habet fortissimæ viros: trans Nestum amnem inchoant et circa Strymonem, &c." This part was fertile, contained mines, and had for its principal town Amphipolis, which guarded the entrance into Macedonia, towards the east. "Secunda pars, celeberrimæ urbes Thessaloniceam et Cassandriam habet." To this part was joined Pallana, a country very fertile, and abundant in grain, and having good ports. "Tertia regio, nobiles urbes Edeffum et Beream, et Pellam et Vettiorum bellicosam gentem: incolæ quoque permultos Gallos et Illyrios impigros cultores." "Quartam regionem Eordæi, et Lyncestæ, et Pelagones incolant. Iuncta his Atintania et Stymphalis et Elimiotis." Cellarius distinguishes "Macedonia propria," from Macedonia adjuncta. Macedonia propria, or Macedon proper, contains the following parts. 1. In this part were the *Alonipi* in the north, where the mountains Hemus and the Scardus join. This country is called *Almonia* by Thucydides; and Livy places here mount Boreas. *Pelagonia*, called by Strabo *παράλιος*, because it contained three towns, though Ptolemy assigns to it only two, is the fourth region of Livy, supposed to be the same with *Pœonia*. *Lyncæis* or *Lyncæis*, inhabited by the Lyncestæ, lay to the S.W. of Pœonia. The chief town was Heraclea. *Eordæi*, inhabited by the Eordæi, was situated W. of the Lyncestæ, or between the country of the Toulanti and Oreites. North of these was the territory of the Daifacæ, whose chief towns were Lyechnides and Ecia. The former was called Lychaidia by Polybius, and was pleasantly situated near a lake of the same name. It is now called Ochrida. To this part belonged also a portion of *Elimiotis*; the rest was in Illyria, as well as Candavia. 2. The second part was comprised between the rivers Erigon and Axios. Here are found the famous towns of Edeffa, Berea, and Pella. Livy places in this part the famous nation of Vettii. Towards the north lies a portion of Pœonia, called *Deurbis*, which, according to Strabo, had three towns, *viz.* Bryantium, Abderonæ, and Stybera. In the part of Pœonia, which was on this side of the Axios, was Armisfa, which, according to Thucydides, was the first town of the kingdom of Macedonia. *Æmathia* was the most considerable part of Macedonia, as formerly to have given it its name; in which country we find Tyrissa, Seydra, Meyza; and since *viz.* *Thessalonica*, Cythrus, Idomene, Gortyna or Gortyna, Argæ, and Pella. Towards the sea was the small

country, called *Bottia*, or *Bottia*. As Herodotus attributes to this small country the towns of Ichne and Pella, Cluvier conjectures that *Æmathia* was enlarged by its encroachments on this province. *Pieria* lay to the south of this small country, and in process of time comprehended Bottia. In Pieria were the towns of Alorus, Methone, Pida, called Citron, Dium, and others less considerable. The river Empeus, flowing from the valleys of mount Olympus, discharged itself into the sea, south of Dium, and at its mouth was Phyla, a strong town, built by Demetrius Gonatas. 3. The third part of Macedonia, according to Cellarius, was comprehended between the rivers Axios and Strymon; and this is the second according to the distribution of Livy. In this part are found *Amphaxitis*, E. of the mouth of the Axios, on the Thermaic gulf. The most considerable town was Therna, which afterwards took the name of Thessalonica, and is now called Salonichi. *Mygdonia* lay to the N. of the Thermaic gulf, but did not extend to the sea. Here were the towns of Antigonea and Stola, Phryca, Perpillas, Afforus, and Xylopolis; and by extending this part towards the south, it will be made to comprehend the towns of Apollonia and Arethusa. Thucydides places immediately after Mygdonia, *Grestonia*, *Andania*, and *Bisaltia*. *Antebus* probably derived its name from the town of Anthemus, placed by M. d'Anville towards the E. of Amphaxitis, near the source of the Rellius. *Grestonia* or *Orgetonia*, was situated N.E. of Amphaxitis, and had a town of the same name. The Echodorus had its source in this country, and ran from hence into Mygdonia. *Sintice* and *Bisaltia* lay towards the N. and N.E. of Grestonia, upon the Pontus, between the mountains, and had a town named Heraclea Sirtica. *Bisaltia* was a country inhabited by the Bisaltæ, who occupied a territory near the river Strymon. Another considerable part of Macedonia was comprehended in a peninsula, which projected between the Thermaic gulf to the west, and the Strymonic gulf to the east. Towards the N.W. was the small country called *Grestia*; southwards from the sea to the E. was Chalcidica, terminated by three long peninsulas, passing in a direction from N.W. to S.E. The most westerly was called *Pallana*, which had formerly borne the name of *Phlegra*; the next was *Sithonia*; and the third was a peninsula joined to the continent by a tongue of land, in which was situated mount Athos. On the western coast is *Grestia*, with its towns Ælia or Ævea, Gigonus, Smyla, Antigonea, Combrea, and Lipaxos or Lipaxus. Upon the isthmus which connects *Pallana* with the continent, was the town called Potidea, and afterwards Cassandra; to the W. were the towns Sana, Menda, Seione, and Therambus or Therambus. At the extremity of the S.E. was *Cassandracum Promontorium*, together with a place of the same name. Upon the eastern coast were Æga and Agathis. Between the eastern coast of *Pallana* and the western coast of *Sithonia*, the sea formed a gulf, called *Toroneus Sinus*; at the bottom of this gulf, on an eminence, was the town of Olynthus, separated from the gulf by the Bolyca palus, a marsh into which were discharged the two small rivers Olynthus and Amnias. Upon the western coast of *Sithonia* were the towns of Micyberna, Sermyla, Galepus, and Torone, whence the Toroneic gulf derived its name. At the western extremity of this peninsula was the *Promontorium Derris*, and at the S.E. point was the *Promontorium Amphipolis*. On the eastern side were Sarga, Singus, Pidaurus, and Asfa, at the mouth of the Chabrias. The gulf, which bathed this coast, had taken its name from Singus, situated at the entrance of a very large bay. The peninsula, in which stood mount Athos, had several places situated along

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the sea coast. On the coast towards the N. were Sana, Cleonæ, Thyssum, near the *Promontorium Nymphæum*. Upon the coast towards the S.E. at the foot of the mountain, was Apollonia, and the promontory that bore the name of *Acro-Athos Promontorium*. Towards the N.W. were the towns of Olophyxus, Dium, and Acanthus, situated in a bay in which Xerxes would have brought his ships into the Singitic gulf when he meant to cut through Athos, in order to prevent the necessity and danger of doubling the two promontories, Acro-Athos and Nymphæum. To the N., on the same coast, are Stagyra, Arna, Arethusa, Bromiscus, Argilus, and Eion at the mouth of the Strymon, where also was Amphipolis.

The *Macedonia adjecta* of Cellarius, was that which was taken from Thrace in the time of Philip, and extended from the river Strymon on the W. to the Nyssus on the E. Amphipolis, the port of which was Eion, belonged to this part. Cluverius places also in this part the town of Berga, but it really lay W. of the river. From Berga was derived the proverbial expression *Bergaizare* *id est*, nihil veri dicere, for exaggeration, or saying any thing that was scarcely credible. To the E. of Strymon was Gazolus; on the sea-coast, beyond Eion, were Phages, Gapselus, Æsymba, and Neapolis. In the inland territory was Philippi, formerly called Crenides and Datus, and which under its latter name became a Roman colony; and towards the W. Drabescus, Triuilum, Domerus, &c.

Macedonia was intersected by many Roman ways, the most ancient of which was called *Via Egnatia*. It was thought to have been a continuation of this Roman way, that terminated at Brundisium; it commenced at Dyrrachium, whence it passed by Hydrantium to Aulon, on the coast of Epirus. From each of these towns it branched off to Claudiana. From this place it passed to Lichnidus, belonging to the Daflaretii, and thence turning to the S., it passed by Heraclæa, belonging to the Lynceæ, by Edessa, Pella, Thessalonica, Apollonia, Amphipolis, Philippi, Neapolis, and the rest of Thrace, as far as Cypselus or Cypela on the Hebrus. Some authors have continued it as far as Constantinople.

Ptolemy extends Macedonia as far as the Ionian sea, and assigns as its boundaries on the N. Dalmatia and Mælia, and on the west Thrace. On the coast he places the Taulanti, then the Elymiotæ, Orestis, Edonis and Odomantice on the Strymonic gulf, and on the same gulf Amphaxitis, then Chalcidica, Paraxia on the coast, Pieria on the Thermaic gulf, the Pelasgioti on the coast, Phlitiotis on the Pelasgic gulf; and northwards, towards the W., &c. the Albani, the Almopi, Orbelæ, the Eordati, the Edraci, Joranum, Sintices, the Daflaretii, Lyceæ, Pelagonia, Bifaltie, Mygdonia, Emathia, the Parthyæi, Stymphaliæ, the Eltioti, and the Thessalii. The islands which he assigns to Macedonia were Saso in the Ionian sea, and in the Ægean sea, Lemnos with its two towns Myrina and Hephæstia, Scythos with a town of the same name, Scopelos, and Seyros with a town of the same name.

According to M. de l'Isle's map of Greece, the extent of Macedonia from N. to S. was about 160 miles, and from W. to E. about 220. Its form was very irregular; but its situation was excellent, its shores being washed on the E. by the Ægean, and on the W. by the Ionian seas: but these advantages with regard to navigation and commerce, were never well improved; as the Macedonians were never powerful at sea, notwithstanding the many noble bays and excellent harbours which their coast afforded.

Among the most considerable mountains of this country, we may reckon the great ridge, which traversed the northern part, called the Scardian mountains. In this part also was

situated mount Pangæus, which was lofty and well covered with wood, and which was more valuable on account of its mines of gold and silver. From Thrace it was divided by mount Hæmus, which towards the W. joined the Scardian hills. Athos, in the Chalcidian region, was one of the most celebrated mountains in the world. (See *ATHOS*.) Olympus was also another mountain, that was so lofty as to reach almost the confines of heaven, whence the poets took the liberty of making it the seat of the gods. (See *OLYMPUS*.) The Scardian hills and mount Athos were well covered with woods; and, indeed, the whole kingdom of Macedonia, being every where intermixed with mountains and rising grounds, abounded with all sorts of trees, that were valuable on account either of timber, fruit, or shade. The seas that adjoined it were the Adriatic, which afforded several safe ports, besides the great haven of Epidamnus, now Durazzo; and the Ægean sea, which opened to this country not only the trade of Greece, but that of Asia. Its bays were spacious, and four of them were especially remarkable; viz. Sinus Strymonicus, which enclosed in its bosom the island of Thafus, and is now called Golfo di Contessa:—Sinus Singiticus, having on one side mount Athos, and on the other a long slip of land, once full of rich and populous towns, now styled Golfo di Monte Santo:—Sinus Toronaicus, having the ridge of land just mentioned on one side, and part of the region Paraxia on the other, now called Golfo di Aiomama:—and Sinus Thermæus, 60 miles in length, now called the gulf of Salonichi. Of the rivers of Macedonia, those that fell into the Adriatic were the Panyasus, the Apfus, the Laous, called also Æas and Aous, and Celydaus or Pelychus, which is considered as the boundary between Macedon and Epirus. The rivers that discharged themselves into the Ægean sea were the Aliæmon, the Erigon, the Axios (see *AXIOS*), and the Strymon, the ancient boundary between Macedon and Thrace, but since the time of Philip this boundary has been the Nessus. As to the lakes of Macedonia, besides those formed by the overflowing of the river Strymon, and the junction of the rivers Axios and Erigon, there is almost in the centre of the country, not far from the Candavian mountains, a large and famous lake, called the lake of Lychnidus, or the lake of Prespa. There is also another lake in the province of Mygdonia; and a third near the ancient city of Sintia, called afterwards Heraclæa Sintica.

The climate of Macedonia was salubrious and favourable to longevity; the soil was generally fertile, especially on the sea-coast, producing in abundance corn, wine, and oil; but the principal riches of Macedonia consisted in its mines of almost all kinds of metals, but more particularly of gold. The Romans, when they reduced Macedonia into a province, refrained the inhabitants from digging or refining gold or silver, but left them at liberty with regard to any other metal. In ancient times Macedonia abounded with horses above all the other countries of Greece. Three hundred stallions, and 30,000 mares, were kept in the royal stud near Pella.

MACEDONIA, History of. This country was originally inhabited by many nations. Those from whom the race sprung, which from small beginnings became lords of Greece, were Argives. Under the conduct of Caramus, who was descended from Heracles by his son Temenus, they came into this country about 814 years B.C. and established themselves by their arms. Their dominion was afterwards considerably enlarged by their prudence as much as by their valour; for erecting no trophies after their victories, and treating those whom they had subdued with the tenderness of brethren, they engaged the affections of the conquered, with whom they associated as one people, and thus various tribes

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were reduced into one nation. Although the Macedonians were always governed by kings, they preserved as great or even greater liberty than most of the Grecian commonwealths: their monarchs always ruling them according to the maxims of natural equity. This was the original constitution, and it may be said, very much to their honour, that it was not subverted but with the kingdom. In cases where the punishment was capital, the cause was heard by the army or by the people; and till they condemned the party, the king did not pretend to put him to death. Alexander in many instances adhered to this custom; although a rigid regard to the constitution of his country was not always the ruling principle in a Macedonian monarch, as we are informed by Polybius. The throne was hereditary; and continued in the race of Caranus, till the slaughter of Alexander's family; and in general the eldest son succeeded. The ancient kings of Macedon made no ostentatious display of regal dignity. Alexander the Great was the first who wore a diadem and rich robes of state, which were transferred to his successors. The people were loyal and attached to their prince. With regard to marriage, the Macedonian kings were not very scrupulous; as they had frequently several wives and a number of concubines. In the education of their children they were very exemplary, their sons being placed under the tuition of the best masters, who inculcated the love and practice of great and glorious actions; and their daughters were initiated in the practice of every virtue. In the conduct of their own affairs they were moderate and prudent, affecting no magnificent entertainments, condescending to their subjects, and habituated to business. Their chief diversion was hunting. These princes were generally learned, or at least patrons of learned men. In the most solemn acts of their administration, they maintained such a decorum as rather endeared them to than awed their subjects. They heard causes in person, and suffered those who pleaded before them to speak with the greatest freedom. After their deaths, the Macedonian kings were interred in the royal sepulchre; and as they were beloved whilst they lived, the people mourned for them when they died as for their common parents.

The Macedonians, with respect to religion, followed the opinions embraced by the rest of the Greeks, worshipping many gods, and indulging a great variety of ridiculous rites. Jupiter, Hercules, and Diana, were the objects of their special reverence. They were strict in their morals, and temperate in their ordinary mode of living, but magnificent and self-indulgent in their feasts. At these feasts no women were admitted; and it was an inviolable rule that nothing should be divulged, that passed at their convivial meetings. They used their captives as concubines, but held it dishonourable to marry them. In capital cases, judgment was given by the voice of the army; in cases of doubt torture was allowed; and their punishments were various. Sometimes, but chiefly on extraordinary occasions, and in conformity to foreign customs, the criminal was thrust through with darts, or crucified with his head downwards, or thrown chained into rivers; however, the most frequent punishment, and that which seems to have been legal, was stoning to death, in which the army, as they had been constituted judges, were executioners.

As there were several mines in Macedonia, there was under its several kings a variety of silver and gold coins; of the latter sort were the Philippiæ, so called from bearing the bust of Philip, the father of Alexander. These were for a long time the most current coins in Greece.

The language of the Macedonians differed very much from the several dialects of the Greek; inasmuch that the natives of Greece, who served in Alexander's army,

were not able to understand a discourse delivered in the Macedonian tongue.

Their military discipline deserves particular notice, as it served to raise them from being a mean and obscure people to be lords of Greece. At first they were brave and warlike, and by degrees they became invincible from the union of superior courage with military skill. Their army consisted of their natural born subjects, their allies, and mercenaries. The natives served at their own expence, and contented themselves with the spoil of their enemies. The allies were composed of the respective quotas of Thessaly, Pæonia, and other dependent provinces, and of auxiliary troops furnished by Greece. The mercenaries were soldiers of fortune, who served only for pay. The Thessalians furnished horse, and there were also many troops of Macedonian cavalry; the discipline of which was so strict, that if any of the private men lost their horses, either by sickness or in action, their officers were obliged to furnish others out of their own stables. The infantry were composed of three bodies, *viz.* the light-armed, the peltastæ, who were better armed, and the heavy-armed soldiers, of whom the phalanx was composed. These troops were adapted to all sorts of enterprises. The heavy-armed foot were generally drawn up in the centre of the army, in a square body, called the phalanx. This consisted, according to Polybius, of 16 in flank, and 500 in front, all pikemen, the soldiers standing so close, that the pikes of the fifth rank reached their points beyond the front of the battle. As to the arms of the Macedonians, they were offensive and defensive. At first their targeteers had only wooden bucklers, or such as were made of a kind of wicker; but in process of time, they had them of leather and brass. Their swords, like those of other Greeks, were made both for pushing and cutting; and they also made use of daggers. Their spears were both long and short; they had also breast-plates made of linen quilted to a proper thickness, and a particular kind of military shoe. When the army was in the field, the phalanx was drawn up generally in the centre. The horse and light-armed troops in two lines on the right and left. Immediately before battle, the king or general usually made an oration, of which the soldiers expressed their approbation by clashing their arms; but if it did not affect them, they remained silent. When they charged, they exclaimed, *Alala!* *Alala!* and when they desired quarter, they held their spears aloft in the air. All authors agree in representing the hardiness, frugality, and good order of the Macedonian troops. Their camp was always fortified with a good ditch and entrenchment. Their tents were small, made of skins, and when folded up, they made use of them in passing rivers. The king's tent was pitched in the centre, and consisted of two rooms, one in which he slept and the other in which he saw company; and before the door of it, his guards did duty. The military signals of the Macedonians were either trumpets or fires. On a march the cavalry and light-armed troops took post in the van, the phalanx in the centre, and the baggage in the rear, unless they apprehended a sudden engagement; in which case they marched in order of battle. Every soldier had a kind of knapsack, and the army was attended with a certain number of carts and waggon; but the Macedonians did not allow either women or useless servants to follow the camp. The plunder was sometimes distributed among the soldiers, at other times collected and sold for the use of the king, or for the army. In quarters, the army was preserved from corruption, and its discipline maintained by military games, in which rewards, both honorary and lucrative, were bestowed. After victories, the kings were accustomed to reward all who distinguished themselves.

Those

Those who died in the service were honoured with public monuments, and their children and relations were freed from tribute. In all other respects, they were treated with the greatest humanity and condescension; and when the time limited for their service expired, or their wounds rendered them incapable of serving, they were dismissed, with ample provision for themselves and families, that they might enjoy the fruits of their labour, and by living in ease and peace, excite younger and more robust men to come cheerfully in their room.

The kingdom of Macedon commenced with Caranus in the year 814 B.C. and continued 646 years, till the battle of Pydna.

A TABLE of the kings of Macedon from its establishment to its dissolution.

B.C.	Kings.
814	- Caranus.
786	- Canus.
774	- Thurimas.
729	- Perdiccas I.
678	- Argæus I.
640	- Philip I.
602	- Ætropas.
576	- Alecdus or Alcetas.
547	- Amyntas I.
497	- Alexander I.
454	- Perdiccas II.
413	- Archelaus, said to be the patron of learning.
399	- Amyntas II.
398	- Paufanias.
397	- Amyntas II.
392	- Argæus II the Tyrant.
390	- Amyntas II. restored.
371	- Alexander II.
370	- Ptolemy <i>Alorites</i> .
366	- Perdiccas III.
360	- Philip II. son of Amyntas.
336	- Alexander III. called the Great.
323	- Philip III. <i>Arideus</i> .
316	- Cassander.
298	- Antipater.
297	- Alexander.
294	- Demetrius <i>Poliocertes</i> .
287	- Pyrrhus.
286	- Lyfimachus.
280	- Ptolemy <i>Ceraunus</i> .
279	- Meleager.
278	- Antipater the <i>Etesian</i> .
277	- Antigonus, called <i>Gonatas</i> .
243	- Demetrius II.
232	- Antigonus <i>Dofon</i> .
221	- Philip V.
179	- Perseus.
168	- Perseus defeated at the battle of Pydna, and taken prisoner by the Romans, which properly finishes the kingdom of Macedon.
152	- Andriceus, pretending to be the son of Perseus, assumed the tyranny of Macedon, but died in the year 148 B.C.

In the preceding reigns no very interesting event occurred, till that of Amyntas, to whom Megabyzus, the Persian

general, sent seven of the principal commanders of his army to require him to acknowledge king Darius. Amyntas complied, and gave them a magnificent feast. Being intoxicated with wine, they desired that the women might be produced according to the custom of Persia. In this particular they were also gratified; but as their intoxication increased, they began to behave in a brutal manner, and were all slain by the contrivance of Alexander, the son of Amyntas. Upon this Bubaris was sent by Megabyzus, with a considerable body of troops, to revenge their deaths; but Alexander contrived to pacify Bubaris, by introducing to him Gygea his sister, who was a very beautiful woman; and who so far captivated the officer, that for the sake of obtaining her for a wife, he adjusted all things to the satisfaction of Amyntas. From this time the kings of Macedon became tributary to the Persian emperors; but they were always regarded as faithful allies, and treated with kindness and respect. From this reign the history of the kings of Macedonia begins to be blended with that of the other powers of Greece. The Macedonian sovereigns indubitably extended their possessions and authority both to the east and west of their country; and the prudence of Perdiccas I. paved the way for the prosperous reign of Philip II., and for the succeeding conquests of his son Alexander. (See the biographical articles of PHILIP and ALEXANDER *the Great*.) After a reign of about 12 years, the extensive dominions of Alexander were divided among his generals; Philip Aridaus was recognized as his successor; but the ambition of the other princes deprived him of a great part of his father's possessions. His successors, after many destructive wars with the princes who reigned in Asia, terminated their career by a war with the Romans, which proved disastrous to them; so that Perseus, after his defeat, was carried captive to Rome; and in a short time Macedonia became a part of the Roman empire. See the next article.

MACEDONIA *Salutaris*. When Paulus Æmilius had finished the conquest of Macedonia, by his victory over Perseus its last king, he divided this kingdom into four distinct regions, which became subject to different sorts of government, sometimes at the will of the emperor, and at other times under the authority of the senate. At length, after the reign of Constantine, Macedonia became subject to the government of the prætorian prefect of the Eastern Illyria, and was divided into two provinces. The second of these provinces was named *Salutaris*, on account of its mineral waters; it extended itself to the upper part of Macedonia, in the vicinity of the mountains which separated this province from *Mæsia Superior* or *Dardania*. It was under the metropolis of Sobi, and comprised eight towns. Pliny.

MACEDONIA, in *Modern Geography*, a province of European Turkey, bounded on the N. by Servia, on the E. by Romania, on the S. by Thessaly and the Archipelago, and on the W. by Albania. Its figure is irregular; its situation advantageous; and the air clear, sharp, and salubrious. The soil is, in general, fertile; and the maritime coasts particularly abound with corn, wine, and oil. In the inland parts are several uninhabited wadies. It had formerly mines and plenty of timber. Its numerous fine bays render it convenient for trade. Its capital is Salonichi. See the article **MACEDONIA**.

MACEDONIAN KINGDOM, in *Ancient History*, one of the four kingdoms into which the empire of Alexander was divided after his death. This kingdom, under Perseus, who was overcome and taken by Æmilius, and carried in triumph to Rome, where he died in prison, was reduced to the

the form of a Roman province. The other three, *viz.* the Asiatic, Syrian, and Egyptian kingdoms, flourished for a considerable time under their own kings, but were at last compelled to receive the Roman yoke.

MACEONIAN *Parphy*, in *Gardening*. See BERON.

MACEONIAN *Year*. See YEAR.

MACEONIAN, in *Ecclesiastical History*, the followers of Maceonius, bishop of Constantinople, who, through the influence of the Eusebians, was deposed by the council of Constantinople in 362, and sent into exile. He considered the Holy Ghost as a divine energy diffused throughout the universe, and not as a person distinct from the Father and the Son. The sect of Maceonians was crushed before it had arrived at its full maturity, by the council assembled by Theodosius in 381, at Constantinople. See SEMI-ARIANS.

MACEIRA, or MUDJARE, in *Geography*, an island in the Arabian sea, near the coast, about 50 miles long, and from three to eight broad. It is barren and uninhabited, and on the N.W. coast are dangerous shoals, extending 90 miles along the shore, and far into the sea, so that the land cannot be seen till the unskillful pilot touches the rocks. N. lat. 20° 48'. E. long. 57° 35'.

MACEIRA, *Linde*, an island in the Arabian sea, 16 miles long and three broad; 10 miles W. of Maceira.

MACER, *Equitatus*, in *Biography*, a Roman poet, who flourished in the age and reign of Augustus, and is mentioned as a writer in natural history. His works are referred to by Ovid, particularly a poem on the events of the Trojan war, after the period at which Homer concludes. A poem, "De Herbarum Virtutibus," extant under the name of Macer, is now given up as supposititious.

MACER, in *Geography*, a river of Africa, in the country of Tripoli, which runs into the Mediterranean.

MACER, in the *Materia Medica*. The Grecian macer is brought from Barbary; and the part in use is the thick yellow bark, which has a very astringent taste, and is said by Dioscorides to be good against spitting of blood, the dysentery, and fluxes. See SIMAROUBA.

MACERATA, in *Geography*, a town of Naples, in Lavara, about three miles from Capua. Also, a town in the marquise of Ancona, on the Chienta, the see of a bishop, suffragan of Fermo; containing several churches, 13 convents, an university, two academies, and about 10,000 inhabitants; 20 miles S. of Ancona. N. lat. 43° 15'. E. long. 13° 31'.—Also, a town in the duchy of Urbino; 10 miles N.W. of Urbino. N. lat. 43° 48'. E. long. 12° 35'.

MACERATION, in *Pharmacy*, the operation of dissolving a solid body by means of water, or some other liquor.

In this sense, the word amounts to much the same with liquefaction, or liquation.

MACERATION is also used for the infusing of a body in any menstruous fluid, or in order to a solution of its principles, whether with or without fire.

In which sense maceration amounts to much the same with digestion.

Others restrain maceration to that particular kind of digestion which is performed in thick substances, as when having mixed robs with fat to make *unguent. resosum*, the mixture is exposed for some days to the sun, that the virtue of the robs may be the better communicated to the fat.

MACHA MONA, a kind of African calabash. It is the fruit of a very large tree which grows in Africa, and the American islands. When this fruit is ripe, the pulp has a

fourish taste, with a little astringency: it is delicious in hot countries; and they prepare a liquor of it, which they use instead of lemonade, to cool and refresh themselves, and give it to sick persons under a loofeness. The pulp, dried, tastes as well as the spiced bread of Rheims. The slaves make a kind of thick gruel with this pulp and water; it is of an absorbent quality. The African women use the pulp instead of rennet, for curdling their milk.

The seeds of this fruit are as big as small pine-apple kernels, kidney-shaped, of a chestnut-colour, and enclosing an almond far more delicious than our sweet almonds.

MACHACA, in *Geography*, a town of Peru, in the diocese of La Paz; 80 miles S.W. of La Paz. S. lat. 17° 45'. W. long. 69° 14'.

MACHÆRINA, in *Botany*, Vahl. Enum. v. 2. 238. See SENOPIUS.

MACHÆRION, a word used by chirurgical writers, as the name of an instrument of the nature of the incision knife. It is also sometimes used to express an incision; and by the auspices of old it was applied to some particular part of the liver of animals, from which they prefaged events.

MACHÆRUS, or MACHERONTE, in *Ancient Geography*, a city and fort beyond Jordan, in the tribe of Reuben, N. and E. of the lake Asphaltites, two or three leagues from Jordan, and not far from its mouth in the Dead sea. This castle had been fortified by the Amoneans. Gabinius demolished it, and Aristobulus fortified it anew; and Herod the Great made great additions to its strength. At or near it was a spring of very salutary hot waters. John the Baptist was put in prison, and beheaded at Machærus, by the order of Herod Antipas. Josephus Ant.

MACHALA, in *Geography*, a town of South America, in the audience of Quito, and jurisdiction of Guayaquil; annexed to the lieutenantancy of Puna. It lies on the coast of Tumbez, together with that of Naranjol, the landing-place of the river of the same name, called also the Suyá, near which is a road leading to the jurisdictions of Cuenca and Alauli. The jurisdictions of Machala and Manaranjol produce great quantities of cacao, and that of the former is esteemed the best in Guayaquil. In its neighbourhood, as well as in the island of Puna, are great numbers of mangrove-trees; in the wood of which the Indians pay their annual tribute. This wood is used in ships, &c. and is very durable, as it is subject neither to split nor rot: 55 miles N.N.W. of Loxa. S. lat. 3° 15'. W. long. 79°.

MACHAON, in *Biography*, an illustrious hero and physician, who, with his brother Podalirius, accompanied the Grecian army in the expedition against Troy, and performed great services among the troops. These two persons were deemed the sons of Esculapius; and Machaon appears to have been the elder brother, according to the poet Quintus Calaber, who introduces Podalirius as saying, on the occasion of his death, that "his dear brother had brought him up like a son, after their father was taken into heaven, and had taught him to cure diseases." (Lib. vii. v. 60.) Homer, indeed, mentions Podalirius first, when he names both together; but that seems to have arisen only from the convenience of the verse. *Ἠδὲ δὲ Πόδας ἦν Μάχωνος*. For Machaon appears to have been most highly esteemed by the great officers of the army. It was he who administered to Menelaus, when wounded by Tindarus, first wiping the blood from the wound, and then applying emollient remedies, after the manner of his father. It was Machaon, also, who cured the lameness of Philoctetes, occasioned by dropping an arrow, dipped in the gall of the Lernean Hydra, bequeathed him by Hercules,

Hercules, on his foot. "Tarda Philoctetæ sanavit crura Machaon." Prop. lib. ii.

It appears, too, from the writings of the poets, that Machaon was a brave and active soldier; for he is mentioned as engaged in some of the most dangerous enterprises, with the other celebrated leaders. Homer tells of a wound which he received in the shoulder, in one of the battles of the Trojans; and Virgil and Hyginus inform us, that he was one of the brave warriors who entered the wooden horse, from which, according to the former, he was the first to descend. (Æneid. lib. ii. v. 263. Hygin. Fabul. lib. i. cap. 81. &c.) He is said to have lost his life in single combat with Nereus, or, as others state, with Euryphilus, the son of Telephus, during the siege of Troy; which, however, is inconsistent with the assertion just mentioned, since the siege was terminated by the introduction of the troops in the wooden horse. (See Pausanias in Laconic. 2. Calaber, lib. vi. & vii.) Pausanias adds, that the remains of Machaon were preserved by Nestor, and conveyed to Messenia, where they were buried.

Machaon married Anticlea, daughter of Diocles, king of Messenia, by whom he had two sons, Nicheachus and Gorgastus, who resided at Phæra, and possessed the territory of their grandfather, until the Heraclidæ, on their return from Troy, made themselves masters of Messenia, and the rest of the Peloponnesus. Machaon is supposed to have been a king, either in his own right, or that of his wife, since Homer, in two or three places, calls him "Father of the people," (πατὴρ λαοῦ), a title which he gives to Agamemnon and the other kings. Pausanias mentions three other sons of Machaon, namely, Sphyrus, Alexanor, and Polemocrates, who are supposed to have been the fruit of another marriage. M. Goulin, in his literary and critical memoirs, states his opinion, that the birth of Machaon may be fixed about the year of the world 2765. See Le Clerc. Hist. de la Médecine. Schultzius Hill. Medicinæ.

MACHAU, GUILLAUME, a French poet and musician, born about 1282. He was at first in the service of the count of Philippe-le-Bel, and, in 1307, was appointed valet-de-chambre to the king, and continued to occupy this office to the end of that prince's reign, who died in 1314.

As the works of this author are the most ancient lyric compositions that have been preserved in France, with the original music, great pains have been taken in commenting them, and rendering both words and music intelligible.

The abbé Lebœuf, in the year 1746, gave a very ample and satisfactory account to the Academy of Inscriptions at Paris of two volumes of French and Latin poems, preserved in the library of the Carmelites of that city, "with a description of the kind of music to which some of these poems were set."

In 1747, the count de Caylus, having found in the king of France's library, N. 7600—2, a duplicate of these poems, gave likewise an account of them to the same Academy, in two memoirs. The author, Guillaume de Machau, is styled by the count, *poet and musician*; and both these excellent critics agree, that he flourished about the middle of the fourteenth century, and died in 1372. Among the poems, which are written up in various subjects, there is an infinite number of lurs, virelais, ballads, and rondeaux, chiefly in old French, with a few in Latin, and set to music: some for a single voice, and others in four parts, triplum, tenor, contratenor, and a fourth part, without a name. In these last pieces, as the words are placed only under the *tenor part*, it is natural to conclude that this was the principal melody. In the music, which is written with great care and neatness, notes in a lozenge form, with tails to them, frequently occur; these, whether the heads were *full* or *open*, were at

first called *minims*; but when a still quicker note was thought necessary, the white or open notes only had that title, and the black were by the French called *noirs*, and by English *crabbits*: a name give by the French with more propriety, from the hook or curvature of the tail, to the still more rapid note, which we call a *quaver*.

The Latin poems are chiefly motets, and for a single voice; some of which are written in black and red notes, with this instruction to the singers: "nigra sunt perfectæ, & rubra imperfectæ." An admonition worth remembering by those who wish to decipher music of the fourteenth and fifteenth centuries, in which red notes frequently occur. It was an easy expedient of diminution, till the invention of printing, when the use of ink of different colours, on the same page, occasioned the expence and trouble of *double printing*. The abbé Lebœuf observes, that the diffusion and accelerated motion of notes, during these ages, gave great offence and scandal to pious and sober Christians. In a lyric eleison to the Gregorian chant, which is called *tenor*, the three parts that are added to it are called triplum, motetus, and contratenor. In the second volume of these poems the common chants of the whole mass, and even the credo, are written in four parts. This mass is supposed to have been sung at the coronation of Charles V. king of France, 1364.

There are in the French MS. many ballads and rondaux in three parts, tenor, triplum, and contratenor. The fourteenth century seems the era when music in parts, moving in different melodies, came first into general favour; for of the preceding age no music can be found of more than two parts in strict counterpoint of note against note.

Machau calls his collection of songs set to music, *Remedes de forisme*, regarding music as a specific, or at least an opiate, against the ills of life. In the illuminations to these lyric compositions an assembly of minstrels is represented with thirty or forty musical instruments, of which he gives the names. His poem called "Le Dit de la Harpe," is a moral and allegorical piece in the style of the famous "Roman de la Rose," by Guillaume de Loris, and Jean de Meun.

The abbé Rive has likewise given an historical and critical account of another MS. copy of these poems in the collection of the duke de la Vallière; but none of these gentlemen have produced specimens of Machau's musical compositions; indeed the count de Caylus frankly confesses, that though he has studied this music with the utmost attention, and consulted the most learned musicians, he has been utterly unable to satisfy his curiosity concerning their intrinsic worth.

MACHAU, in *Geography*, a town of Bohemia, in the circle of Königgrätz; eight miles S.W. of Brannaw.

MACHAVANA, a river of Africa, which runs into the Indian Sea, 3. lat. 26. 45.

MACHAULT, JAMES, born in *Britany*, a French Jesuit, was a native of Paris, and born in 1599. He entered on his novitiate in his eighteenth year, and after having finished the usual course of academic studies, he was selected to teach, first pious literature, then philosophy, and for several years disputation, in different seminaries belonging to the order. He was elected successively rector of the colleges at Alençon, Orleans, and Caen, and died in his native city in 1682. He was author of many considerable works, as "The Account of the Missions in Paraguay and other Parts of South America," 8vo. 1650; "A Relation of the State of Affairs in Japan," 1647; "Account of the Provinces of Goa," &c.; "A Relation of the Travels of twenty-five Members of the Society on the Indian Mission," 1659; "Account of the Mission of the Society in Persia," &c.

MACHAULT,

MACHAULT, in *Geography*, a town of France, in the department of the Ardennes, and chief place of a canton, in the district of Vouziers; nine miles S.W. of Vouziers. The place contains 693, and the canton 4000 inhabitants, on a territory of $242\frac{1}{2}$ kilometres, in 14 communes.

MACHÉCO, a town of France, in the department of the Lower Loire, and chief place of a canton, in the district of Nantes; 8 miles S.W. of Nantes. The place contains 1899, and the canton 5152 inhabitants, on a territory of 155 kilometres, in six communes. N. lat. 47° . W. long. $1^{\circ} 44'$.

MACHERA LAPIS, in *Natural History*, the name of a stone of a ferruginous colour, frequent on mount Berecynthus in Phrygia. Plutarch, and many other grave writers, relate, that if any person found this stone, and took it up at the time of the celebration of Cybele, he instantly was seized with madness.

MACHERIA, in *Geography*, a town of Hindoostan, in Palnaud; six mile S.W. of Timerycotta. N. lat. $27^{\circ} 35'$. E. long. $77^{\circ} 15'$.

MACHERN, a town of Prussia, in Natangen; 25 miles S. of Rattenburg.

MACHERRY, a town of Hindoostan, in the country of Mewat; 70 miles S.S.W. of Delhi.

MACHESIN, or **MACHISIN**, a town of Asiatic Turkey, in the province of Diarbekir; 105 miles S.E. of Raca.

MACHIA, a town of Naples, in the country of Molise; 12 miles S.W. of Molise.—**Alfo**, a town of Naples, in the Capitanata; 10 miles N.N.W. of Volturara.—**Alfo**, a town of Naples, in Calabria Citra; five miles N. of Bisignano.—**Alfo**, a town of Naples, in Principato Citra, on the coast; 15 miles S. of Capaccio.

MACHIAN, one of the Molucca islands, near the W. coast of Gilolo; about 18 miles in circumference, and populous. The Dutch have three forts garrisoned with soldiers. Its principal articles of commerce are cloves and sago; a little N. of the line. E. long. $127^{\circ} 21'$.

MACHIANA, an island at the mouth of the river of the Amazons, about 15 miles long and three broad; a little S. of the line. W. long. $57^{\circ} 2'$.

MACHIAS, a port of entry, post-town, and seat of justice in Washington county, and state of Maine, America, situated on a bay of the same name; 20 miles S.W. of Passamaquoddy, in N. lat. $47^{\circ} 37'$. This town carries on a considerable trade to Boston and the West Indies, in fish, lumber, &c. It was permanently settled in 1763, and incorporated in 1784. The chief settlements are at the E. and W. Falls, and at Middle river. At W. Falls, there is a gaol, and the county courts are held there. The entrance of Machias river is in N. lat. $44^{\circ} 37'$. W. long. $66^{\circ} 56'$. The town is divided into four districts for the support of schools, and into two for the convenience of public worship. In 1792 Washington academy was established here, which has for its support a township of land. In 1800 the town contained 114 inhabitants. The exports consist principally of lumber, viz. boards, shingles, clap-boards, laths, and various kinds of dressed timber. The cod-fishery, which might be prosecuted to advantage, has been neglected. The saw-mills are 17 in number, and much employed. The total amount of exports annually exceeds 15,000 dollars. From Machias bay to the mouth of St. Croix there are many fine islands. Morfe.

MACHIAVELISM, in *Literary History*, is a species of detestable politics, which may be defined in few words, the art of reigning tyrannically, the principles of which are inculcated in the works of Machiavel, a native of Florence, and particularly in his treatise, entitled "The Prince." M. de

Wicquefort observes, concerning the character of this writer; Machiavel says almost every where what princes do, and not what they ought to do. To the same purpose the chancellor Bacon remarks: "Est quod gratias agamus Macchiavello et hujus modi scriptoribus qui aperte & indissimulante professunt quid homines facere soleant non quid debeant." Machiavel was secretary, and afterwards historiographer to the republic at Florence. He was put to the rack upon the suspicion of being concerned in a confederacy against the house of Medicis; but he endured the torments of it, without making any confession. He was as much an enemy to religion as to sound politics; and is said to have died in the year 1530, uttering profane jests and blasphemies. Bayle. See **MACCHIAVELLI**.

MACHIAWARA, in *Geography, a town of Hindoostan, in the circar of Sirhind; 28 miles N. of Sirhind.*

MACHICOLATION, from *mecke*, a match or wick to preserve fire, and *coulr*, to flow, in *Fortification*, perpendicular apertures in the upper part of the gate of an ancient castle, for the purpose of pouring down various burning substances on the assailants, when they were battering them, or otherwise trying to force them open. In various ancient charters, permission was granted to the owners of castles, *embattelandi, kernellandi, and machicolandi*.

MACHICORA, in *Geography*, a river of Madagascar, which gives name to a province, and runs into the sea on the S. coast. S. lat. $25^{\circ} 5'$. E. long. $41^{\circ} 12'$.

MACHIGASTA, a town of South America, in the province of Tucuman; 50 miles W.S.W. of St. Fernando.

MACHINE, in a general sense, signifies any thing that is used to augment or to regulate moving forces or powers; or, it is any instrument employed to produce motion, so as to save either time or force. The word is derived from *unxars, machine, invention, art*; and is therefore properly applied to any agent in which these are combined, whatever may be the strength or solidity of the materials of which it is composed. The term machine, however, is by common usage generally restricted to a certain class of agents, which seem to hold a middle place between the most simple *organa*, commonly called tools or instruments, and the more complicated and powerful, termed *engines*. This distinction, however, does not enter into the present article; we shall consider machines under two heads, *simple* and *compound*. To the first class belong the *lever*, the *inclined plane*, the *screw*, the *wedge*, the *wheel* and *axle*, and the *pulley*, commonly called the six mechanical powers; though some authors will only allow the lever, and the inclined plane, to be simple machines, the others being compounded of those two.

Compound machines are all such as consist of a combination of the several simple machines or mechanical powers above-mentioned, the number of which in the present advanced state of the sciences is almost infinite. These are again classed under different denominations, according to the agents by which they are put in motion, the purposes they are intended to effect, or the art in which they are employed, as hydraulic, pneumatic, military, architectural, &c. machines. The ancients excelled in the two latter species of engines, but in those which relate to civil arts and manufactory, the moderns have doubtless far exceeded their masters. With regard to military machines, the invention of gunpowder has completely changed their nature, and all those of the ancients are become useless and forgotten; these were principally of three distinct species, viz. those employed for throwing destructive weapons; as the *scorpion*, which was for casting arrows; the *catapulta* for stones and javelins; the *pyrobale* for flaming darts; the *ballista* for bullets, &c. &c.

Others

Others were for razing the walls of fortified places, of which the principal was the *aries*, or *battering ram*; and those of the third kind were for covering the approaches of the besiegers, as the wooden tower, &c.; for a description of which see the respective articles. The warlike machines employed by Archimedes in the defence of Syracuse have been much applauded by the ancients, and though many of the circumstances related on this head are doubtless false or exaggerated, yet it is sufficient to know the genius of their author to be convinced that they were powerful and effective, probably much exceeding any of those of which the construction has been ascertained.

Of the architectural machines of the ancients we are totally unacquainted, and one is at a loss to conceive what means they employed for transporting and raising those enormous stones which are found in the walls of some ancient buildings, though it is not unlikely that they owed as much to their patient perseverance and manual labour, as to the power of their machines. The Spaniards, when they made the conquest of Peru, were struck with astonishment to find the natives, whom they considered as savages and barbarians, raising enormous masses of stone of ten feet square for building walls and other purposes, without the assistance of any instruments than those which nature had supplied them with; unacquainted with any other scaffolding but that of banks of earth raised against their buildings, they contrived by strength of hand to raise these massy loads up the inclined planes thus formed; and many of the Druidical remains in this country were probably erected in a similar manner. The ancient Greek and Roman architects, however, were no doubt acquainted with, and employed very powerful machines in the construction of their noble edifices, with the nature of which we have not been informed; even Vitruvius, who writes expressly on the subject, has left us nothing that can throw any light on the construction of these engines, yet that they were in possession of immense and wonderful machinery, appears in the most convincing manner to any person who reflects on the magnificent structures which they erected, and which excite to this day the wonder and admiration of the world, not only on account of their grandeur and incomparable elegance, but also on account of the mechanical knowledge that seems indispensably necessary for their erection.

The hydraulic machines of the ancients were indeed much inferior to those of modern invention. The *sereno* of Archimedes, and the *pumps* of Ctesibius, were the principal engines of this description; for which see the respective articles. As to the modern machines they are too numerous to admit even of a slight enumeration in this place; most of them, however, of any importance, will be found under the several heads in this work. See CRANES, *Wind* and *Water MILLS*, *STEAM Engine*, &c. &c.

Montucla, at the conclusion of the third volume of his "Histoire des Mathématiques," has given a catalogue of several interesting works, which have been compiled in order to describe and exhibit the most important and curious machines, both ancient and modern, of which we have selected a few for the information of those who may not possess the above-mentioned work.

1. The first and most interesting modern work of this description is entitled "Le diverse et artificieuse machine del capitano Agostino Ramelli dal ponte della Trebia, &c. &c. composta in lingua Italiana et Francese; a Parigi 1588," in folio, (in Germany,) in 1620. This is a very scarce work, seldom to be met with but in choice libraries.

2. "Machine nova Pauli Verantii cum declaratione, La- Vol. XXI.

tinia, Italica, Hispanica, Gallica, et Germanica," Venetiis 1591, 1625, in folio, with figures.

3. "Résumé de plusieurs Machines militaires, &c. pour la Guerre et Récréations," par François Thypourel et Jean Appus, 1620, 4to.

4. "Heinrich Zeizings, Theatrum machinarum," Lipsie 1621.

5. "A Century of Inventions, &c." by Edward Somerfet, marquis of Worcester, London 1663, in 12mo.

6. "Les dix Livres d'Architecture de Vitruve, &c." translated into French by Claude Perrault, 1673, folio.

7. "Veterum mathematice, Astronomicæ, Apollodori, &c." 1693, folio. This learned and curious edition of the ancient Greek machinicians was begun by Thaveret, and finished by La Hire; but it relates principally to military engines.

8. "Theatrum machinarum universale, &c." by Jacob Leupold, Lipsie, seven volumes folio, 1724, 1727, 1774. This is the greatest and most complete work of the kind that ever was published. The first volume is little more than an introduction to the work; the second and third volumes contain descriptions of hydraulic machines; the next two volumes relate to machines for raising weights, the theory of levelling, and other subjects; and the sixth treats principally on machines connected with the construction of bridges; the seventh volume is entitled "Théâtre arithmétique géométrique," where the author treats of all instruments employed in these two sciences. This work would have been much more considerable, if its author had lived to complete the immense task he had undertaken.

9. "A short Account of the Methods made use of in laying of the Foundation of the Piers of Westminster Bridge," by Charles Labelye, 1739.

10. "The Advancement of Arts, Manufactures, and Commerce; or, A Description of useful Machines and Models," by A. M. Baily, London 1778, 1779, folio.

Besides the above-mentioned works, many useful particulars may be gathered from Strada, Besson, Beroaldus, Bockles, Beyer, Lempergh, Van Zyl, Belidor's Architecture hydraulique, Desaguliers's Course of experimental Philosophy, Emerson's Mechanics. The Royal Academy of Sciences at Paris have also given a collection of machines and inventions approved of by them. This work, published by M. Gallon, consists of six volumes in quarto, containing engraved representations of the machines, with their descriptions annexed.

We might have carried the enumeration of works of this kind to a much greater length, but the above are the most interesting, and the reader who wishes for farther information on this subject may consult the history of Montucla above-mentioned. But we ought not to omit to mention in this place, the second volume of the "Architecture Hydraulique" of Prony, and the second volume of Gregory's Mechanics: the first of these relates principally to steam engines, but the latter contains a description of the most useful modern machines for various purposes.

In the construction of machinery, as also in estimating its effects, several important considerations naturally arise in the mind of a skilful artist, such as the effect of FRICTION, RIGIDITY of ropes, the STRENGTH and STRESS of materials; the proper measure, comparison, and equilibrium of FORCES, the laws of ROTATORY and ACCELERATED motion, &c. &c. These are all treated of under the respective articles in the Cyclopædia, and it therefore only remains for us in this place to offer a few remarks on the nature of machines in general, and the best means of determining their maximum effects.

Machines are introduced for three purposes, viz. to accommodate

commutate the direction of the moving force to that of the resistance : to be overcome : to increase the effect of a given finite power, so as to overcome a resistance which is greater, and would otherwise ever remain unchanged : and lastly, to regulate and modify a variable force, so as to produce a constant and uniform effect. These are the principal ends to be accomplished by machines, and the experienced engineer will always endeavour to execute them in the simplest manner possible; for complicated machinery is not only most liable to inaccurate adjustment, and frequent disarrangement, but is likewise more cumbersome and expensive, at the same time that the retardation arising from friction, adhesion, and inertia, is more considerable, and consequently a greater power becomes necessary, in order to produce the same effect. Another important point to be attended to, is the most advantageous application of the first mover, whether this agent be air, water, steam, or animal strength. To enter upon this question in all its generality, would far exceed our limits; besides, with regard to the three former, they will be better investigated under the articles *Wind* and *Water Mills*, *STEAM Engines*, &c.; what few remarks, therefore, we have to make on this head, will be confined to the application of animal exertion to the motion of machines, and for the other agents we must refer the reader to the articles above-mentioned.

We have a striking instance of the injudicious application of the exertion of men, in the old crane worked by means of an internal walking wheel, which, from its nature, must be very heavy, while the action of the man is exerted at a very trifling distance from the axle, and consequently at a great mechanical disadvantage; whereas in Hardie's crane, the man acting externally at the greatest distance from the fulcrum, produces a much greater effect with less expence of labour; the other advantages which this machine possesses over the one above-mentioned, not arising solely from this cause, are not connected with our present enquiry.

The above remark applies principally to the mechanical advantage to be obtained in the application of a first mover; but there is also another consideration of a physical nature, which is equally important, and ought therefore to be particularly attended to. No animal can exert more than a determinate and limited force; and, consequently, if it requires all this force merely to produce an equilibrium, no effect will result from the action; and, on the other hand, if all the strength of a man or horse is employed in giving motion to himself, or to external objects before the application reaches the resistance, there is still the same unproductive effect. A man, for example, pushing at a capstan bar, must first of all walk as fast as the bar moves round, which evidently requires an expenditure of his muscular power; but this alone will not render his exertion effective: he must also press the bar forward, with as much force as he has remaining above that which he expended in walking at that rate. The proportion of these two expenditures may be very different under different circumstances; and on the judicious selection of such circumstances as make the first of these as small as possible, lies much of the skill of the engineer. In the common operation of thrashing corn, much more than half the man's power is expended in giving the necessary motion to his own body; and only the remainder is employed in urging forward the swingle which is in motion, sufficient for shaking out the ripe grain from the stalk. Dr. Robison mentions an experiment, made in order to ascertain the quantity of power thus lost. In order to which, the swingle was taken off the flail, and the same weight or load put on the end of the staff; then by causing the labourer to perform the usual motions of thrashing, with all the rapidity

that he could continue during the ordinary hours of work; it was found that the number of motions thus made was to those made in the actual operation of thrashing, in about the ratio of 5 to 2: whence we may infer, that at least half the thrasher's power is expended in merely moving his own body. We may also bring another very simple case, by way of further illustration. Suppose a quantity of earth is to be removed from one place to another by barrows. It is obvious that the loads may be so great, that a man must exert his whole strength barely to lift up the shafts, and consequently will have none left to push the barrow forward: if part of the load be taken off, he can go forward, and so much the faster as the quantity of the load is reduced; but if even the whole be taken away, he can still only move at a certain rate, and, consequently, in neither of the extreme cases is any effect produced. It becomes then an interesting question to determine what load he ought to carry, in order to produce the greatest possible effect in a given time. We shall not, in this place, enter any farther upon this subject, trusting that what has been already advanced will be sufficient to point out the necessity of attending to such circumstances; and in the subsequent part of the present article, we will endeavour to explain in what manner the proper adjustment of power and effect may be computed.

The nature of the first movement being determined, the next object is to communicate it to the desired point, where the resistance is to be overcome; and much of an artist's skill depends upon performing this in the simplest and most effectual manner possible. In order to this, it frequently becomes necessary to convert one species of motion into another species: as, for example, a rotatory into a reciprocating motion, or a reciprocating into a rotatory motion, &c. &c. The methods of forming this communication are extremely numerous, and it will not therefore be expected that we should attempt an enumeration of them. In some instances, a simple lever or resilient cord will answer better than any combination; in others, it is highly advantageous to use a combination of levers acting upon each other by means of so many fulcra, and by which the direction of the motion may be changed at pleasure; in others, as when motion is communicated to a series of wheels and axles in succession, it may be effected by a rope running in grooves round one wheel and the succeeding axle, or by means of tooth and pinion work, by a barrel and endless screw, and various other contrivances which will naturally suggest themselves, according to the circumstances under which they arise.

This part of the construction being settled, other important circumstances require particular attention, *viz.* to adjust the several parts of the machine so, that its motion may be easy, free, and uniform. One of the most obvious methods of rendering a motion uniform is by means of a *pendulum* and *escapement* (see these two articles); and where these cannot conveniently apply, a fly is sometimes employed; for a particular description of which, see *FLY*. The uniformity of a machine is not, however, wholly dependent upon the application of such regulators: there are other points connected with this subject, that must not be overlooked, and on which we intend to offer a few remarks: consulting ourselves, for this purpose, of the observations of Dr. Robison. When heavy flumpers are to be raised, in order to drop on the matters to be pounded, the wipers by which they are lifted should be made of such a form, that the flumper may be raised by a uniform pressure, or with a motion almost perfectly uniform: if this is not attended to, and the wiper is merely a pin sticking out from the axle, the flumper is forced into action at once, which occasions violent jolts

jolts to the machine, and great strains on its moving parts, and their points of support; whereas, when they are gradually lifted, the inequality of the motion is never felt at that point of the machine where the power is applied. We have seen, says the professor, pistons moved by means of a double rack on the piston rod, where a half wheel takes hold of one rack, and raises it to the required height; and the moment the half wheel has quitted that side of the rack, it lays hold of the other side, and forces the piston down again. This was considered as an improvement of the common method of the crank, by correcting the unequal motion of the piston. But in fact it is far inferior to the latter, as it occasions such abrupt changes of motion, that the machine is shaken and torn to pieces with the jolts it occasions; a circumstance which will always be avoided as much as possible by a judicious engineer.

When several stampers, pistons, or other reciprocal movers, are to be raised and depressed, their times of action ought to be distributed in a uniform manner, so that the machine may always be equally loaded with work. When this is done, and the observations in the preceding paragraph attended to, the machine may be made to move almost as smoothly as if there were no reciprocations on it. Nothing shews the ingenuity of the constructor more than the artful, yet simple, contrivances for obviating those difficulties that unavoidably arise from the very nature of the work that must be performed by the machine, and of the power employed. We mentioned above, the conversion of the continued rotation of an axis into the reciprocating motion of a piston, and the improvement that was thought to have been made in the common and obvious contrivance of the crank, but which, as was observed, occasioned such jolts as would in a short time have destroyed the machine. In order to avoid this, in a large forge where a great sledge hammer of seven hundred weight was to be raised, the engineer formed the wipers into spirals, which communicated motion to the hammer almost without any jolt whatever: and under some circumstances, this contrivance would have been highly beneficial; but in the machine to which we allude, it would not apply, as it did not communicate a sufficient momentum to the hammer in its descent: yet it is deserving of notice, as it might in some cases become extremely advantageous.

In employing a power, which of necessity reciprocates, to drive machinery, in which a rotatory motion is required, as in applying the steam-engine to a cotton or grist-mill, considerable difficulties also arise, which must be attended to with particular care. The necessity of reciprocation on the first mover wastes much power, because the instrument that communicates such immense force must be extremely strong, and well supported. The impelling power is wasted in imparting, and afterwards destroying, a great quantity of motion in the working beam. The skilful engineer will attend to this, and do his utmost to procure the necessary strength of the first mover, without making it a vast load of inert matter: he will also remark that all the strains on it, and on its supports, are changing their direction on every stroke; which therefore requires particular attention in the manner of supporting it. If we observe steam-engines that have been long erected, we shall find that they have uniformly shaken the building to pieces, which is principally to be attributed to the inattention of the engineer to this circumstance; and experience has now taught us, that no building can long withstand the desultory and opposite jolts of such immense masses; and, consequently, that the great movements ought to be supported by a frame-work, independent of the building which contains it. Another cir-

cumstance, on which the uniformity of the motion depends, is the form given to the teeth of the wheel: this is of great importance, and has excited great attention amongst both theoretical and practical mechanicians. Two forms have been proposed: of these the first was given by La Hire, who affirmed that the pressure would be uniform, if the teeth were formed into cycloids; and M. Camus, in his "Cours de Mathematique," has adopted and perfected La Hire's principle, and applied it to the various cases that are likely to arise in practice. The construction, however, is liable to a limitation; on which account, a second method has been proposed, which secures the perfect uniformity of motion, without any such limitation. This consists of making both teeth portions of involutes of circles; but as we shall consider this subject under the articles *Tooth* and *Piston Work*, it will be useless to insist any farther upon it in this place; and we will therefore proceed to the theoretical investigation of the power of machines, and their maximum effect: limiting our observation to those principally whose motion is uniform, these forming by far the most numerous class, and the knowledge of which is, therefore, of the greatest importance.

Of the maximum Effects of Machines.—When forces acting in contrary directions, or in any such directions as produce contrary effects, there is with respect to every simple machine, and consequently with respect to every compound one, a certain relation between the powers and the distances at which they act, which, if subsisting in any such machine when at rest, will preserve it in that state of statical equilibrium; because the efforts of these powers, when thus related with regard to magnitude and distance, being equal and opposite, destroy each other, and have no tendency to change the state of the system to which they are applied. So also, if the same machine have been put into a state of uniform motion, whether rectilinear or rotatory, by the action of any power distinct from those we are now considering, and these two powers be made to act upon the machine in such motion, in a similar manner to that in which they act upon it when at rest, their simultaneous action will preserve it in that state of uniform motion, or dynamical equilibrium, and this for the same reason as before; because their contrary effects destroy each other, and have, therefore, no tendency to change the state of the machine. But if at the time a machine is in a state of balanced rest, any one of the opposite forces be increased, while it continues to act at the same distance, this excess of force will disturb the statical equilibrium, and produce motion in the machine; and if the same excess of force continues to act in the same manner, it will, like every constant force, produce an accelerated motion: or if it should undergo particular modifications, when the machine is in different positions, it may occasion such variations as will render it alternately accelerated and retarded. Or, the different forces of resistance to which a moving machine is subjected, as the rigidity of cords, friction, resistance of the air, &c. may so modify it, as to change a regular or irregular variable motion into one which is uniform. Hence, then, the motion of machines may be considered as of three kinds, as that which is gradually accelerated, which obtains commonly in the first instants of the communication; 2. That which is entirely uniform. 3. That which is alternately accelerated and retarded. Pendulum clocks and machines that are moved by a balance are related to the third class. Most other machines are of the second class, at least a short time after their motion is commenced.

Now, although the motion of a machine be alternately accelerated and retarded, it may, notwithstanding, be mod-

ured by an uniform motion, in consequence of the periodical and regular repetition which may exist in the acceleration and retardation. Thus, the motion of a second pendulum, considered in relation to a single oscillation, is accelerated during the first half second, and retarded during the second; but the same motion taken for many oscillations may be considered as uniform. Suppose, for example, that the extent of each oscillation is five inches, and that the pendulum has made ten oscillations; its total effect will be to have run over 50 inches in 10 seconds, and as the space described in each second is the same, we may compare the effects to a moveable, which moves for 10 seconds at the rate of five inches per second. We see, therefore, that the theory of machines, whose motions are uniform, conduces naturally to the estimation of the effects of those whose motion is alternately accelerated and retarded, so that what follows will be directed to those machines only, whose motion falls under the second head, such problems being of far the greatest utility in practice.

We have had already frequent occasion to make use of the terms *moving*, or *moving force* and *resistance*; and in what follows, they will be used in the same general sense. By the first is always to be understood any cause of motion whatever, and by the latter, any thing that is opposed to the action of the former. The *impelled point* of a machine, is that to which the action of the moving power may be considered as immediately applied; and the *working point* is that where the resistance arising from the work to be performed immediately acts, or to which it ought all to be reduced. Thus in the wheel and axle, *Plate I. fig. 6. Mechanics*, where the moving power P is to overcome the weight or resistance W, by the application of the cord to the wheel and to the axle, A is the impelled point, and E the working point. The *velocity of the moving power* is the same as the velocity of the impelled point; and the *velocity of the resistance*, the same as that of the working point. The *performance* or *effect* of a machine, or the *work done*, is measured by the product of the resistance into the velocity of the working point; and the *momentum of impulse* is measured by the product of the moving force into the velocity of the impelled point.

These definitions being established, we may exhibit a few of the most useful problems relative to the effect of machines, and with which we must conclude this article.

Let A B (*Plate XXXII. Mechanics. fig. 1.*) represent the velocity of a stream, A C the velocity of the part of the engine which it strikes, when the motion of the machine becomes uniform, and C B will represent their relative velocity, upon which the effect of the engine depends. It is known that the action of a fluid upon a given plane, is as the square of this relative velocity; consequently the weight raised by the engine, when its motion becomes uniform, being equal to this action, it is likewise as the square of C B. Let this be multiplied by A C, the velocity of the part of the engine, impelled by the fluid; and the effect of the engine in a given time will be proportional to $A C \times C B^2 =$ (supposing C B to be bisected in D) $A C \times 2 C D \times 2 D B = 4 A C \times C D \times D B$; consequently, the effect of the engine is greatest when the product of A C, C D, and D B is greatest. But it is easy to see, that this product is greatest when the parts A C, C D, and D B, are equal; for if you describe a semicircle upon A D, and the perpendicular C E meet the circle in E, then $A C \times C D = C E^2$, and is greatest when C is the centre of the circle; D that in order that $A D \times C D \times D B$ may be the greatest possible, A D must be bisected in C; and C B having been bisected in D, it follows

that A C, C D, D B, must be equal; or that A C, the velocity of the part of the engine impelled by the stream, ought to be but one-third of A B, the velocity of the stream. In this case, when, (abstracting from friction) the engine acts with the utmost advantage; the weight raised by it is to the weight that would just sustain the force of the stream, as the square of C B, the relative velocity of the engine and stream, to the square of A B, which would be the relative velocity, if the engine was quiescent; that is, as 2×2 to 3×3 , or 4 to 9. Therefore, that the engine may have the greatest effect possible, it ought to be loaded with no more than $\frac{4}{9}$ th of the weight, which is just able to sustain the efforts of the stream. See Maclaurin's Account of Sir Isaac Newton's Discoveries, p. 171, and Fluxions, art. 928.

Again, suppose that a given weight P, (*fig. 2.*) descending by its gravity in the vertical line, raises a greater weight W, likewise given, by the rope P M W, that passes over the fixed pulley M) along the inclined plane B D, the height of which B A is given; and let it be required to find the position of this plane, along which W will be raised in the least time, from the horizontal line A D to B. Let B C be the plane upon which, if W was placed, it would be exactly sustained by P; in which case, P is to W as A B to B C. But W is to the force with which it tends to descend along the plane B D, as B D to A B; consequently the weight P is to that force, as B D to B C. Therefore the excess of P above that force (which excess is the power that accelerates the motion of P and W) is to P, as $B D - B C$ to B D; or taking B H upon B C equal to B D, as C H to B D. But it is known that the spaces described by motions uniformly accelerated, are in the compound ratio of the forces which produce them and the squares of the times; or, that the square of the time is directly as the space described in that time, and inversely as the force; consequently, the square of the time in which B D is described by W, will be directly as B D, and inversely as $\frac{C H}{B D}$, and will be least when $\frac{B D^2}{C H}$ is a minimum; that is, when $\frac{B C^2}{C H} + C H + 2 B C$, or (because

$2 B C$ is invariable) when $\frac{B C^2}{C H} + C H$, is a minimum.

Now as when the sum of two quantities is given, their product is a maximum when they are equal to each other; so it is manifest, that, when their product is given, their sum must be a minimum when they are equal. Thus it is evident, that as in *fig. 1*, the rectangle or product of the equal parts A C and C D was equal to C E²; so the rectangle of any two unequal parts, into which A D may be divided, is less than C E², and A D is the least sum of any two quantities, the product of which is equal to C E². But

the product of $\frac{B C^2}{C H}$ and C H is $B C^2$, and consequently,

given: therefore the sum of $\frac{B C^2}{C H}$ and C H is least when

these parts are equal, that is, when C H is equal to B C, or B D equal to $2 B C$. It appears, therefore, that when the power P and weight W are given, and W is to be raised by an inclined plane, from the level of a given point A to the given point B in the least time possible; we are first to find the plane B C, upon which W would be sustained by P, and to take the plane B D double in length of the plane B C; or we are to make use of the plane B D, upon which

a weight

a weight that is double of W could be sustained by the power P .

For another example; suppose a fluid, moving with the velocity and direction AC , (*fig. 3.*) strike the plane CE ; and suppose that this plane moves parallel to itself in the direction CB , perpendicular to CA , or that it cannot move in any other direction. Then let it be required to find the most advantageous position of the plane CE , that it may receive the greatest impulse from the action of the fluid. Let AP be perpendicular to CE in P , draw AK parallel to CB , and let PK be perpendicular upon it in K , and AK will measure the force with which any particle of the fluid impels the plane CE in the direction CB . For the force of any such particle being represented by AC , let this force be resolved into AQ , parallel to EC , and AP perpendicular to it; and it is manifest, that the latter AP only has any effect upon the plane CE . Let this force AP be resolved into the force AL perpendicular to CB , and the force AK parallel to it; then it is manifest, that the former, AL , has no effect in promoting the motion of the plane in the direction CB ; but that the latter AK , only, measures the effort by which the particle promotes the motion of the plane CE in the direction CB . Let EM and EN be perpendicular to CA and CB , in M and N ; and the number of particles, moving with directions parallel to AC , incident upon the plane CE , will be as EM . Therefore the effort of the fluid upon CE being as the force of each particle, and the number of particles together, it will be as $AK \times EM$; or, because AK is to AP ($= EM$) as EN to CE , as $\frac{EM^2 \times EN}{CE}$;

so that CE being given, the problem is reduced to this, to find when $EM^2 \times EN$ is the greatest possible, or a maximum. But because the sum of EM and of EN ($= CM$) is given, being always equal to CE , it follows that $EN^2 \times EM$ is greatest when $EN^2 = \frac{1}{2} CE$; in the same manner as it was demonstrated above, that when the sum of AC and CB (*fig. 1.*) was given, $AC \times CB$ was greatest, when $AC = \frac{1}{2} AB$. But when $EN^2 \times EM$ is greatest, its square root $EN \times EM$ is of necessity at the same time greatest. Therefore the action of the fluid upon the plane CE , in the direction CB , is greatest when $EN = \frac{1}{2} CE$, and consequently $EM = \frac{1}{2} CE$; that is, when EM , the sine of the angle ACE , in which the stream strikes the plane, is to the radius, as the $\sqrt{2}$ to $\sqrt{3}$; in which case it easily appears, from the trigonometrical tables, that this angle is of $54^\circ 44'$.

Several useful problems in mechanics may be resolved by what was shewn in the preceding paragraph. If we represent the velocity of the wind by AC , a section of the sail of a windmill, perpendicular to its length by CE , as it follows from the nature of the engine, that its axis ought to be turned directly towards the wind, and the sail can only move in a direction perpendicular to the axis, it appears, that when the motion begins, the wind will have the greatest effect to produce this motion, when the angle ACE , in which the wind strikes the sail, is of $54^\circ 44'$. In the same manner, if CB represent the direction of the motion of a ship, or the position of her keel, abstracting from her leeway, and AC be the direction of the wind, perpendicular to her way, then the most advantageous position of the sail CE , to promote her motion in the direction CB , is when the angle ACE , in which the wind strikes the sail, is of $54^\circ 44'$. The best position of the rudder, where it may have the greatest effect in turning

round the ship, is determined in like manner, and the same angle enters likewise into the determination of the figure of the rhombuses that form the bases of the cells in which the bees deposit their honey in the most frugal manner. (*See Honey-Comb*) But it is to be carefully observed, that when the sine of the angle ACE is to the radius as $\sqrt{2}$ to $\sqrt{3}$; or, which is the same thing, when its tangent is to the radius as the diagonal of a square to its side; this is the most advantageous angle only at the beginning of the motion of the engine; so that the sails of a common windmill ought to be so situated, that the wind may indeed strike them in a greater angle than that of $54^\circ 44'$. For it is demonstrable, that when any part of the engine has acquired the velocity c , the effort of the wind upon that part will be greatest, when the tangent of the angle in which the wind strikes it, is to the radius, not as the

$\sqrt{2}$ to 1 , but $\sqrt{2} \times \frac{9c}{4a} \times \frac{3c}{2a}$ to 1 , the velocity of the wind being represented by a . If, for example, $c = \frac{1}{2}a$; then the tangent of the angle ACE ought to be double of the radius; that is, the angle ACE ought to be of $63^\circ 26'$. If $c = a$; then ACE ought to be of $74^\circ 19'$. This observation is of the more importance, because, in this engine, the velocity of the parts of the sail remote from the axis bears a considerable proportion to the velocity of the wind, and perhaps sometimes is equal to it; and because a learned author, Daniel Bernoulli, has drawn an opposite conclusion from his computations in his hydrodynamics, by mistaking a minimum for a maximum; where he infers, that the angle in which the wind strikes the sail, ought to decrease as the distance from the axis of motion increases: that if $c = a$, the wind ought to strike in an angle of 45° ; and that if the sail be in one plane, it ought to be inclined to the wind, at a medium, in an angle of 50° . How he fell into these mistakes, is shewn by Maclaurin, in his Fluxions, § 914.

In like manner, though the angle ACE of $54^\circ 44'$ be the most advantageous at the beginning of the motion, when a ship sails with a side wind; yet it ought to be enlarged afterwards as the motion increases. In general, let Aa (*fig. 3.*) parallel to CB , be to AC , as the velocity which the engine has already acquired, to the direction CB , to that of the stream; upon AC produced, take AD to AC as 4 to 3 , draw DG parallel to CB , and let a circle described from the centre C with the radius Ca , meet DG in g ; and the plane CE shall be in the most advantageous situation for promoting the motion of the engine, when it bisects the angle aCg .

It is generally supposed, that a direct wind always promotes the motion of a ship, the sail being perpendicular to the wind, more than any side-wind; and this has been affirmed in several late ingenious treatises; but, to prevent mistakes, we are obliged to observe, that Maclaurin has demonstrated the contrary in his Treatise of Fluxions, § 913; where other mistakes of this second general problem in mechanics are given, to which we refer. See Maclaurin's Account of Sir Isaac Newton's Philosophical Discoveries, book II. chap. 3. p. 173.

Let ε denote the absolute effort of any moving force, when it has no velocity, and suppose it not capable of any effort when the velocity is W ; let F be the effort answering to the velocity V , then if the force be uniform, we shall have

$$F = \varepsilon \left(1 - \frac{V}{W} \right)$$

For it is the difference between the velocities W and V which is efficient, and the action, being constant, will vary as the square of the efficient velocity. Hence we shall have this analogy,

$$\phi : F :: (W - \phi)^2 : (W - V)^2,$$

and, consequently,

$$F = \phi \left(\frac{W - V}{W} \right)^2 = \phi \left(1 - \frac{V}{W} \right)^2 \quad \text{Q E D.}$$

Although the pressure of an animal is not actually uniform during the whole time of its action, yet it is nearly so, and therefore in general we may adopt this hypothesis, in order to approximate to the true nature of animal action. On which supposition the preceding proposition, as well as the following one, will apply to animal exertion. By retaining the same notation, we have also

$$W = \frac{V \sqrt{\phi}}{\sqrt{\phi} - \sqrt{F}},$$

which formula, applied to the motion of animals, gives the following theorem.

The utmost velocity with which an animal unimpeded, can move, is to the velocity with which it moves when impeded with a given resistance: as the square root of its absolute force to the difference of the square roots of its absolute and efficient forces.

Again, to investigate expressions by means of which the maximum effect, in machines whose motion is uniform, may be determined.

1. It follows from the observations made in the preceding part of this article, that when a machine, whether simple or compound, is put into motion, the velocities of the impelled and working points are inversely as the forces which are in equilibrio when applied to those points in the direction of their motion. Consequently, if f denotes the resistance when reduced to the working point, and v its velocity; while F denotes the force acting at the impelled point, and V its velocity, we shall have $F V = f v$, or introducing t , the time, $F V t = f v t$. Hence

In all working machines which have acquired an uniform motion, the performance of the machine is equal to the momentum of the impulse.

2. Let F be the effort of a force upon the impelled point of a machine, when it moves with a velocity V , the velocity being W , when $F = 0$, and let the relative velocity $W - V = u$.

Then, since $F = \phi \left(\frac{W - V}{W} \right)^2$, by the foregoing proposition, the momentum of impulse $F V$ becomes

$$F V = V \phi \left(\frac{u}{W} \right)^2 = \phi \frac{u}{W} (W - u);$$

because, since $W - V = u$, we have $V = W - u$.

Now making this expression for $F V$ a maximum, or supposing the constant quantities, and making

$$u (W - u) = \text{a maximum,}$$

we have, by throwing it into fluxions,

$$2 u \dot{u} W - 3 u^2 \dot{u} = 0, \text{ or } 2 W = 3 u, \text{ or } u = \frac{2}{3} W;$$

whence, again, $V = W - u = W - \frac{2}{3} W = \frac{1}{3} W$.

Consequently, when the ratio of V to v is given by the construction of the machine; and the resistance is susceptible of variation, we ought to load the machine more or less, till the velocity of the impelled point is one-third of the greatest

velocity of the force, in order that the work done may be a maximum.

Or the work done by an animal is the greatest when the velocity with which it moves, is one-third of the greatest velocity with which it is capable of moving when not impeded.

Again, since we have

$$F = \phi \frac{u^2}{W^2} = \phi \frac{\frac{2}{3} W^2}{W^2} = \frac{4}{9} \phi,$$

in the case of the maximum, we have also

$$F V = \frac{4}{9} \phi V = \frac{4}{9} \phi \cdot \frac{1}{3} W = \frac{4}{27} \phi W,$$

for the momentum of impulse, or for the work done when the machine is in the best state.

Consequently, when the resistance is a given quantity, we must make

$$V : v :: 9 f : 4 \phi,$$

which structure of the machine will give the maximum effect = $\frac{4}{27} \phi W$.

If we enquire the greatest effect on the supposition that ϕ only is variable, we must make it infinite in the above expression for the work done, which would then become

$$W F, \text{ or } W \frac{V}{\phi} f, \text{ or } W \frac{V}{\phi} f t,$$

including the time in the formula.

Whence we come to this important conclusion, viz.

That the sum of the agents employed to move a machine may be infinite, while the effect is finite.

For the variations of ϕ , which are proportional to this sum, do not influence the above expression for the effect. The last theorem may be applied to the action of men and of horses, with more accuracy than might at first be supposed. Observations have been made on men and horses drawing a lighter along a canal, and working several days together. The force exerted was measured by the curvature and weight of the track rope, and afterwards by a spring steel-yard. The product of the force thus ascertained into the velocity per hour, was considered as the momentum; and in this way the action of the men was found to be very nearly as $(W - V)^2$. The action of the horses, loaded so as not to be able to trot, was nearly as $(W - V)^2$, or as $(W - V)^2$. Hence the hypothesis above adopted may, in many cases, be safely assumed. According to the best observations, the force of a man at rest is on an average about seventy pounds, and the utmost velocity with which he can walk is about six feet per second, taken at a medium. Hence in the above theorems $\phi = 70$, and $W = 6$; consequently $F = \frac{4}{9} \phi = 31 \frac{1}{3}$ lbs, the greatest force a man can exert when in motion, and he will then move at the rate of $\frac{1}{3} W$, or two feet per second, or rather less than 1 mile per hour.

The strength of a horse is generally reckoned about six times that of a man, that is, about 420 lbs. at a dead pull. His utmost walking velocity is about ten feet per second; and therefore his maximum action will be $6 \times 420 = 2520$ lbs, and he will then move at the rate of $\frac{1}{3}$ of 10, or $3 \frac{1}{3}$ feet per second, or nearly 2 miles per hour. In both these instances we suppose the force to be exerted in drawing a weight, by a cord running over a pulley, which makes its direction horizontal.

The theorem above given may serve to shew under what points of view machines ought to be considered by those who would labour beneficially for their improvement. The first object of utility is in furnishing the means of giving to

to the moving force the most commodious direction, and when it can be done of causing its action to be applied immediately to the body to be moved. These, it is true, can rarely be united, but the former may, in most instances, be accomplished; of which the use of the simple lever, pulley and wheel and axle, furnish many examples. The second object gained by the use of machines, is an accommodation of the velocity of the work to be performed, to the velocity with which alone a natural power can act. Thus, whenever the working power acts with a certain velocity, which cannot be changed, and the work must be performed with a greater velocity, a machine is interposed round a fixed support, and the distance of the impelled and working points are taken in the proportion of the two given velocities. But the essential advantage of machines, and that in fact which properly appertains to the theory of mechanics, consists in augmenting, or rather modifying the energy of the moving power, in such a manner that it may produce effects, of which it would otherwise have been incapable. Thus a man might carry up a flight of steps twenty pieces of stone, each weighing say 30lbs. one by one, in as small a time as he could, with the same labour, raise them all together with a piece of machinery, that would have the velocities of the impelled and working points as twenty to one, and in this case the instrument would furnish no real advantage except in saving his steps. But if a large block of 20 times 30, or 600lbs. were to be raised to the same height, it would far exceed his utmost efforts to accomplish it, without the intervention of some machine. Or the same purpose may be illustrated somewhat differently, confining the attention still to those machines whose motion is uniform. The product $f \times v$ represents, during the unit of time, the effect which results from the motion of the resistance; this motion being produced in any manner whatever. If it be produced by applying the moving force immediately to the resistance, it is necessary, not only that the product $FV = f \times v$, but also at the same time $F = f$ and $V = v$; if, therefore, as most frequently happens, f be greater than F , it will be absolutely impossible to put the resistance in motion, by applying the moving power immediately to it. Now, machines furnish the means of disposing of the product FV in such a manner, that it may always be equal to $f \times v$, however much the factors FV may differ from the analogous factors in $f \times v$; and consequently of putting the system in motion, whatever may be the excess of f above F . Or, generally, as Prony remarks, (*Arén. Hydraul. art. 501.*) machines enable us to dispose of the factors FV in such a manner, that while that product continues the same, its factors may have to each other any ratio at pleasure. Thus, to give another example: suppose that a man, exerting his strength immediately upon a mass of 25lbs. can raise it vertically, with the velocity of four feet per second; the same man acting upon a mass of 1000lbs. cannot give it any vertical motion, though he exerts his utmost strength, unless he has recourse to some machine. Now he is capable of producing an effect equal to $25 \times 4 \times t$; the letter t being introduced, because, if the labour be continued, the value of t will not be infinite, but comprised within assignable limits. Thus we have $25 \times 4 \times t = 1000 \times v \times t$; and, consequently, $v = \frac{1}{4}$ th of a foot. This man may, therefore, with a machine as a lever, or axis in *perpetua*, cause a mass of 1000lbs. to rise $\frac{1}{4}$ th of a foot in the same time that he could raise 25lbs. 4 feet without a machine; or he may raise the greater weight as far as he lists, by employing forty times as much time. From what has now been said on the extent of the effects which may be attained by machines, it will be seen, that so long as a moving force exercises a determinate

effort with a velocity likewise determinate, or so long as the product of these is constant, the efforts of the machine will remain the same: so that under this point of view, supposing the preponderance of the effort of the moving power, and abstracting from inertia and friction or material resistance, the convenience of application, &c., all machines are equally perfect. But from what has been shewn in the preceding part of this article, a moving force may, by diminishing its velocity, augment its effort, and reciprocally. There is, therefore, a certain effect of the moving force, such that its product by the velocity, which comports to that effort, is the greatest possible. Now admitting of the truth of the results in the preceding propositions $V = \frac{1}{2}W$, or $F = \frac{1}{2}R$, and these two values obtaining together their product, $\frac{1}{2} \times W$ expresses the value of the greatest effect with respect to the unit of time; and in practice it will always be advisable to approach as nearly to these values as circumstances will admit, for it cannot be expected that it can always be exactly attained. But a small variation will not be of much consequence: for by a well known property of those quantities, which admit of a proper maximum or minimum, a value assumed at a moderate distance from either of these extremes, will produce no sensible change in the effect.

If the relation of F to V followed any other law than that which we have assumed, we should find from the application of that law, values of F and V , less different from the preceding, but the general method would be still exactly the same.

With respect to practice, the grand object in all cases should be to procure an uniform motion. Because it is from that which, *ceteris paribus*, the greatest effect, always results. Every irregularity in the motion wastes some of the impelling power, and it is the greatest only of the varying velocities which is equal to that, which it would acquire if it moved uniformly throughout: for while the motion accelerates, the impelling power is greater than what it takes the resistance at that time opposed to it, and the velocity is less than what the machine would acquire, if moving uniformly; and when the machine attains its greatest velocity, it attains it because the power is not then strong enough to move the resistance. In both these cases, therefore, the performance of the machine is less than if the power and the resistance were exactly balanced, in which case it would move uniformly. Indeed, thus, when the motion of a machine, and particularly a very powerful one, is irregular, there are, as we have already remarked in the preceding part of the article, continual repetitions of strains and lulls, which soon derange, and ultimately destroy the whole structure.

In the preceding remarks and propositions relative to the maximum effect of machines, we have considered ourselves under an interesting chapter on this subject. General Principles of Mechanics, in which the theory is pursued to a much greater length than our limits will admit of, both with regard to machines and motions are uniform and accelerated, and to which we would refer the reader for further information. See also Prony's "Architecture Hydraulique" tom. iii. 487 to 507; and the last edition of Ferguson's Mechanics by Belcher, in which an interesting paper on this subject is given by professor Leslie.

MACHINE for taking down extemporaneous pieces of music, commonly called *volantines*. Such a contrivance has been long among musical *diffusions* of the most important kind. To fix such fleeting sounds as are generated in the extatic moments of enthusiasm, while the bright-eyed

"Scatters from her pictured urn,
Thoughts that breathe, and notes that burn,"

would be giving permanence to ideas which reflection can never find, nor memory retain.

The first idea of such a contrivance being practicable was suggested to the Royal Society of London, in a paper written by the late Rev. Mr. Creed, and sent to the president, 1747, under the following title:

"A demonstration of the possibility of making a machine that shall write *extempore voluntaries*, or other pieces of music, as fast as any master shall be able to play them, upon an organ, harpsichord, &c. and that in a character more natural and intelligible, and more expressive of all the varieties those instruments are capable of exhibiting, than the character now in use."

This paper was published the same year in the Philosophical Transactions, N. 183, and, afterwards, in Martyn's Abridgment, vol. x. p. 266; and the author's idea always appeared to us so feasible, that we have long wondered at its not having been executed by some ingenious English mechanic.

The first mention that we can find to have been made at Berlin, of such a contrivance, was in 1752, in a printed "Weekly Account of the most remarkable Discoveries in Nature and Science." In 1753, an ample description of such a machine appeared in the same weekly publication: and here, in an elaborate preface, the author points out the great want of such a piece of mechanism, its utility, and properties; and concludes with saying, that this machine, so big with advantages to music and musicians, is the *particular invention*, Besondere Erfindung, of M. Unger.

The description preceded the execution some time. The invention was here only recommended to the public, and offered to be completed, and applied to a keyed instrument, at a small expence. It was M. Hohlfeld who afterwards constructed the machine, and rendered it so perfect, that we were assured by a great performer, who tried it upon a clavichord, that there was no refinement in music which it could not express, except *tempo rubato*.

The description of the Berlin machine so much resembles that proposed by Mr. Creed, that we shall not insert it here, but refer our readers to the Philosophical Transactions, where he will find that the machine was to consist of two cylinders, which were to be moved by clockwork, at the rate of an inch in a second of time; one of these was to furnish paper, and the other was to receive it when marked by pins or pencils, fixed at the ends of the several keys of the instrument to which the machine was applied. The paper was to be previously prepared with red lines, which were to fall under their respective pencils.

The chief difficulties in the execution, which have occurred to English mechanics, with whom we have conversed on the subject, were, the preparation of the paper for receiving the marks made by the keys; and the kind of instrument which was to serve as a pencil, and which, if hard and pointed, would, in the *forte* parts, tear the paper; and if soft, would not only be liable to break when used with violence, but would be worn unequally, and want frequent cutting.

In the Berlin machine the pencils were approximated according to Mr. Creed's idea, and made to terminate in a very narrow compass, so that paper of an uncommon size was not requisite; but it was not found necessary to prepare the paper, as proposed in the Philosophical Transactions: for the degree of gravity or acuteness of each sound was ascer-

tained by a ruler applied to the marked paper, when taken off the cylinder.

About the year 1780, the late ingenious and marvellous mechanic Merlin, stimulated by the reports of this machine having been successfully constructed in Germany, and by our earnest recommendation of the undertaking, went to work, and apparently vanquished all the difficulties of construction, except the time inevitably necessary for its completion; as he was never able to simplify the mechanism so much as to render its appropriation within the reach of great composers and voluntary players in general, to whose use only it seems to belong; he disposed of his model to a foreign nobleman, who had it conveyed to Germany, and we believe never fabricated another machine of the same kind. See MERLIN.

MACHINE, in *Dramatic Poetry*, is when the poet brings some divinity or supernatural being upon the stage: to perform some exploit, or solve some difficulty, out of the reach of human power.

The machines of the drama are gods, angels, ghosts, &c. They are so called from the machines or contrivances by which they are represented upon the stage, and afterwards removed again.

Hence the use of the word machine has also passed into the epic poem; though the reason of its name be there wanting. It denotes, in both cases, the intervention or ministry of some divinity; but as the occasion of machines in the one and the other is somewhat different, the rules and laws of managing them are different likewise.

The ancient dramatic poets never brought any machine on the stage, but where there was an absolute necessity for the presence of a god; and they were generally laughed at for suffering themselves to be reduced to such a necessity. Accordingly, Aristotle lays it down as an express law, that the unravelling of the piece should arise from the fable itself, and not from any foreign machine, as in the *Medea*. Horace is somewhat less severe, and contents himself with saying, that the gods should never appear, unless where the *nodus*, or knot, is worthy of their presence; "*Nec deus interit, nisi dignus vindice nodus—inciderit.*" But it is quite otherwise with the epopee; in that there must be machines every where, and in every part. Homer and Virgil do nothing without them. Petronius, with his usual fire, maintains, that the poet should deal more with the gods than with men; that he should every where leave marks of his prophetic raptures, and of the divine fury that possesses him; that his thoughts should be all full of fables, that is, of allegories and figures: in fine, he will have a poem distinguished from a history in all its parts; not so much by the verses, as by that poetical fury, which expresses itself wholly by allegories; and does nothing but by machines, or the ministry of the gods. A poet, therefore, must leave it to the historian to say, that a fleet was dispersed by a storm, and driven to foreign shores; and must himself say, with Virgil, that Juno went to seek *Æolus*; and that this god, at her request, turned the winds loose against the Trojans: he must leave the historian to write, that a young prince behaved with a great deal of prudence and discretion on all occasions; and must say, with Homer, that Minerva led him by the hand in all his enterprises: let an historian say, that Agamemnon, quarrelling with Achilles, hath a mind to shew him, though mistakenly, that he can take Troy without his assistance; the poet must say, that Thetis, piqued at the affront her son had received, flies up to heaven, thence to demand vengeance of Jupiter: and that this god, to satisfy her, sends the god *Somnus*, or Sleep, to Agamemnon,

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to deceive him, and make him believe that he shall take Troy that day.

It is thus that the epic poets used machines in all parts of their works; in the *Iliad*, *Odyssey*, and *Æneid*, the proposition mentions them; the invocation is addressed to them; and the narration is full of them: they are the causes of actions; they make the knots, and at last they unravel them. This last circumstance is what Aristotle forbids in the drama; but it is what Homer and Virgil have both practised in the epopea. Thus Minerva fights for Ulysses against Penelope's lovers; helps him to destroy them; and, the next day, herself makes the peace between Ulysses and the Ithacans; which closes the *Odyssey*. The use of machines in the epic poem is, on some accounts, entirely opposite to what Horace prescribes for the theatre. In tragedy, that critic will never have them used without an absolute necessity; whereas, in the epopea, they should never be used, but where they may be as well let alone; and where the action appears as if it did not necessarily require them. How many gods and machines does Virgil implore to raise the storm that drives Æneas into Carthage; which yet might easily have happened in the ordinary course of nature.

In Milton's *Paradise Lost*, most of the actors are supernatural personages; and in Voltaire's *Henriade*, the poet has made excellent use of St. Louis.

Machines, in the epic poem, therefore, are not contrivances of the poet, to recover himself after he has made a false step, nor to solve any difficulty peculiar to some part of the poem; but it is the presence of a divinity, and some supernatural and extraordinary action, which the poet inserts in most of the incidents of his work, to render it more majestic and admirable, and to train up his readers to piety and virtue. This mixture should always be so managed, as that the machines may be retrenched, without retrenching any thing from the action. As to the manner in which the machines are to act; it may be observed, that in the old mythology, there are gods both good, bad, and indifferent; and that our passions may be converted into so many allegorical divinities: so that every thing, both good and bad in a poem, may be attributed to these machines, and may be transacted by them. They do not, however, always act in the same manner; sometimes they act without appearing, and by simple inspirations, which have nothing in them extraordinary or miraculous; as when we say, the devil suggested such a thought, &c. The second manner of acting is entirely miraculous; as when a divinity presents itself visible before men, so as to be known by them; or when they disguise themselves under some human form without discovering themselves. The third manner partakes of each of the two, and consists in oracles, dreams, and extraordinary inspirations: all which Boileau calls *divi machines*.

All these manners ought to be so managed as to carry a verisimilitude: and though verisimilitude be of a vast extent in machines, as being founded on the divine power, yet it has its bounds. See farther, on the importance and use of machinery, the article *Epic Poem*.

MACHINE, in *Agriculture*, a term applied to instruments of various kinds which are contrived either for the purpose of lessening labour or performing the different operations and processes of the art with greater accuracy and correctness, such as those of sowing, drilling, reaping, threshing, winnowing, and a great many others. The term is most commonly employed when the nature of the tool is of the more complex kind. It may, however, be employed with propriety in many other circumstances. See *THRESHING Machine*.

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MACHINE, *Architectonical*, is an assemblage of pieces of wood so disposed, as that, by means of ropes and pulleys, a small number of men may raise vast loads, and lay them in their places. Such are cranes, &c.

It is hard to conceive what sort of machines the ancients must have used to raise those immense stones found in some of the antique buildings. See MACHINE, *supra*.

MACHINE, *Blowing*. See BELLOWS, and BLOWING MACHINE.

MACHINE, *Bruising*, a contrivance for the purpose of crushing and reducing gram, pulse, malt, and other articles, some of which are employed as team food. Machines of this kind are made in London by Rowntree and others.

MACHINE, *Chaff-cutting*, a tool contrived for the purpose of cutting straw, hay, and other similar materials into chaff for the purpose of food for team-horses, and other animals. There are various descriptions of this kind of machinery which act on very different principles, and some of them have lately undergone very much improvement. See CHAFF-CUTTER.

MACHINE, *Draught*, a simple contrivance formed for the purpose of ascertaining the force or power of draught, in drawing ploughs, and various other implements where draught is required. A machine of this sort, invented by Mr. More, late secretary to the Society for the Encouragement of Arts, &c. in London, is thus described by Mr. Young in the first volume of the *Annals of Agriculture*. It is a spring coiled within a cylindrical case, having a dial-plate, marked with numbers like that of a clock, and so contrived that a hand moves with the motion of the spring, and points to the numbers in proportion as the force is exerted: for instance, when the draught equals 1 cwt. over a pulley, the hand points to *fig. 1*; when the draught is equal to 2 cwt. it points to *fig. 2*; and so on. Till this very useful machine was invented, Mr. Young says, it was exceedingly difficult to compare the draught of different ploughs, as there was no rule to judge but by the exertions of the horses as apparent to the eye; a very indecisive mode of ascertaining their force.

MACHINE, *Drill*, that sort of tool which is employed in sowing and depositing various kinds of grain, pulse, and small seeds, in drills or rows. They are very differently formed, according to the purposes for which they are intended, and the manner of drilling which is intended to be practised.

They require to be constructed with great correctness, and in as simple a manner as possible, in order that they may perform their work with accuracy, both in respect to the drills, the quantity of seed, and the depth of depositing it in the soil.

In the choice of this sort of machinery, the farmer should be principally directed by the nature and extent of his land, the situation which it possesses, and the kinds of crops which he intends to cultivate. They have lately been so contrived, as, by slight alterations in the sowing parts, to be capable of not only sowing grain as well as small seeds, but of executing the work at different distances, and in a greater or less number of rows at once, as circumstances may require.

There are several machines of this nature, which perform the business in a very exact and regular manner; among which are Cook's, Bailey's, Amos's, McDougal's, and many others; each of which sow several rows at the same time, and some of them are likewise capable of forming horse-hoes.

Besides these, there are also drills constructed for particular

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cular sorts of crops, as those of peas, beans, turnips, &c. See *Plough Drill*, and *Turnip Drill*.

A drill machine, invented by Mr. Robert Salmon of Woburn, Bedfordshire, which obtained the premium given by the duke of Bedford, at Woburn sheep-shearing, a few years ago, for the best newly-invented agricultural implement, is described below. This machine drills and sows at the same time; and the principal improvement in it, as in Cook's drill, and others, consists in constructing it in such a manner, that the workman who holds the drill has a perfect command upon it, with respect to the direction in which it shall move, even though the horse which draws it should deviate from the line the drill is intended to follow. In *Plate (Machines) Agriculture*, is given a descriptive representation of the machine, in which *fig. 1* is a section of a part, *fig. 2* an elevation of the same, *fig. 4* is a perspective view of the whole, and *figs. 3* and *5* detached parts.

The great wheels, A, A, *fig. 4*, have their axle-trees attached to the bed B, to which are framed the long handles, D, D, forming a frame independent of the remainder of the machine, and having no connection with it, except in the middle of the bed B, where a short beam, E, is jointed to it, as is well explained in *fig. 1*; the other end of this beam is mortised into a cross beam F, to which the three drills, G, G, G, are fixed; a frame formed of two horizontal pieces, H, H, *figs. 2* and *4*, and four vertical pieces, I, I, I, I, is erected upon F; the handles, D, D, pass between H, H, but are not fixed thereto; the hook a, by which the machine is drawn, is fixed to the two middle uprights, I, I, and a strong chain leads to the harness of the horse employed; K is the feed-box supported from H, H, by two uprights for the purpose; the box is a frustum of a pyramid, and joins at the bottom to a prismatic box, containing the feed-roller b, *fig. 1*, which is exactly the same length as the box, and comes through its ends, its pivots being supported by a piece of iron-plate fixed at the end of the box, as seen in *fig. 4*; a brush, d, presses upon the roller, and is adjustable by a screw that it may always bear upon it with an equal degree of force; a number of notches is cut in the circumference of the roller, and as the box K is full of seed, it always rests upon the roller; when it turns round, it takes one of the notches full of seed, and passing it by that means under the end of the brush d, delivers it into a tin-plate tube r, which conveys it down into the furrow made by the drill; the roller has three series of notches answering to the three drills G, G, G; at e, a piece of leather presses against the roller, to prevent any seed getting down, except that which passes under the brush d; f is a slider, which stops the seed from coming down to the roller, when shoved in, and is used when the machine is required to advance without sowing, or when a lesser number of rows is required to be sown. The roller is turned by means of an endless chain, q q, passing round a groove made in the middle of the roller, from thence it proceeds through a block of pulleys at t, shewn separate in *fig. 5*, to a small wheel b; the block, t, is made of cast-iron, and slides freely up and down between the two innermost uprights, I, I, of the frame; its weight keeps the chain always tight, and prevents it from slipping without turning the roller; the wheel, b, is fixed upon an axle p, on the end of which is a cog-wheel, turned by another cog-wheel on the nave of the great wheel A; these wheels are enclosed in a box l, which likewise contains a contrivance for disengaging the wheels, shewn on a larger scale in *fig. 3*, where p is a section of the axle p, passing through a long staple fixed to the bed B; it can slide up and down in this staple, except when confined by a catch o, pressed against it by a spring. In the present

position, the cog-wheels are engaged to work together: but by pulling the cords m and l, the former draws back the catch o; and the other, by means of the crooked lever n n, raises up the axle p, and disengages the cog-wheels; the return of the catch, o, prevents its descent; the cords, l and m, are conducted to the end of the handles, D, D where they are both attached to one handle, in reach of the workman who guides the machine.

The operation of the drill is exceedingly simple. As the horse draws it along by means of the chain, the drills, G, G, G, make the furrows, and the feed-roller delivers the seed in small quantities, and at regular intervals into them. As the hook a, from which the chain draws, is placed nearly in the centre of the machine, it will easily be made to follow any other line than that in which the horse draws, by turning the handles, D, D, to one or other side. This alters the direction of the wheels, A, A, which immediately proceed in that line, and the drill follows them. This quality is of the greatest consequence in making straight work. L is a cross piece fixed to the handles, D, D, and supporting a handle M, by which, and one of D, the workman holds when he guides the drill, as he is then in a position to see the drills made last, and adapt the present ones to them; the wheel always going in the last made drill. Another handle, similar to M, is fixed to the other end of L, to be used when the machine is on the other side of the work done last. The drills are fixed to the piece F by screws, and their distance from one another can be altered at pleasure. The feed-box containing the roller is made in two halves, connected by hooks, so that it can be taken apart, and the roller removed for a fresh one to be put in with different sized notches, for sowing a different kind of grain.

The drawing was taken from a machine made by Mr. Shepherd, Woburn, and exhibited at Woburn sheep-shearing, June 1808. Mr. Salmon has made a great number of the same pattern, which are now in use, and are found to answer well. Several of them have five drills instead of three, and are in that case worked by one horse.

In this drill, at whatever distance the shares are placed to go from each other, the distance from the wheels to the two outside rows is always equal thereto; consequently, when at work, one or the other of the wheels always runs in the last made drill, thereby gauging accurately the interval between each bout the drill goes; and as the holder always goes in the line of the wheel, he can distinctly see and correct the smallest error that may have been made in any previous bout.

In all cases, one horse is sufficient to draw this drill either for three or more rows, as little depends on the horse's inclination; and a driver can be dispensed with, where tractable horses are used. As in all machines of this sort, in proportion to the number and distance of rows made, so will be the quantity of work performed.

MACHINE, *Electrical*. See *ELECTRICAL Machine*.

MACHINE, *Fan*, in *Agriculture*, a common name applied to that sort of tool which is employed in removing the chaff from the grain. See *WINNOWER Machine*.

MACHINE, *Land-Levelling*, the name of an useful machine, invented by Mr. David Charles, for the purpose of rendering high ridges and other inequalities, in such lands as are in a state more level and even in their surfaces. It would seem probable that no effective implement of this sort has hitherto been introduced. But such a machine is said, in "Transactions of the Society of Arts," to be useful and necessary even in the most fertile parts of the country, where the improved system of drill-husbandry has been

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been introduced, or even where there is any attention to the waste of time, or to the ease of cattle in the act of ploughing; in order to get rid of crooked or unequal ridges, without either a summer fallow by cross ploughing, or else by frequent repetitions of ploughing in the winter and spring, which the humidity of this climate will not allow in every kind of soil. "Fourteen acres of land were reduced with this tool by the inventor to a perfect level, where the crowns of the ridges were about two feet higher than the furrows, and where they were crooked and of unequal breadths. But the chief success has been upon a field of eight acres, which lay in an unprofitable state, and which is a deep clay, that had produced a crop of wheat from an old lay sod the former year, without any manure, which was winter ploughed, and lay in that state until the machine was introduced the first dry weather in April. It was preceded by two horse ploughs, taking perhaps a square of an acre at once: these loosened the soil the depth of a common furrow, and twice the breadth across the ridges. The levelling machine followed, drawn by two oxen and two horses, with a man at each handle, to press it down where the height was to be removed, and to lift up the body by the handles where it was to be discharged. Thus, four men, one driver, and eight head of cattle, will more effectually level from half an acre to three roods in one day, according as the earth is light or heavy, than sixty or eighty men would accomplish with harrows and shovels, &c. even with the assistance of a plough. In sandy ground, where the depth of one furrow will bring a l to a level, as much, of course, will be done in one day as two ploughs can cover;" but in this case, the ground required to be gone over several times. It is further stated, that "after this field was levelled, the backs of the ridges, as they are termed, which were stripped of their vegetable mould, were ploughed up, the furrows not requiring it. They were also harrowed, and the field copiously manured with lime-compost, harrowed in, and broke into nine feet ridges, perfectly straight, in order to introduce Duckitt's drill. It was sown under furrow, broad-cast, the last of it not until the 13th of May, and was cut down a reasonable crop the 4th of September." And "the field now lies in proper form, well manured, with the advantage of a fair crop from heavy tenacious ground, without losing a season, and in a year by no means favourable." The writer is "well aware there are many shallow soils, where it may be hazardous to remove the enriched surface, and trust perhaps one half of the land for a crop that had never before been exposed to the atmosphere; but where the soil is sufficiently deep, or there is a good under-stratum, with manure at hand to correct what is sour for want of exposure and tillage, it is evident, from this experiment, that no risk is run." And in order "to avoid the expence of a fallow, and to lay out ground in straight and even ridges, even where drill husbandry is not practised, should be objects to every rational farmer: but where the new system is intended to be adopted, it becomes indispensibly necessary. In laying down lawns, parks, &c. where furrows are an eye-sore, or places inaccessible to wheel-carriages from their declivity, and from which earth is to be removed, it will also be found equally useful." Besides these, there are many other cases in which the old rounded ridges may be levelled down with great advantage, either by this or some other means.

A representation of this machine is given at *fig. 1.* in *Plate (Machines) Agriculture*, in which *a*, *fig. 2.* is a part of the pole, to which the oxen or horses which draw the machine are fastened, and which is attached to the machine by a pin at *b*; *c, c,* the two wheels, shod with iron, which run upon the axle *d*; *e, e,*

the upper frame work of the machine, extending from the axle to the extremity of the handles, *f, f.* and secured firmly by the cross pieces, *g, g,* the curved iron sliders of the machine, which may be raised or depressed a little by means of the pins, *h, h,* which pass through holes in the wood-work, and also in the iron sliders. These sliders form one piece with the back iron scraper *i*, in the manner more fully explained in *fig. 3, k*, the wooden back of the machine, which should be made strong, to resist the weight of the earth when collected therein. The iron scraper should be firmly secured to this by screws and iron work; *l, l,* the wooden sides of the machine, firmly connected with the back and frame work, in order to assist in collecting the earth to be removed; *m*, a strong cross piece, into which the ribs which support the back are well mortised.

The interior part of the back of the machine is shewn at *k*, in *fig. 3*: *i*, the iron scraper, sharp at the bottom, firmly screwed to the back of the machine; *g, g,* parts of the side irons or sliders, shewing the mode in which they are united with the scraper *i*; *m*, the cross piece already described.

MACHINES, Military, among the *Ancients*, were of three kinds: the first serving to launch arrows, as the scorpion; or javelins, as the catapulta; or stones, as the balista; or fiery darts, as the pyrobolus: the second serving to beat down walls, as the battering ram and terebra; and the third to shelter those who approach the enemies wall, as the tortoise or testudo, the vinea, pluteus, and the towers of wood. These machines, together with their proportions and properties, are described in the works of Vitruvius, Ammianus Marcellinus, and other writers. Mr. Grose has given descriptions and drawings of these in the *first* volume of his "Military Antiquities," chap. xii.

MACHINE, Stone-lifting, in *Agriculture*, an implement of the triangle kind, similar to that used by wood-cutters for weighing bark, constructed for the purpose of raising large stones of some tons weight used in the northern parts of Scotland, and many other places. It is supposed to save much expence in powder and boring as well as labour, three men being sufficient to work it. It is described in the *Agricultural Survey of Perthshire* in this manner.

"The three legs, *a d*, *b d*, and *c d*, which are shewn at *fig. 4*, are beams of any hard wood, four inches thick; six inches broad, and about fourteen feet long. Their thinnest side points inwards, which gives them more strength. Their feet form on the ground an equilateral triangle *abc*, and their three tops at *d* are fixed together by an iron rod, which passes through each. The two legs *a d* and *b d* are fixed to one another by the windlafs *k*, and by the cross-bar *o p q*. There are two pulleys *e* and *f*, with an iron hook two inches in circumference to each; *g g g* may be (more than one, but rather) one iron chain which goes round the stone *n*, while lying in the ground at *m*. below its greatest diameter, or where it begins to become narrow. This chain consists of rounded links, which are about three inches long, and about the thickness of a man's little finger. It has a hook at one end, that may be put into any hook towards the other end, which will make it embrace the stone exactly, and be of the same circumference, where the stone touches the earth; *h g*, *h g*, *h g*, are shorter chains of the same workmanship, whose hooks are fixed into links of the surrounding chain at *g g g*, and to on round the stone, having the corresponding link of each fixed on the hook of the lower pulley at *h*. The whole rope must be of the same thickness with the two great hooks, two inches in circumference.

"All things being thus prepared, two men turn round the handles of the cylinder, and the waggoner adding them

by applying a lever to any side of the stone that seems to be firmest, they force it aloft, and hold it up at the proper height, until the diver put his carriage backward between *b* and *c*, which carriage ought to have a strong frame upon four low stout wheels; then the stone is let gently down and carried away."

By this sort of machine large stones or other bodies can be raised and removed without any great difficulty.

MACHINE, Threshing, a contrivance made use of instead of the flail for threshing corn and other feed crops. See *THRUSHING Machine*.

MACHINE, Water, or Hydraulic, is either used to signify a simple machine, serving to conduct or raise water; as a sluice, pump, &c. or several of these acting together, to produce some extraordinary effect; as the

MACHINE of Marli. See *MARLI*. See also *FIRE-engine*, *STEAM-engine*, and *WATER-wheels*.

MACHINE, Water-raising, a sort of machine contrived for the purpose of raising water a few feet high by the power of the wind, for the purpose of draining morasses, or of watering lands on a higher level, and other similar uses. A section of it is given at *fig. 5*, and it is described by the author of the *Philosophy of Agriculture and Gardening* to "consist of a windmill sail placed horizontally, like that of a smoke-jack, surrounded by an octagon tower; the diverging rays of this tower, *a b, a b*, may consist of two-inch deals only, if on a small scale, or of brick-work if on a larger one. These upright pillars are connected together by oblique horizontal boards at *A B*, by which boards placed horizontally from pillar to pillar in respect to their length, but at an angle of about 45 degrees in respect to their breadth, so as to form a complete octagon, including the horizontal windmill sail near the top of it; the wind, as it strikes against any of them, from whatever quarter it comes, is bent upwards, and then strikes against the horizontal wind-sail. These horizontal boards, which form the sides of the octagon, may either be fixed in their situations, or be made to turn upon an axis a little below their centres of gravity, so as to close themselves on that side of the octagon tower most distant from the wind. It may be supposed that the wind thus reflected, would lose considerably of its power before it strikes on the wind-sail; on fixing a model of such a machine, however, on the arm of a long whirling lever, with proper machinery to count the revolutions of the wind-sail, when thus included in a tower, and moving horizontally; and then when moved vertically, as it was whirled on the arm of the lever with the same velocity, it was found on many trials by Mr. Edgeworth, in Ireland, and Dr. Darwin, at Derby, that the wind, by being thus reverted upwards by a fixed planed board, did not seem to lose any of its power. And as the height of the tower may be made twice as great as the diameter of the sail, there is reason to conclude, the doctor thinks, that the power of the horizontal wind-sail may be considerably greater, than if the sail was placed nearly vertically opposed to the wind in the usual manner. At the bottom of the shaft of the wind-sail is placed a centrifugal pump with two arms at *D, C*, which consists simply of an upright bored trunk, or cylinder of lead, with two opposite arms with an adapted valve at the bottom to prevent the return of the water, and a valve at the extremity of each arm to prevent any ingress of air above the current of the water as it flows out; *c c c c* is a circular trough to receive the streams of water from *C* and *D*, to convey them where required in any particular operation or process.

And at *fig. 6* is another machine, invented by Mr. Sergeant, of Whitehaven, calculated for raising or forcing

water in particular cases, as for domestic or other uses. It is extremely simple and cheap in its construction, the whole, exclusive of the pump pipes, &c. not costing more than five pounds. The object for which it was particularly contrived was that of raising water for the supply of a gentleman's house from a stream running at the distance of about 140 yards. In which intention a dam was made a little distance above, so as to cause a fall of about four feet, the water being brought by a wooden trough, into which was inserted a piece of two-inch leaden pipe, a part of which is seen at *a*, in the figure; the stream of this pipe is so directed as to run into the bucket *b c*, when the bucket is elevated; but as soon as it begins to descend, the stream flows over it, and goes to supply the wooden trough, or well, in which the foot of the forcing pump, *c*, stands, of three inches bore; *d* is an iron cylinder attached to the pump rod, which passes through it, which is filled with lead, and is in weight about 240 pounds. This is the power which works the pump, forcing the water through 240 feet of inch pipe from the pump up to the house. At *e* a cord is fixed, which, when the bucket comes to within four or five inches of its lowest projection, becomes stretched, and opens a valve at the bottom of it, through which the water discharges itself. This sort of pump may be found very beneficial in a variety of instances where its application can be admitted.

MACHINE, Wind. See *ANEMOMETER*, and *WIND Machine*.

MACHINERY, in the Lyric theatre, or Opera-house. In the early operas of Italy, during the 17th century, it seldom happened that the names of the poets, composers, or singers, were recorded in printed copies of the words; though that of the machinist was seldom omitted; and much greater care seems to have been taken to amuse the eye than the ear or intellect of those who attended these spectacles.

In 1675, we are told, in the *Theatrical Annals of Venice*, that a musical drama, called *La Divisione del Mondo*, written by Giulio Cesare Corradi, and set by Legrenzi, excited universal admiration, by the stupendous machinery and decorations with which it was exhibited. And in 1680, the opera of *Berenice*, set by Domenico Freschi, was performed at Padua in a manner so splendid, that some of the decorations recorded in the printed copy of the piece seem worthy of notice in this article. The musical drama consisted of poetry, music, dancing, machinery, and decorations; and it would be curious to point out the encephalometers which any one of these constituent parts at different periods has made upon the rest. In the beginning it was certainly the intention of opera legislators to favour Poetry, and make her mistress of the feast; and it was a long while before Music absolutely took the lead. Dancing only slept into importance during the last century; but very early in the 17th century, machinery and decorations were so important, that little thought or expence was bestowed on poetry, music, or dancing, provided some means could be devised of exciting astonishment in the spectators, by splendid scenes and ingenious mechanical contrivances.

In the opera of *Berenice* just mentioned, there were choruses of one hundred virgins, one hundred foldiers, one hundred horsemen in iron armour, forty cornets of horse, six trumpeters on horseback, six drummers, six ensigns, six sacbuts, six great flutes, six minstrels playing on Turkish instruments, six others on octave flutes, six pages, three sergeants, six cymbalists, twelve huntmen, twelve groomes, six coachmen for the triumph, six others for the procession, two lions led by two Turks, two elephants by two others, *Berenice's* triumphal car drawn by four horses, six other cars with prisoners and spoils drawn by twelve horses, six coaches

coaches for the procession. Among the scenes and representations in the first act, was a vast plain, with two triumphal arches; another, with pavilions and tents; a square prepared for the entrance of the triumph; and a forest for the chase. Act II. the royal apartments of Berenice's temple of vengeance; a spacious court, with a view of the prison; and a covered way for the coaches to move in procession. Act III. the royal dressing room, completely furnished; stables with one hundred live horses; portico adorned with tapestry; a delicious palace in perspective. And besides all these attendants and decorations, at the end of the first act, there were representations of every species of chase: as of the wild boar, the stag, deer, and bears; and at the end of the third act, an enormous globe descends from the sky, which opening divides itself into other globes that are suspended in the air, upon one of which is the figure of Time, on a second that of Fame, on others, Honour, Nobility, Virtue, and Glory. Had the salaries of singers been at this time equal to the present, the support of such expensive and puerile toys, would have inclined the managers to enquire, not after the best, but the cheapest vocal performers they could find; as splendid ballets often oblige them to do now; and it is certain, that during the 17th century, the distinctive characteristic charm of an opera was not the music, but machinery. The French established musical dramas in their court and capital during the rage for mythological representations, to which they have constantly adhered ever since; and when they are obliged to allow the musical composition and singing to be inferior to that of Italy, they comfort themselves and humble their adversaries by observing, that their opera is, at least, a fine thing to see: "c'est au moins un beau spectacle, qu'un opera en France."

MACHINERY, in *Mechanics*, may be considered as the operative and moving parts of machines; it is, however, very generally, though perhaps improperly, applied to include all the parts of machines, fixed as well as moving, and in this view may be considered as the instruments or parts by which the principles of mechanics are carried into execution, and rendered applicable to all the purposes of arts and manufactures.

The denomination machine is now vulgarly given to a great variety of subjects that have very little analogy by which they can be classed with propriety under one name: we say a travelling machine, a bathing machine, a copying machine, a threshing machine, an electrical machine, &c. &c. The only circumstances in which all these agree, seem to be, that their construction is more complex and artificial than the utensils, tools, or instruments which offer themselves to the first thoughts of uncultivated people; they are more artificial than the common cart, the bathing tub, the flail, or the glass tube which first discovered the phenomena of electricity. In the language of ancient Athens and Rome, the term was applied to every tool by which hard labour of any kind was performed; but in the language of modern Europe, it seems restricted either to such tools or instruments as are employed for executing some philosophical purpose, or of which the construction employs the simple mechanical powers in a conspicuous manner, so that their operation and energy engage the attention. It is nearly synonymous, in our language, with *engine*; a term altogether modern, and in some measure honourable, being bestowed only, or chiefly, on contrivances for executing work in which ingenuity and mechanical skill are manifest. Either of these terms, machine or engine, is applied with impropriety to contrivances in which some piece of work is not executing on materials, which are then said to be manufactured. A *travelling* or *bathing* machine is surely a vulgarism.

A machine or engine is, therefore, a tool, but of complicated construction, peculiarly fitted for expediting labour, or for performing it according to certain invariable principles: and we should add, that the dependence of its efficacy or mechanical principles must be apparent, and even conspicuous.

The contrivance and erection of such works constitute the profession of the engineer; a profession which ought by no means to be confounded with that of the mechanic, the artisan, or manufacturer. It is one of the *Artes liberales*; as deserving of the title as medicine, surgery, architecture, painting, or sculpture. Nay, whether we consider the importance of it to this flourishing nation, or the science that is necessary for giving eminence to the professor, it is very doubtful whether it should not take place of the three last named, and go *pari passu* with surgery and medicine.

In the language of our practical mechanics, the terms *machine*, *engine*, and *mill*, are used without a proper distinction of the classes of machinery to which they should in strictness be applied. All these denominations are alike the practical applications of the science of mechanics, and consist only of different combinations of the mechanical powers. Though the combinations and modifications which the ingenuity of mankind is constantly producing are endless, still it is possible, by a proper classification, to arrange them under their proper terms, to avoid the confusion which at present prevails amongst those of our ingenious countrymen, who have laboured to improve the arts dependent on mechanics, without troubling themselves to fix upon the most precise language in which to express their ideas. If we might presume to decide upon a proper definition of these words, which has not hitherto been done, we should advise that the term machine be used as generic, and applied to any mill, engine, instrument, or apparatus having moving parts. That machinery should also be used as a general term, signifying the moving and operative parts of any machine or engine whatever, and its synonymous term mechanism be applied to the most delicate machinery, such as the parts of watches and mathematical instruments, or to the most delicate parts of any other machine, as the machinery of a flour-mill, or sawing-mill; the mechanism of a clock, watch, orrery, &c.

Let the term *engine* be restricted to such machines as have some relation to hydraulics or pneumatics, or, in short, where their operations depend upon, or actuate fluids; as a steam engine, a water engine, pumping engine, blowing engine, pressure engine, and fire extinguishing engine.

Mill should be applied to large and powerful compound machines, or systems of machines: including their first mover in the term; as a cotton mill, which contains a vast number of different machines, and also the water wheel, or steam engine, which actuates them all; so likewise, an iron mill, copper mill, rolling mill, grinding mill, logwood mill, wooded mill, &c. &c.

Grain mill, or *flour mill*, is, in some degree, an exception to our definition, because in the early stages of society it was the only mill in use, and hence the term became particularly attached to it; and any machine for grinding or reducing to powder is called a mill, as a coffee mill, bark mill, colour mill, malt mill, &c. though, in strictness, these should be called machines.

In this classification, we have studied to infringe as little as possible upon the distinctions which have been made by custom, and confirmed by the usage of mechanics themselves, though not invariably, for they have dividing engines, cutting engines, and many others which should be machines.

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The practical application of mechanics to the construction of machinery, is a subject of the utmost importance to the welfare of our country, depending so materially as it does upon commerce, which is derived chiefly from our manufactures; and these owe the pre-eminence they have over other nations to the general introduction of machinery, which has taken place within these forty years, to abridge manual labour in every department, and in every trifling operation: it is to this source we must look for the increase of property of every description, as the introduction of every machine is a real creation of all the work it will perform, without the addition of farther increase of human labour. An idea is very generally entertained, that machinery is prejudicial to the interest of mankind, as far as it tends to diminish the value of that labour by which the lower classes of society can alone purchase the means of subsistence: this idea is, however, founded on error, as applied to any supposed injury society in general can sustain, though individuals whose labours are superseded by machines, will suffer inconvenience for a time, yet it is only for a time, and so long as they, or others more intelligent, shall discover a new channel for the exertion of their industry. As machines tend to increase the quantities of those luxuries and necessities of life which mankind are so anxious to obtain, it only requires that an equitable division of these benefits should be made to obviate every objection, and really improve the condition of all classes; a retrospect of the last forty years shews the truth of this observation, for though so many machines have been employed in all trades and manufactures as probably to do more work than the whole population could do previous to that period, yet the value of human labour has, notwithstanding, increased in the same proportion as other articles have advanced in price.

We shall, in this article, enter into some general observations upon the construction of machinery, and particularly point out such contrivances as seem applicable to other purposes than those for which their inventors have employed them; and we shall give, as examples of practical machinery, a description of the famous block machines at Portsmouth, which contain many new contrivances. We were unable to introduce these under the article *Block*, as the machines were not erected at the time that article was printed.

The grand object of all mechanism, or machinery, is to convey and modify the motion of the first mover of the machine, and communicate it in a proper manner to the subject to be operated upon: thus, the slow rotative motion of a water-wheel is, by the machinery of cranks, levers, and toothed wheels, converted into a rapid reciprocating motion for working sawing machines, and the velocity of the motion is increased or diminished, as the occasion requires either great power or great speed. In like manner, the rectilinear motion of the piston rod of a steam engine is, by the machinery of parallel levers, working-beam, connecting-rod, crank and fly-wheel, converted into a rotative motion; and this motion can again, by the machinery of wheel-work, be adapted, either in velocity or power, to work grinding-stones, circular saws, threshing-mills, and other similar machines which require great velocity; or fluting-mills, boring machines, rasping machines for logwood, lead-pipe drawing machines, &c. which require great power to give them motion, and are, therefore, performed with a less velocity. Machinery is, therefore, the organs by which motion is altered in its velocity, its period, and direction, and thus adapted to any purpose. All machinery will be found, upon minute investigation, to be only modifications of the six mechanical powers: the greatest number will be found to

consist chiefly of parts which have a motion of rotation round fixed axes, and derive all their energy from levers virtually contained in them: thus the pulleys, wheel and axle, are only modifications of the lever, and the screw is compounded of the lever with a variety of the inclined plane or wedge, so that the number of mechanical powers may be reduced to two, which assume an infinite variety of forms and motions. The theory and manner of calculating their effects will be found under *MECHANICS*.

In contriving any machinery, the engineer should always remember that nothing contributes more to the perfection of a machine, especially if it is massive and ponderous, than great uniformity of motion. Every irregularity of motion wastes some of the impelling power; and it is only the greatest of the varying velocity which is equal to that which the machine would acquire if moving uniformly throughout; for while the motion accelerates, the impelling force is greater than what balances the resistance then actually opposed to it, and the velocity is less than what the machine would acquire if moving uniformly; and when the machine attains its greatest velocity, it attains it because the power is then not acting against the whole resistance. In both of these situations, therefore, the performance of the machine is less than if the power and resistance constantly bore the same relation to each other, in which case it would move uniformly.

Every attention should, therefore, be given to this, and we should endeavour to remove all cause of irregularity through the whole machine. There are continual returns of strains and jolts from the inertia of the different parts acting in opposite direction. Although the whole momenta may always balance each other, yet the general motion is hebling, and the points of support are strained. A great engine, so constructed, commonly causes the building to tremble; but when uniform motion pervades the whole machine, the inertia of each part tends to preserve this uniformity, and all goes smoothly. It is also deserving of remark, that when the communications are so contrived, that the uniform motion of one part produces uniform motion to the next, the pressures at the communicating points remain constant or invariable. Now the accomplishing of this is generally within the reach of mechanics, and the engineer should adapt his machinery to the particular case before him.

In the machinery for modifying and adapting a rotatory motion, the first which presents itself is the communication by means of toothed wheels acting on each other. This is the most general method in machinery, because it transmits the motion with certainty and accuracy, and if the teeth are properly formed, wheels, perhaps, consume less force in friction than any other method; but this is a subject understood by few mechanics. In the treatises on the construction of mills, and other works of this kind, are many instructions for the formation of the teeth of wheels, and almost every noted millwright has his own nostrums; but they are most of them defective in principle, or at least they are only correct in certain cases, which have by experiment or theory been determined, and are extremely fallacious when applied indifferently for all cases, as is the millwright's custom. An investigation of this subject, as applied to delicate mechanism, where accuracy rather than strength is the object, will be found in our article *Clock Work*, and we propose to give some further applications of these principles to wheels of large dimensions under *MILL Work*.

In the formation of the teeth of wheels, a small deviation from the perfect form is not, perhaps, of very great importance, except in cases where a very large wheel drives

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drives a very small one, a case the judicious engineer should always avoid: the grand point to be attended to, is to adopt such a construction as will insure all the teeth of a wheel being precisely equal, and to make as great a number of them as the strength will admit. This will cause several teeth to be in action at once, and make the communication of the motion extremely smooth and uniform. To obtain strength in the cogs when they are made fine, the width or thickness of the wheel must be increased; and this is one of the greatest practical improvements which has been made in machinery for these last twenty years. Formerly the best engineers, such as Smeaton, directed the teeth of large cog-wheels to be four and five inches distant from each other, or *pitch*, as the millwrights term it. Such wheels always act unequally upon each other in consequence of the point of contact of the large cogs constantly altering its position, becoming alternately nearer or farther from the centre of one or other of the wheels; and this, tending to increase the acting radius of one, whilst it diminishes the other, causes their velocity and powers to vary at every cog that passes by, and the machine works by starts and jerks. The wheel-work of modern machinery is constructed with fine cogs, seldom more than one and a half or two inches pitch, and as much length of cog, or breadth of the wheel, as will make them sufficiently strong. We have seen some wheels in a large cotton mill which bore a strain equal to thirty horses' power, in which they were nine and twelve inches broad upon the face. Cog-wheels are found to work most smoothly when the teeth of the large wheel are made of hard wood, and the teeth of the small one made of cast iron, the acting surfaces being dressed or filed smooth and to the true figure. A mechanic, in contriving any machinery, should always bear in mind, that where he introduces cog-wheels, they should be as large in their diameters as is consistent with other circumstances, because this allows the teeth to be made finer in proportion to the power they are to bear, than if they were of smaller radii; and the teeth, therefore, nearer the centre: it also occasions less pressure or drift upon the centre, and the wear of the whole will be equable. Another circumstance is worth notice, and should always be attended to, where it will not interfere with more important considerations: this is, the direction in which any force is given to, and taken from, any piece of wheel-work: suppose, for instance, a water-wheel turning its axis, upon which is fixed a cog-wheel to give motion to a second wheel, for the purpose of driving any machinery; now if this second cog-wheel is applied on that side of the first cog-wheel which is ascending, it will be opposite to that side of the wheel which is loaded with water, and is consequently descending. In this state the gudgeons of the water-wheel will have to bear (in some cases) double the strain of the power of the machine: because the power, which is the weight of the water, is applied on one side the centre of the wheel, and is taken off by turning the second cog-wheel on the other side: the centre, or fulcrum, therefore, bears the whole power, and also the re-action to that power, in addition to the weight of its own parts; in the same manner as the fulcrum of a steelyard or balance beam bears the whole of the weight suspended from either end, and its own weight also. On the other hand, suppose the second wheel applied on the descending side of the water wheel, this being on the same side of the centre, the pressure thereon will be far less than the power of the machine. In some cases (but not in a water-wheel), by the proper arrangement of the wheel work, the power may be made to operate to lift the centres, and thus in part relieve them from the weight of the wheel, so as actually to diminish the pressure of

friction of the pivots, when, by a contrary application, it would have increased it in the same degree. Similar advantages will attend the precaution of adapting the positions of different wheels upon their shafts to the different weights or strains they have to bear, so that the gudgeons at the two ends of any shaft may have an equal drift or pressure upon them. This will cause them to wear equally, and to have less friction, because they may be made smaller than where no such care is taken, still having sufficient strength. It is accomplished by considering the drift or pressure upon the centre of every wheel upon any axis, and placing the two gudgeons or pivots of the axis at a distance from each of the wheels, proportionate to the drift upon its centre. Thus, suppose a shaft has a cog-wheel fixed upon it, and a small wheel or pinion also fixed upon it at some distance from the wheel, the power is given to the axis by wheel-work operating upon the teeth of the pinion, and the re-action to this power is given by some machinery which the teeth of the large wheel actuates. In this case the drift on the centre of the pinion will be very considerable, because the power is applied near the centre of the axis; but the wheel transmitting the power at a greater radius, will, perhaps, have much less drift on its centre (the proportion depending in some degree upon the direction in which the power and re-action are applied, as stated in our last observation): if this is the case, the gudgeon at that end of the shaft, where the pinion is placed, should be lengthened out, so as to give the bearing point at a greater distance from it than the wheel, which should have its gudgeon placed much nearer to it, because less strain is to be borne. By this means the drift upon the two ends of the shaft will be equally divided between them: and though this proportion of the centre cannot be always accomplished without inconvenience, the engineer should always have it in view; and then, where it is not practicable, he should attain the same end, by apportioning the strength or diameter of the gudgeons to the relative strains they have to bear.

An endless belt or strap is a very general method of transmitting rotatory motion: it is usually employed in cases where a very quick motion is to be created, and the re-action to be overcome is nearly equable. In such cases it has the advantage of wheel-work from its simplicity and the ease of its motion. Some curious properties belong to the endless strap, *viz.* that the pulley or rigger it works upon must be largest in the middle, that is, the diameter must be greater in the middle of the pulley than at the edges, because the strap always rides on to the largest diameter of the pulley, and if this is not in the centre it will slip off at one side. It is not easy to give any satisfactory explanation of this fact, nor of another, that if, by accident, one of the pulleys is stopped while the strap is urged round by the motion of the other, it instantly flies off its pulley, unless the edge of the pulley should be much wider than the strap. This property is a great recommendation of it for some purposes, such as threshing mills, flour-dressing machines, lathes, cotton machines, &c. where any thing accidentally stopping the machines would destroy them if driven by wheel-work, but the strap slips round, and very soon comes off, so as to avoid all further danger. Belts of *gan-mah*, such as are used for saddle girths, are sometimes used instead of leather straps, though these are undoubtedly preferable. The strap should be dressed to an equal thickness and breadth throughout, and the ends very neatly joined; that is, of the same thickness there as at every other part. It is sometimes done by sewing, but the best method is by gluing them together, with a glue compounded of Irish glue, munglass, ale grounds, and boiled linseed oil. The two ends being tapered away and overlapped

overlapped are united with this cement, and will be as flexible as any other part, but so strong that it will tear to pieces in any part rather than at the joint. A tool for equalizing the thickness and breadth of the straps for belts is described in the Transactions of the Society of Arts, vol. xxviii. p. 192, invented by Mr. Aubrey. They will by this means be rendered very correct, for nothing can be more unpleasant in machinery than the joint and thick places in the endless straps jerking over the riggers, and causing a violent drift upon the centres every time by the increased tension of the strap.

A mechanic, in calculating any extensive piece of machinery which is to depend upon straps for the communication of its motions, particularly if they are of great length to convey their motion to a considerable distance, and have much strain upon them, should always consider that such machinery will lose some of its velocity; that the wheels, which are turned by straps, will never make quite so many revolutions as they ought to do from a calculation of their diameters. This is generally supposed to arise from the strap slipping, in some degree, upon the surface of the wheels it passes over, but we are inclined to suspect that it arises from another cause which has not been investigated, viz. the elasticity of the strap: for instance, suppose that the distance between two wheels connected by a strap is ten feet, and that the strain upon the strap is such as to stretch or extend it two inches in that length on the side which bears the strain (called by mechanics the leading side), on the other, or returning side, there will be no strain, and therefore the strap will return to its original length. In such a case the wheel which is driven will lose in its motion two inches in every ten feet, because the strap gives out that quantity in leading to the wheel, but takes it up again in returning, as soon as the strain is removed from it.

Small machines are sometimes turned by a catgut band, the ends of which are united by a small steel hook and eye, the hook being fastened at one end and the eyes at the other. They are made with tubes, for the reception of the ends of the band, which are tapped with a screw withinside, and the band being tapered and screwed into the tube holds very fast. But to prevent it drawing out, a small quantity of rosin should be applied to the end of the band which projects through the tube, and a hot wire being touched to it fuses and hardens the end, that it will never draw out of the tube. This method is constantly used in small lathes, and works very neatly. The pulleys for a catgut-band should always be cut with a sharp angular groove, for the reception of the band, and it should not touch the bottom of it, or it will be liable to slip. For the same reason, the pulleys are best made of wood, because metals soon acquire a polish, which prevent the band holding firmly upon it. The wood should be cut with its grain across the direction of the band, that every part of the circumference may be of a similar texture.

Endless chains are sometimes used to communicate motion of wheels, and frequently cogs are formed on the wheels to be received into the links of the chains. This method is very practicable on particular occasions, and though it has not advantages to put it in competition with cog-wheels acting upon each other when they can be applied, it is in many instances a valuable resource to the engineer to convey motion to some distance when it requires to be accurate, and where it would injure the operation of the machine if any motion was lost by the slipping of bands. In making such chains the greatest care is necessary to have all the links precisely of one length, and the cogs very accurately fitted to them, or a great friction will be caused by the cogs

forcing themselves into spaces not exactly situated to receive them. The best way is to make the links in the manner of watch or clock chains, with iron plates, and holes drilled through them at equal distances, to receive cross pins upon which the cogs are to act. By this means the lengths may be made far more accurately than by bending the iron in the manner of common chain links.

Mr. Nicholson has described a spinning-wheel for children, at a charity-school, in which a large horizontal wheel, with a slip of buff leather glued on its upper surface near the outer edge, drove twelve spindles, at which the same number of children sat.

The spindles had each a small roller, likewise faced with leather, and were capable, by an easy and instantaneous motion, of being thrown in contact with the large wheel at pleasure; each child, therefore, could throw her own part of the apparatus into work, or cause it to stop as often or as long as she pleased.

The winding bobbins for yarn at the cotton mills operate on the same simple and elegant principles, which possess the advantages of drawing the thread with an equal velocity, whatever may be the quantity of the bobbins, and cannot break it. The same mode of communication has been adopted in large work by Mr. Taylor, of Southampton, in his saw mills. In this the wheels acted upon each other by the contact of the end grain of wood instead of cogs. The whole made very little noise and wore very well: it was in use nearly twenty years. There is of consequence a contrivance to make the wheels bear firm against each other, either by wedges at the socket or by levers. This principle and method of transmitting mechanic power certainly deserve attention; particularly as the customary mode by means of teeth requires much skill and care in the execution; and after all wants frequent repair. We have seen it applied to a threshing machine, a small wheel on the threshing drum being applied in contact with the large wheel which gave motion to it, and a pressure sufficient to make it turn the machine was given by loading the socket for the spindle of the drum with a considerable weight. The same principle is capable of communicating motion with great accuracy when no force is required, as will be seen on a perusal of Mr. Troughton's ingenious method of dividing astronomical instruments. See GRADUATION.

The construction of bearings, pivots, gudgeons, or centres, of spindles, as they are indifferently termed, is a most important point; these parts being the principal seats of that friction which is the destruction of all machinery. Pivots are always made of iron or steel, both because these substances are better adapted for rubbing surfaces, and that their strength admits the pivot being as small as possible; the bearing, or bed to receive the gudgeons or pivots, should be of a softer metal, as brass, tin, or zinc, and kept well supplied with oil when at work. Hardened steel is a most admirable substance for pivots, which have a great strain to bear, and a rapid motion. The bearing or bed may also be made of the same material, and is the only instance where two bodies, having friction against each other, can with propriety be made of the same substance: for it is found, that where iron or soft steel surfaces are worked with a friction against parts of the same substances, the friction and abrasion are far greater than when a softer material, as brass, tin, hard wood, ivory, horn, &c. is used. The great difficulty of making hard steel pivots to spindles is the only reason they are not generally used; but there are some cases, in which nothing else can be employed: where steadiness and accuracy of motion are required, and great velocity at the same time. To obtain this accuracy, it is necessary that the

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pivot should be fitted, and kept in accurate contact with the interior surface of its socket or pivot-hole, and this will present a sufficient access of oil, to prevent any other spindle, than one of hardened steel, from burning or heating by the friction, when in rapid motion; and the expansion occasioned by this heat increases the pressure and the friction, till the pivot becomes fixed in its socket, and will rather twist off than turn round in it. The spindle for a turning lathe must always be of hard steel; and even then, a failure of the supply of oil for a moment, will cause it to burn into the collar. Circular saw-spindles are frequently burnt in the same manner; their motion being very quick.

The best form of a gudgeon or pivot for a spindle, is that of a cylinder, with a flat shoulder, to prevent it from shifting in its position endways. This form will bear most fairly and steadily; but it is necessary that the socket, or brass which contains the pivot, should be made in two halves, and put together with screws, that the halves may be screwed closer as the socket enlarges by wearing; but as this is only an imperfect method, because the pivot can never fit accurately after having been worn, a conical form is used for the pivots of axes requiring great accuracy, as these may be always made to fill their sockets, by pressing the cone farther into its socket. The cone is used in many turning lathes, whilst others are made very nearly cylindrical, with a shoulder; and as the collar is of hard steel, they do not wear in any sensible degree. Their advantage over the cone is, that they have no drift endways upon the opposite centre, as the cone has; though this is of slight importance in small machinery. In heavy works, such as the gudgeons of water-wheels, a conical figure would be highly improper, and has no advantage to recommend it; as such gudgeons seldom have any brass screwed down over them, their own weight being sufficient to keep them down, and they always fit true as they wear away. The most accurate and simple of all pivots is that which is similar to a piece of work, while turning in a lathe; the axis having a small hole made in each end of it, and the supports formed by sharp conical points, received into the holes; and one of them must be adjustable by a screw, to make it always fit the length of the spindle. It is usual to make the conical points on the ends of two screws, either of which may then be adjusted. The same thing may be accomplished by making conical points at the ends of the spindle, and forming the holes for its reception in ends of the two fixed screws, which can at all times be screwed up as the parts wear. It is the most perfect of all methods, but is not adapted to bear any great strain, because the screws will get loose, and all the objections to the conical spindle apply to it.

The pivot at the lower end of a vertical shaft, which has a great weight to sustain, as in a heavy horse-wheel, is very properly made of a hemispherical figure, and received into a proper cavity. A cylindrical pivot, having a flat end, is frequently used for large and heavy upright axes; but it is difficult to keep oil supplied to them, as the great weight presses it out from between the acting surfaces, and the gudgeon burns. To avoid this, some mechanics make a cleft across the lower face of the gudgeon, exactly in the manner of a screw-head. This getting full of oil, is constantly supplied to the acting surfaces.

We have seen an horizontal windmill, having a vertical axis 100 feet high, with sails and wheels of immense weight, all bearing upon one pivot. This was with the greatest difficulty kept in order; and it was necessary to keep a small stream of cold water always running into a pan, which surrounded the gudgeon, to keep it cold. This method of

watering, instead of oiling, a gudgeon is also used in paper-mills; but it cannot be recommended as a good method.

Friction-rollers are frequently used for supporting gudgeons, and, if made with great care, have the least friction which can be conceived; but they are liable to get out of order, if not made with extreme accuracy. See *MILL-Work*.

A great number of machines, depend upon reciprocating motions, such as pump-mills, saw-mills, &c. Where the first mover has a circular motion, as a water-wheel, the reciprocating movement will be most conveniently produced by means of a crank; because it commences the change of motion by degrees, and does not suddenly urge the parts into motion in a contrary direction; nor suddenly check the movement again, but effects both changes without violence. It is proper, in such cases, to regulate the motion of the first mover by a fly-wheel, otherwise the resistance of the work, at the instant of the change of motion, is so small, that the machine would accelerate in that period, and then be checked again. The same may be accomplished by having several of the reciprocating movements and these act alternately, that when one requires the most power, the others take the least, so as to equalize the resistance to the first mover, and make the motion uniform. All reciprocating machines labour under great disadvantages, from the circumstance that a great mass of matter must be put in motion, and this motion destroyed again. Thus, in a single pump forcing water through a great height of pipes, the column of water is, at every stroke the pump makes, put in rapid motion, which is wholly lost during the return of the pump-bucket for another stroke, when fresh impetus must be given to the water: now by applying a double acting pump, or two or three pumps acting at intervals, and the water regulated by an air-vessel, the motion will be very easy, because the column of water will be in constant motion through the pipes, and the momentum once given to it will continue as long as the machine is at work, instead of requiring a repetition of it at every stroke.

In every machine, the action of the moving power is transferred to the working point, through the parts of the machinery, which are material, inert, and heavy; or, to describe it more accurately, before the necessary force can be exerted at the working point of the machine, the various connecting forces must be exerted in the different parts of the machine: and in order that the working point may follow out the impression already made, all the connecting parts or limbs of the machine must be moved in different directions, and with different velocities. Force is necessary for thus changing the state of all this matter, and frequently a very considerable force. Time must also elapse before all this can be accomplished. This often consumes, and really wastes, a great part of the impelling power. Thus, in a crane worked by men walking in a wheel, it acquires motion by slow degrees; because, in order to give sufficient room for the action of the number of men or cattle that are necessary, a very capacious wheel must be employed, containing a great quantity of inert matter. All of this must be put in motion by a very moderate preponderance of the men: it accelerates slowly, and the load is raised. When it has attained the required height, all this matter, now in considerable motion, must be stopped. This cannot be done in an instant, with a jolt, which would be very inconvenient, and even hurtful: it is therefore brought to rest gradually. This also consumes time. Nay, the wheel must get a motion in the contrary direction, that the load may be lowered into the cart or lighter; and this can only be accomplished by degrees. Then the tackle must be lowered down again.

for another load, which also must be done gradually. All this wastes a great deal both of time and force, and renders a walking-wheel a very improper form for the first mover of a crane, or any machine whose use requires such frequent changes of motion. The same thing obtains, although in a lower degree, in the steam-engine, where the great beam and pump-rods, sometimes weighing many tons, must be made to acquire a very brisk motion in opposite directions, twice in every working stroke. It operates in a greater or a less degree, in all engines which have a reciprocating motion in any of their parts. Pump-mills are of necessity subjected to this inconvenience. In the famous engine at Marly, about $\frac{1}{2}$ th of the whole moving power of some of the water-wheels is employed in giving a reciprocating motion to a set of rods and chains, which extend from the wheels to a cistern about three-fourths of a mile distant, where they work a set of pumps: thus the engine is, by such injudicious construction, a monument of magnificence, and the struggle of ignorance with the unchangeable laws of nature. In machines, all the parts of which continue the direction of their motion unchanged, the inertia of a great mass of matter does no harm; but, on the contrary, contributes to preserve the steadiness of the motion, in spite of small inequalities of power or resistance, or unavoidable irregularities of force in the interior part. But in all reciprocations, it is highly prejudicial to the performance; and, therefore, constructions which admit such reciprocation without necessity, are avoided by all the intelligent engineers.

In many machines, but generally in small works, what are called hearts, camms, snails, excentric wheels, &c. are a very excellent method of producing slight reciprocating movements to levers. From the rotatory motion of an axis, they have the great advantage of admitting any modification of the motion, to act suddenly or gradually, in either direction, at the pleasure of the maker. This is done, by wheels of a particular form, fastened upon an axis, and levers applied in contact with their circumferences, which receive a motion in proportion as the different radii of the wheels alter their lengths; and if, at any point of the motion, the lever is to be in a state of rest, the periphery of the wheel is, during that period, made a circular arc, and concentric with the axis. From the facility of producing any motion whatever by camms, it is an universal method, and applicable to all subjects; but still has objections, which will induce the engineer to neglect it in those instances, where any other movement will answer the same purpose. These objections are the great friction, and wear of the camms, which soon unfit them for accurate motion: this may in some measure be obviated by applying rollers in the ends of the levers, to receive the contact of the camm. Another objection is, that the camm is unfit for producing a double motion, because a spring or weight must be introduced to return the lever, and always keep it in contact with the camm. Now if this spring is only used to return the lever, it will operate very well; but if it is made so strong as to effect any operation of the machine, the friction will be great, and be a serious objection to the use of camms.

The principles of these movements, and practical directions for constructing camms for any kind of movement, is fully explained in our article *DIAGONAL Motion*, which renders it unnecessary to enlarge upon the subject in this place. Camms are used on a large scale in rolling-mills, for working the shears with which large iron bars are clipped into lengths. They are also employed in the machine for punching holes through the iron plates for boilers, weaving machines, &c.: and are in common use in the blowing ma-

chine used in iron forges; but it is a very injudicious application, and a common crank would be much better.

We once with great pleasure contemplated a very complicated machine, in which were many reciprocating parts necessarily operating only whilst moving in one direction; in the other, they had merely to return to repeat their operations. To produce this reciprocation, the inventor applied a crank, which was caused to revolve by the action of a pair of elliptical cog-wheels, each balanced on an axis passing through one of its foci. In this construction, the motion of the driven wheel and the crank it carried, was exceedingly variable, but by equal increments of alternate acceleration and retardation. Thus when the long radius of the first wheel was operating, it met the shortest radius of the other, therefore giving it and also the crank a rapid motion: in this state, the crank was returning to repeat its stroke, and with a quick stroke; but by the time it had completed half a revolution, the action was reversed, the short radius of the first wheel acting upon the long radius of the second, which was therefore with its crank at the slowest point of its movement: but the decrease of the motion, from the quickest to the slowest point of its revolution, being effected by equal increments, gave no shock to the machinery. The crank was of course, during the slow half of its movement, performing its work; and in the quick period, returning to fetch its stroke. By this judicious arrangement, the resistance to the first movement was very nearly equable: for when it had work to perform, the wheel-work gained a power upon the working point; but in returning, it caused it to urge the working point with such an increased velocity, as in some degree counterbalanced the diminished resistance: but in this, no loss was occasioned, because this increased velocity shortened the period of inaction hastening the return to a situation for repeating its operation.

These elliptical wheels are, in the hands of an able mechanic, a very useful contrivance, but they have not been much used in machinery, from the difficulties of forming their teeth with precision. In the *COMETARIUM*, (see that article,) they are introduced to represent the elliptic motions of comets, and we have seen two instances of their being used in large machines, where they operated with as much facility as circular wheels. It is to be observed, that a small excentricity of the ellipse, consequently a slight deviation from the circular figure, will produce a great inequality of their motion, because the increase of the acting radius of one wheel, is attended with a correspondent decrease of the other, so that to produce almost any differences of motion which can be required in practice, the excentricity of the wheels will be such as can easily be accomplished, and as will work with each other smoothly and accurately. When heavy stampers are to be raised in order to drop on the matter to be pounded, the wipers, by which they are lifted, should be made of such a form that the stamper may be raised by an uniform pressure, or with a motion almost imperceptible at first. If this is not attended to, and the wiper is only a pin sticking out from the axis, the stamper is forced into motion at once. This occasions a violent jolt to the machine, and great strains on its moving parts and their points of support: whereas, when they are gradually lifted at first, the inequality of defultory motion is never felt at the impelled point of the machine.

We have seen pistons of pumps moved by means of a double rack on the piston rod: a half wheel takes hold of one rack and raises it to the required height. The moment the half wheel has quitted that side of the rack, it lays hold of the other side and forces the piston down again. This has been proposed as a great improvement, by correcting the

the unequable motion of the piston, moved in the common way by a crank motion; but it occasions such abrupt changes of motion, that the machine is shaken by jolts. Indeed, if the movements were accurately executed, the machine would be soon shaken to pieces, if the parts did not give way by bending and yielding. Accordingly we have always observed that this motion soon failed, and was changed for one that was more smooth: a judicious engineer will avoid all such sudden changes of motion, especially in any ponderous part of a machine.

When several stampers, pistons, or other reciprocal movers are to be raised and depressed, common sense teaches us to distribute their times of action in an uniform manner, so that the machine may always be equally loaded with work. When this is done, and the observations in the preceding paragraph attended to, the machine may be made to move, almost as smoothly as if there were no reciprocations in it. Nothing shews the ingenuity of the engineer more, than the artful, yet simple and effectual contrivances, for obviating those difficulties that unavoidably arise from the very nature of the work to be performed by the machine, or in the power employed to actuate it.

In the contrivance of machinery, an engineer must not be tied down by too many inviolable maxims, because those contrivances which are the most improper in some situations will be the best of all in other cases. There is great room for ingenuity and good judgment in the management of the moving power, when it is such as cannot immediately produce the kind of motion required for effecting the purpose. We mentioned the conversion of the continued rotation of an axis into the reciprocating motion of a piston, and the improvement which was thought to have been made on the common and obvious contrivance of a crank, by substituting a double rack on the piston rod, and the inconvenience arising from the jolts occasioned by this change. We have been informed of a great forge, where the engineer, in order to avoid the same inconvenience arising from the abrupt motion given to the great sledge hammer of seven hundred weight resisting with a five-fold momentum, formed the wipers for lifting it into spirals, which communicated motion to the hammer with scarcely any jolts whatever: but the result was, that the hammer rose no higher than it had been raised in contact with the wiper, and then fell on the iron bloom, with very little effect. The cause of its inefficiency was not guessed at; but it was removed, and wipers of the common form were put in place of the spirals.

In this operation the rapid motion of the hammer is absolutely necessary; it is not enough to lift it up, it must be raised up so as to fly higher than the wiper lifts it, and to strike with great force the strong oaken spring which is placed in its way. It compresses this spring, and is reflected by it with a considerable velocity, so as to hit the iron as if it had fallen from a great height: had it been allowed to fly to that height it would have fallen upon the iron with somewhat more force (because no oaken spring is perfectly elastic); but this would have required more than twice the time.

In employing a power which of necessity reciprocates, to drive machinery which requires a continuous motion (as in applying the steam engine to a cotton or corn grinding mill), there also occur great difficulties. The necessity of reciprocation in the first mover wastes much power, because the instrument which communicates such an enormous force must be extremely strong, and be well supported. The impelling power is wasted in imparting, and afterwards destroying a vast quantity of motion in the working beam. The skilful engineer will attend to this, and do his utmost

to procure the necessary strength of this lever, without making it a vast load of inert matter. He will also remark, that all the strains on it, and on its supports, are changing their directions in every stroke. This requires particular attention to the manner of supporting it: if we observe the old steam engines which have been long erected, we see that they have uniformly shaken the building to pieces. This has been owing to the ignorance or inattention of the engineer in this particular; they are much more judiciously erected now, experience having taught the most ignorant that no building can withstand their desultory and opposite jolts, and that the great movements must be supported by a frame work of wood or iron, independent of the building of masonry which contains it. The gudgeons of a water wheel should never rest on the wall of the building; it shakes it, and if set to work soon after the building has been erected, it prevents the mortar from taking firm bond, perhaps by shattering the calcareous crystals as they form.

When the engineer is obliged to rest the gudgeons in this way, they should be supported by a block of oak laid a little hollow: this softens all tremor, like the springs of a wheel carriage. This practice would be very serviceable in many other parts of the construction. It will frequently conduce to the good performance of an engine, to make the action of the resisting work, unequable, and accommodated to the inequalities of the impelling power. This will produce a more uniform motion in machines, in which the momentum of inertia is inconsiderable. There are some beautiful specimens of this kind of adjustment in the mechanism of animal bodies.

In many compound machines it is of consequence to be able to detach part of the movements while the others continue in motion. Thus in cotton-spinning machines, it is necessary to be able to call off or stop any spindle at pleasure, without disturbing the rest; and in a large mill containing many machines, it is essential that any one may be released without interruption to the first mover. Such contrivances are called coupling or clutch-boxes: they are effected in various ways, some of which are detailed under COUPLING-BOX. But we wish here to describe a recent improvement, very generally adopted in cotton and woollen mills; the object of which is to avoid a jerk being given to any machine when it is put in action, from its being suddenly urged from a state of rest to a state of motion: for if the movement is to be rapid, nothing can be more destructive to the machine than the violence of the shock it receives from the common clutch-box. To avoid this, the arm which gives motion to the machine when the clutch of the running spindle is engaged with it, is not fixed fast upon the spindle, but is made in two halves screwed together upon a circular part of the spindle, and pinched upon it to fast by the screws, that it will have sufficient friction to turn the machine round in the ordinary course of its work, but slips round upon the spindle, if the resistance is greater than this friction, which thus becomes the measure of the power dealt out to the machine.

Suppose a machine of this kind at rest, the clutch is turned by the first mover with a considerable velocity, and is suddenly connected with the arm above described: now it requires some time (independent of any resistance or work of the machine) to put its parts in motion. In this time the arm slips round upon the spindle, but the friction acts constantly, and with an equal force upon the machine to turn it round. It commences its motion, which gradually accelerates, until it arrives at the same velocity as the driving spindle, and then the slipping of the box ceases, and the

machine proceeds in an uniform manner: still the box is a very useful provision in case of any accident happening to the machine to stop it, by any thing getting into its movements: the box then slips round without breaking the works. All machinery, which is exposed to the chance of great violence, should be provided with some equivalent contrivance, which permits the movement to slip when the machine is overloaded and would otherwise be broken. An instance of this will be seen in the *Dressing Engine*; see that article. The same effect may be produced by conical wheels fitting into each other, in the manner of a valve and its seat. One of them being fixed to each spindle, will, when they are jambed into each other, communicate the motion, but permits it to slip if overloaded. A very ingenious application of this will be found, in the mortising machine of the block machines at Portsmouth (see *Machinery for manufacturing Ships' Blocks*), and another judicious application of it under *Loose-wood Mill*.

Many other contrivances are in use for detaching or uniting motions at pleasure. In cog-wheel, the supports for the gudgeons are sometimes fitted up so as to be moveable, that the wheels can be separated to such a distance as to relieve each other's teeth. At other times one of the wheels is fitted on a round part of its axis, and united with it at pleasure by a clutch-box. Thus the wheels are always in motion, but one of them can be detached at pleasure from its axis, on which it slips freely. Bevelled cog-wheels are easily disengaged, by suffering the axis of one to move a little endways, and then their teeth are separated.

Wheels turned by flaps are readily connected, or cast off, by removing the flap, but this is not easily done while the wheels are in motion; though some dextrous workmen are able to put on the flaps when the wheels are going; but it is attended with much difficulty, and great danger, if the motion is quick, of catching the fingers in the flap. We have known an instance of a man's arm being torn away at the shoulder, by carelessness in performing this operation.

For disengaging the motion of a flap, the contrivance called the live and dead pulley is very ingenious: it consists of two pulleys placed close together upon any axis which is to receive a circular motion. The endless flap or band, by encompassing one of these pulleys, gives it a constant rotatory motion. Now one of them being fixed fast upon the spindle, and the other slipping freely round upon it, gives the means of turning or discontinuing the motion of the spindle at pleasure, by shifting the flap either upon the live or dead pulley, which, as they are exactly of the same size, and close to each other upon the spindle, is easily done. The live pulley is that which is fixed to its axis, so called from its causing life or motion to the spindle, and the machinery appended to it. The dead or idle pulley is that which slips upon its spindle; therefore, when the flap is caused to run upon it, it turns round without giving any motion to the spindle. This contrivance is extremely well adapted to give motion to small machinery, from the simplicity of its construction, and the facility with which it is put in motion or at rest. It possesses also another great advantage, viz. it occasions no sudden shock to the machinery at first starting, as it does not instantly communicate to it the full velocity. To illustrate this, suppose the flap running upon the dead pulley, and the machine therefore at rest, the leading side of the flap is in general conducted through a notch in a piece of board which is fitted in a groove, so as to have liberty of sliding in such a manner that it may conduct the flap to work upon either of the pulleys; but this is not necessary nor always attended to, for the person who attends the machine may, by the slightest pressure on the leading side flap

by his hand, cause it to shift upon the other pulley; but as this is not done instantly, it communicates the motion to the live pulley by degrees; for at first shifting, it begins upon a very narrow surface of the pulley, which is, therefore, urged into motion, but without violence to the machine, as the flap at first slips partially upon the surface of the live pulley, and this, as we have before stated, causes the flap to endeavour to escape from the pulley; but the attendant continues to press the flap on the leading side, and force it to act upon the live pulley, which having attained its full velocity, and the flap no longer slipping upon it, has no tendency to get off, unless the machine is overloaded, and then it will get off to the dead pulley. The live and dead pulley is very extensively used in cotton machinery, and is a very excellent contrivance; the only objection to it being that the bush in the centre of the idle pulley is liable to wear very loose in a short time. It is scarcely necessary to add, that the driving wheel for the flap of the live and dead pulley must be as broad on its edge as both the live and dead pulley together; indeed, it is generally a long cylindrical drum, which receives many flaps for turning different machines.

A motion is frequently required in machinery, by which a wheel or axis is made to revolve in one direction for any required time, and then at pleasure changed, so as to revolve in the other direction. Various means may be used for effecting this purpose. The most common is by means of two equal and similar bevelled or contrate wheels, situated on the same axis, and their teeth towards each other. A third bevelled wheel is applied with its axis perpendicular to the former, and its teeth engaging at pleasure with either of the two wheels, which, as they turn the same way round, and can be made to act at one or other of the sides of the third wheel, so as to turn it in either direction, as it is engaged with either of the two wheels. This movement was applied by Mr. Smeaton to a machine he invented for drawing coals from coal-pits. In this the third wheel was a trundle, and could be, by a lever, made to work in the teeth of either of the cog-wheels which were mounted upon the axis of a water-wheel, and thus turned the trundle either way at pleasure, to draw up or let down the baskets or coves, which were suspended from a drum upon the axis of the trundle. Some mechanics have constructed the contrivance in a different manner, by fitting the two wheels upon a circular part of their spindle, and suffering them to turn round freely upon it. Their teeth are always engaged with the teeth of the third wheel, and, therefore, they are always revolving in opposite directions, and either can at pleasure be connected with the axis by a sliding clutch-box, but which is not long enough to engage both at once. The axis can, by this means, be made to revolve in the direction of either wheel at pleasure, by sliding the clutch-box towards that wheel.

We have seen a very ingenious application of the live and dead pulley to this purpose, for a crane in a cotton mill, to take up and down the goods, work-people, &c. It was invented by Mr. Henry Strutt, and has been applied in his cotton mills at Belper, Derbyshire. In this machine it was necessary to have a motion which could be turned either way at pleasure, to draw up or let down the basket; but the double wheel-work above described was evidently improper, from the sudden jerk it would have given at the instant of changing the motion. It was effected in this manner: an axis which gave motion to the crane barrel, has two pair of live and dead pulleys upon it, and also a brake wheel to stop the motion, which is situated between the two pair: an endless flap is conducted to each pair, being turned by a long drum placed parallel to the axis of the pulleys, and kept in constant motion by the mill. One of these endless flaps is crossed between

between the drum and its pulleys, but the other is not, therefore one pair of the live or dead pulleys are always revolving in one direction, and the others are turning in an opposite way. Both straps are conducted through guides fixed to a sliding rail, by which the straps can be shifted both at once, sideways. When this rail is in a position that the straps are both upon their dead pulleys, the axis and brake wheel are at rest, and in this position the rail has a tendency to remain, unless forced by hand. On moving the rail one way from the quiescent point, one of the straps is thrown on its live pulley, and the spindle turns with it, winding up the basket. By moving the rail in the other direction beyond its quiescent point, this strap is shifted on to its dead pulley, and becomes inactive; but the other strap operates on its live pulley, to turn the spindle in the opposite direction, and lets down the basket. We shall describe this very useful and curious machine in its place among the cotton machinery. See MANUFACTURE of Cotton.

Logwood rasping engines, screw presses, and some other machines, require a motion to work them forwards to a certain extent, and then the direction is to be reversed to draw them back, which requires but very little power to effect it. In this case the motion may be effected by a pair of cog-wheels turning each other, and thus communicating the motion for one direction in which it is to perform the work. A couple of pulleys are fixed on the respective axes near the cog-wheels, and an endless strap connects them, but the strap is so long, that when the cog-wheels are in gear, the strap hangs slack, and does not operate: but to reverse the movement, the sockets for one of the gudgeons of the driving spindle or axis is made to shift, that the distance between the centre of the two wheels may be increased, so as to disengage the teeth of the wheels, and the strap becomes tight, and turns the wheels back; but on bringing the wheels together again, the strap becomes slack, and the wheels resume their original course.

Screws are, of all the mechanical powers, the most frequently used in machines, though not always as moving parts, being chiefly introduced for uniting and retaining the parts. They are not so constantly employed as acting movements, on account of their friction, and the trouble of making them; they are, nevertheless, a very useful agent on many occasions, and possess the advantage of accurately retaining any movement they make, and producing an extremely slow motion with ease, and, when it is required, with the most perfect accuracy. No engineer will employ screws for a rapid motion, as their friction and great wear renders them unfit for such situations. To the endless screw acting on the teeth of cog-wheels, this objection does not apply so forcibly, because the great number of teeth on which the screw operates successively, do not wear so fast as the nut of a female screw would under the same circumstances, and the friction is far less, because the screw is not enclosed all round its thread. The endless screw or worm is useful on many occasions to obtain a slow motion, which it does in a very simple manner; but, for the purpose of obtaining a quick motion, it should never be used, on account of the friction and consequent wear. This is seen in the common roasting jack.

In many situations in which moving screws are used, the same effects may be produced in the most simple and convenient manner by Mr. Bramah's method of producing and applying a more considerable degree of power to all kinds of machinery requiring motion and force, than by any means at present practised for the purpose. This method, for which, on the 31st of March 1796, he obtained a patent, consists in the application of water, or other dense fluids, to various engines, so as, in some instances, to cause them to act with immense

force; in others, to communicate the motion and powers of one part of a machine to some other part of the same machine; and lastly, to communicate the motion and force of one machine to another, though removed to a great distance from each other, and where their local situation preclude the application of all other methods of connection. The principle of this invention is the same with the hydrostatic paradox, but its various applications to useful purposes is due to Mr. Bramah. The simplest form is for a press, or machine, to raise an enormous weight to a small height: a metallic cylinder sufficiently strong, and bored perfectly smooth and cylindrical, has a solid piston fitted into it, which is made perfectly water tight, by leather packing round its edges, and other means used in hydraulic engines. The bottom of the cylinder must be made sufficiently strong, with the other part of the surface, to resist the greatest strain which can ever be applied to it. In the bottom of the cylinder is inserted the end of a small tube, the aperture of which communicates with the inside of the cylinder, and introduces water or other fluid into it: the other end of the pipe communicates with a small forcing pump, by which the water can be injected into the cylinder under its piston: the pump has of course valves to prevent the return of the water. Now suppose the diameter of the cylinder to be twelve inches, and the diameter of the piston of the small pump or injector only one quarter of an inch, the proportion between the two surfaces or ends of the said pistons will be as 1 to 2304; and supposing the intermediate space between them to be filled with water, or other dense and incompressible fluids, any force applied to the small piston will operate upon the other in the above proportion, viz. as 1 to 2304. Suppose the small piston or injector to be forced down when in the act of forcing or injecting with a weight of 20 cwt. which can easily be done by means of a long lever, the piston of the great cylinder would then be moved up, with a force equal to 20 cwt. multiplied by 2304. Thus is constructed a hydro-mechanical engine, whereby a weight amounting to 2304 tons can be raised by a simple lever, in much less time through equal space, than could be done by any apparatus constructed on the known principles of mechanics, and it may be proper to observe, that the effect of all other mechanical combinations is counteracted by an accumulated complication of parts, which renders them incapable of being usefully extended beyond a certain degree, but in machines acted upon, or constructed on this principle, every difficulty of this kind is obviated, and their power subject to no finite restraint. To prove this, it will be only necessary to remark, that the force of any machine acting upon this principle can be increased, *ad infinitum*, either by extending the proportion between the diameter of the injector and the great cylinder, or by applying greater power to the lever actuating the small pump. On this principle very wonderful effects may be produced instantaneously, by means of compressed air. Suppose a large cylinder, furnished with a piston in the same manner as before described, a globular vessel is used, made of copper, iron, or other strong material, capable of resisting immense force, similar to those used for air guns: it has a strong tube of small bore, in which is a stop-cock: one of the ends of this tube communicates with the great cylinder beneath its piston, and the other end with the globe. Now suppose the great cylinder to be of the same diameter as that before described, and the small tube equal to one quarter of an inch diameter, which is the same as the injecting pump before-mentioned for the press: then suppose that air is injected into the globe (by the common methods) till it presses against the cock with a force equal to 20 cwt. which can be done; the consequence will be, that when the cock is opened, the piston will be instantly

moved in the great cylinder, with a power or force equal to 2304 tons, and it is obvious, as in the case before-mentioned, that any other unlimited degree of force may be acquired by machines or engines thus constructed. By the hydrostatic principle, the power and motion of any machine may be transferred or communicated to another, let their distance and local situation be what they may. Suppose two small tubes or cylinders, in the inside of each of which is a piston made water and air-tight, a tube may be conveyed under ground or otherwise, from the bottom of one cylinder to the other, to form a communication between them, notwithstanding their distance be ever so great. Let this tube be filled with water, or other fluid, until it touches the bottom of the two pistons; then, by depressing the piston of one cylinder, the piston of the other will be raised. The same effect will be produced, *vice versa*; thus bells may be rung, wheels turned, or other machinery put invisibly in motion by a power being applied to either cylinder.

By these means, it is obvious, that most commodious machines of prodigious power, and susceptible of the greatest strength, may readily be formed. If the same multiplication of power be attempted by toothed-wheel pinions and racks, it is scarcely possible to give strength enough to the teeth of the racks, and the machines become very cumbersome, and of great expence. But Mr. Bramah's machine may be made abundantly strong in very small compass. It only requires very accurate execution. The hydrostatic principle on which it depends has been well known for nearly two centuries, and it is a matter of surprise that it has never before been applied to any useful practical purpose.

The application which Mr. Bramah has made of this truly valuable principle is very general: it was first applied for presses instead of large screws, for which purpose it is greatly superior in every respect. Presses being generally moved by the strength of men alone, the saving of power becomes a great object; and this it accomplishes, having no proportion of the friction of the screw, and immensely greater power. In a screw-press, it requires nearly as much labour to unscrew as to screw it up, an evidence of the enormous friction of a screw, when acting against a great pressure: but the hydrostatic-press only requires a cock to be opened to let out the water from beneath the piston, which then descends quickly, by its own gravity, or the elasticity of the subilaces under the pressure. But the greatest convenience of the hydrostatic principle is, that its power can so easily be transferred to any distance, and in any direction, by means of pipes conducted along in situations where all other means of conveying the motion would be complicated, and expensive in the extreme. Thus, in a large paper-mill, an injecting-pump may be kept in constant action by the water-mill, or steam-engine, and inject water into an air-vessel, from which pipes are conducted to presses in all parts of the mill, and by simply opening a cock at any press, any required pressure will be instantly given by the elasticity of the confined air operating on the enlarged surface of the piston of any press. The air-vessel has, of course, a safety-valve, to allow the escape of the water when the pressure becomes so great as to endanger the rupture of any of the vessels; for it is to be observed, that the power of this principle is irresistible, when the pump is worked by a mill, and will burst any vessels, without the least appearance of strain on the moving parts of the pump.

In Mr. Bramah's extensive work-shops at Pimlico, and another at Mill-Bank, London, the steam-engines which turn the laths, boring-machines, planing-machines, &c. work a small injecting-pump, as above-mentioned, and small copper pipes are laid to every part of the works, and

by cocks admitting it into various cylinders, many powerful operations are performed: it works an immense press for bending strong iron bars, or breaking cast-iron for the foundry. It moves the carriage of the planing-engine; and he has brought the methods of packing the cylinders to such perfection, that they are employed to make the most delicate adjustments in the parts of the machine. (See a full description of this in *PLANING Engine*, and also *PRESS, Hydrostatic*.) In another part of the factory, it works a crane for lifting the heaviest goods, by merely opening a cock, and lowers them down, by opening another, with the utmost safety. A very large *Flood-gate* is also raised up by two cylinders. (See that article.) It may be used for turning the bridges of canals. (See *CANAL*.) On the whole, we cannot conclude this article, without recommending the hydrostatic principle very strongly to engineers, as a method the most perfect of all others of communicating motion, which is to act only for short extents, or with great power, as it can so easily be conducted through any circuitous rout, and loses so little power by friction. The ease with which it is relieved from the action, or caused to operate in a contrary direction, is not its smallest advantage; and by means of the air-vessel the power may be accumulated while the machine is preparing for action, and then an immense power suddenly given. We have little doubt the hydrostatic-press would answer the best of any method for expressing oil. The present oil-press is described under *Oil-Mill*, and operates by a wedge, driven by repeated blows of a heavy hammer. The method is ingenious; but great part of the power is expended in friction, as is evident from the wedge requiring nothing to retain it, as it is driven, the friction over-balancing all the re-action of the substances pressed.

A motion is very frequently required in machinery for giving to any piece of wheel-work an increased or diminished velocity at pleasure. The most complete of these are the *EXPANDING Riggers* (see that article); but many other means may be employed. Thus, on two parallel spindles, which are to turn each other, place a number of wheels, increasing in size by regular steps, the smallest wheel of one spindle being opposite to the largest of the other. The same endless strap will fit any pair of them, and give a great variety of powers and velocities: the same may be effected by having a number of cog-wheels; and, instead of a strap, using an intermediate cog-wheel, which can be applied to connect any pair of the wheels at pleasure. A very ingenious application of double cones is used in a cotton-machine, called the double speeder. See *MANUFACTURE of Cotton*, also Mr. Braithwaite's *CRANE*.

It is very customary to add what is called a fly to machines. This is a heavy disk or hoop, or other mass of matter, balanced on its axis, and so connected with the machinery, as to turn briskly round with it. This may be done with the view of rendering the motion of the whole more regular, notwithstanding unavoidable inequalities of the accelerating forces, or of the resistances occasioned by the work: it then becomes a regulator. Suppose the resistance to a machine extremely unequal, and the impelling power perfectly constant; as when a bucket-wheel is employed to work one pump; when the piston has ended its working-stroke, and while it is going down the barrel, the power of the wheel being scarcely opposed, it accelerates the whole machine, and the piston arrives at the bottom of the barrel with considerable velocity; but in the rising again, the wheel is opposed by the column of water now pressing on the piston: this immediately retards the wheel; and when the piston has reached the top of the barrel, all the acceleration is undone, and is to begin again. The motion of such

such a machine is very hobbling; but the surplus of accelerating force, at the beginning of a returning stroke, will not make such a change in the motion of the machine, if we connect the fly with it; for the accelerating momentum is a determinate quantity: therefore, if the radius of the fly be great, this momentum will be attained by communicating a small angular motion to the machine. The momentum of the fly is as the square of its radius, therefore it resists acceleration in this proportion; and although the overplus of power generates the same momentum of rotation in the whole machine as before, it makes but a small and imperceptible addition to its velocity. If the diameter of the fly be doubled, the augmentation of rotation will be reduced to one-fourth. Thus, by giving a rapid motion to a small quantity of matter, the great acceleration during the return-stroke of the piston is prevented. This acceleration continues, however, during the whole of the returning stroke, and at the end of it the machine has acquired its greatest velocity. Now, the working stroke begins, and the overplus of power is at an end. The machine accelerates no more; but if the power is just in equilibrium with the resistance, it keeps the velocity which it has acquired, and is still more accelerated during the next returning stroke. But now, at the beginning of the subsequent working-stroke, there is an overplus of resistance, and a retardation begins and continues during the whole rise of the piston; but it is inconsiderable in comparison of what it would have been without the fly: for the fly, retaining its acquired momentum, drags forwards the rest of the machine, aiding the impelling power of the water-wheel. It does this by all the communications taking into each other in the opposite direction; the teeth of the intervening wheels are heard to drop from their former contact on one side, to a contact on the other. By considering this process with attention, we easily perceive that in a few strokes the overplus of power, during the returning stroke, comes to be so adjusted to the efficiency, during the working stroke, that the accelerations and retardations exactly destroy each other, and every succeeding stroke is made with the same velocity, and an equal number of strokes is made in every succeeding minute. Thus the machine acquires a general uniformity with trifling periodical inequalities. It is plain, that by sufficiently enlarging either the diameter, or the weight of the fly, the irregularity of the motion may be rendered as small as we please. It is much better to enlarge the diameter: this preserves the friction more moderate, and the pivots wear less. For these reasons, a fly is, in general, a considerable improvement in machinery, by equalising many exertions that are naturally very irregular. Thus a man, working at a common windlass, exerts a very irregular pressure on the winch. In two of his positions in each turn, he can exert a force of near seventy pounds without fatigue, but in others he cannot exert above twenty-five; nor must he be loaded with much above this in general. But if a large fly be connected properly with the windlass, he will act with equal ease and speed against thirty or even forty pounds.

If any permanent change should happen in the impelling power, or in the resistance, the fly makes no obstacle to its production in its full effect on the machine, and it will be observed to accelerate or retard uniformly, till a new general speed is acquired, exactly corresponding with this new power and resistance. Many machines include in their construction movements which are equivalent with this intentional regulation, a flour-mill for example. There is another kind of regulating fly, consisting of wings whirled briskly round till the resistance of the air prevents any great acceleration. This is a very bad one for a working machine,

for it produces its effect by really wasting a part of the moving power. Frequently it employs a very great and unknown part of it, and robs the proprietor of much work. It should never be introduced into any machine employed in manufactures, except in the instance of letting down heavy weights, where a waste or re-action to power is the object.

Some rare cases occur where a very different regulator is required, when a certain determined velocity is found necessary: in this case, the machine is furnished at its extreme mover with a conical pendulum, consisting of two heavy balls hanging by rods, which move in very nice and steady joint at the top of a vertical axis. It is well known, that when this axis turns round, with an angular velocity suited to the length of those pendulums, the time of a revolution is determined.

Thus, if the length of each pendulum be 39½ inches, the axis will make a revolution in two seconds very nearly. If we attempt to force it more swiftly round, the balls will recede a little from the axis, but it employs as long time for a revolution as before; and we cannot make it turn swifter, unless the impelling power be increased beyond all probability: in which case, the pendulum will fly out from the centre till the rods are horizontal, after which every increase of power will accelerate the machine very sensibly, as it then becomes a simple fly. Watt and Boulton have applied this contrivance with great ingenuity to their steam engine, when they are employed for driving machinery for manufactures which have a very changeable resistance, and where a certain speed cannot be much departed from without great inconvenience. They have connected this device of the balls from the axis (which gives immediate indication of an increase of power, or a diminution, or resistance,) with a cock, which admits the steam to the working cylinder. The balls flying out cause the cock to close a little, and diminish the supply of steam, if the impelling power diminishes the next moment, and the balls again approach the axis, and the rotation goes on as before, although there may have occurred a very great excess or deficiency of power. The same contrivance may be employed to raise or lower the feeding sluice of a water-mill employed to drive machinery. (See MILL.) Suppose all resistance removed from the working point of a machine furnished with a very large or heavy fly, immediately connected with the working point; when a small force is applied to the impelled point of this machine, motion will begin in the machine, and the fly begin to turn, continue to press uniformly, and the machine will accelerate. This may be continued till the fly has required a very rapid motion. If, at this moment, a resisting body be applied to the working point, it will be acted on with very great force: for the fly has now accumulated, in its circumference, a very great momentum.

If a body were exposed immediately to the action of this circumference it would be violently struck, much more will it be so, if the body be exposed to the action of the working point, which perhaps makes one turn while the fly makes a hundred. It will exert a hundred times more force (very nearly) than at its own circumference. All the motion which has been accumulated in the fly, during the whole progress of its acceleration, is exerted in an instant at the working point, multiplied by the momentum, which depends on the proportion of the parts of the machine. It is thus that the coining press performs its office; nay, it is thus that the blacksmith forges a bar of iron. Swinging the great sledge hammer round his head, and urging it with force the whole way, this accumulated motion is at once extinguished by impact on the iron. It is thus we drive a nail; and it is thus,

thus, that by accumulating a very moderate force exerted during four or five turns of a fly, the whole of it is exerted on a punch, set on a thick plate of iron, such as is employed for the boilers of steam engines, and the plate is pierced as if it were a piece of cheese. This accumulating power of a fly has occasioned many, who think themselves engineers, to imagine, that a fly really adds power or mechanical force to an engine; and, not understanding on what its efficacy depends, they often place the fly in a situation where it only added a useless burden to the machine. If intended for a mere regulator, it should be near the first mover; if it is intended to accumulate force in the working point, it should not be far separated from it. In a certain sense, a fly may be said to add power to a machine, because by accumulating into the exertion of one moment the exertions of many, we can sometimes overcome an obstacle that we never could have balanced by the same machine unaided by the fly. See *FLY-WHEEL*.

It is this accumulation of force which gives such an appearance of power to some of our first movers. When a man is unfortunately caught by the teeth of a paltry country mill, he is crushed almost to mummy. The power of the stream is conceived to be prodigious, and yet we are

certain, upon examination, that it amounts to the pressure of no more than fifty or sixty pounds; but this force has been acting for some time, and there is a millstone of a ten weight whirling twice round in a second. This is the force that crushed the unfortunate man; and it required it all to do it, for the mill stopped. We have been informed of a mill in the neighbourhood of Elbingroda, in Hanover, where there was a contrivance which disengaged the millstone when any thing got entangled in the teeth of the wheels. On being tried with a head of cabbage, it crushed it, but not violently, and would, by no means, have broken a man's arm.

It is hardly necessary to recommend simplicity in the construction of machines. This seems now sufficiently understood. Multiplicity of motions and communications increase friction; augment the unavoidable losses by bending and yielding in every part; expose all the imperfections of workmanship; and have a great chance of being indistinctly conceived; and are therefore contractions without science. We shall consider this object as applied to large machinery under *MILL Work*.

MACHINERY for manufacturing Cotton. See *MANUFACTURE of Cotton*.

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