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USEFUL KNOWLEDGE;
OR, A
FAMILIAR ACCOUNT
OF THE
VARIOUS PRODUCTIONS OF NATURE,
MINERAL, VEGETABLE, AND ANIMAL.

VOL. II.

LONDON :
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VEGETABLES.

J. H. S. 1840

USEFUL KNOWLEDGE;

OR, A

FAMILIAR ACCOUNT

OF THE

VARIOUS PRODUCTIONS OF NATURE,

Mineral, Vegetable, and Animal,

(SYSTEMATICALLY ARRANGED)

WHICH ARE CHIEFLY EMPLOYED FOR THE USE OF MAN.

ILLUSTRATED WITH PLATES AND 150 WOOD-CUTS, AND INTENDED AS A
WORK BOTH OF INSTRUCTION AND REFERENCE.

BY THE REV.

WILLIAM BINGLEY, M.A. F.L.S.

LATE OF PETERHOUSE, CAMBRIDGE, AND AUTHOR OF ANIMAL BIOGRAPHY.

SIXTH EDITION,

REVISED, ENLARGED, AND ALTERED TO THE EXISTING

STATE OF SCIENCE, BY

DANIEL COOPER.

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THE BRITISH MUSEUM, AND LECTURER ON BOTANY AT THE THEATRE OF

ANATOMY AND MEDICINE, BOROUGH, ETC. ETC.

IN TWO VOLUMES.

VOL. II.

OUT-GROWING VEGETABLES AND ANIMALS.

LONDON:

PRINTED FOR J. G. F. & J. RIVINGTON; LONGMAN & CO.; HARVEY &
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1842.

FLOWERING PLANTS.

GYMNOSPERMOUS;

OR,

NAKED SEED PLANTS.



(Dotted Ducts of Fir, &c)

† Seed-lobes two or more.

†† Seeds naked or uncovered.

Examples. YEW, JUNIPER, FIRS, CYPRESS, CEDAR, SAGO, &c &c

Class II.

NAKED-SEED PLANTS.

Leaves with parallel or forked veins. Stem with wood, pith, bark, and medullary rays. Floral envelopes absent. Seeds naked. Cotyledons two or more, opposite.—Lindley.

NAT. ORD. 71. CYCADACEÆ. Lindl.—THE CYCAS TRIBE

453. SAGO is a granulated preparation from the inner portion of the stem of several species of palm-tree, and also, it is said, from the *Cycas circinalis*, or Broad leaved *Cycas*, which grows in Japan.

This tree attains the height of thirty or forty feet; has a straight and somewhat slender stem, and winged leaves at the summit, each seven or eight feet long, with the leaflets long and narrow. The *C. revoluta* and *C. inermis* are also said to yield it.

Roxburgh is of opinion that the granulated sago met with in Europe is obtained from the *Sagus lævis*, while the *Saguerus Rumphii* of the same author, and which belongs to the Palm tribe, yields the *Wine Sago Palm*; but this species, on the authority of Marsden, yields the greatest quantity of sago of commerce.

The preparation of sago constitutes a principal source of employment to the inhabitants of many parts of the coast of Malabar, as well as those of several of the islands of the East Indies.

The trunk of the sago-tree contains a farinaceous soft

centre, to obtain which it is sawn into pieces of six feet long, which are sawn down the centre into two pieces. After the centre is taken out by pieces of hard stick or bamboo cane, it is reduced to coarse powder, and water being poured upon the mass, this is allowed to stand for some hours to settle; after which it is strained through a coarse cloth, and the finest particles running through with the water, the grosser ones are left behind, and thrown away, or washed over a hair sieve, through which only the edible parts can pass. These are allowed to subside. The water is then poured off, and the starch being properly dried, is made into cakes and baked for use, or is granulated in a manner somewhat similar to that adopted in the preparation of tapioca. It is in the latter state that sago is imported into Europe, where it is much used as a nourishing and agreeable diet for sick persons, in the form of puddings and other culinary preparations. One tree will sometimes yield from 500 to 600 lbs. of *Raw Sago*. This article is known in commerce as *pulverulent* and *granulated* sago; the former is known as *Sago meal*, and is rarely imported; of the latter there are two kinds, *Pearl* and *Common Sago*.

The quantity imported, and on which duty was paid, in 1838, was 26,988 cwts. In 1834, the quantity imported into France was 41,312 lbs.

NAT. ORD. 70. CONIFERÆ, *Juss.*—THE FIR TRIBE.

454. *The COMMON JUNIPER* (*Juniperus communis*) is an evergreen shrub, with slender and pointed leaves, that grows on heaths and downs in several parts of England.

The leaves grow in threes; each is tipped with a spine, and is longer than the ripe fruit, which is a blackish purple berry.—*Sex. Syst. Diccia Monadelphia.*

Juniper berries are at first green; and they continue upon the trees two years before they become ripe, and assume their purple colour. When ripe they have a sweetish aromatic taste. The Swedes prepare from these berries a beverage which they consider useful as a medicine; in some parts of the Continent juniper berries are roasted and used as a substitute for coffee. In Sweden they are eaten at

breakfast, in the form of a conserve ; and in Germany they are frequently used as a culinary spice, and especially for imparting their peculiar flavour to sour crout. The berries are imported into this country from Holland, Germany, and Italy ; those from Italy are most esteemed. In 1838, duty (twenty per cent.) was paid on 5,896 cwts.

Juniper berries impart to alcohol their essential oil, on which chiefly their diuretic and other medicinal properties depend : hence the spirit called *Geneva*, or *gin*, was formerly, and now is occasionally, distilled with these berries ; but *English gin* is generally, if not always, now flavoured with oil of turpentine (461), a cheaper and perhaps equally useful ingredient. Angelica root is also sometimes employed for the same purpose.

The smell of juniper berries is strong, but not disagreeable ; their flavour is warm, pungent, and sweetish, leaving a bitter taste in the mouth. The whole plant, particularly the *tops*, partakes more or less of the same properties. The *essential oil* is esteemed a very good diuretic : it is also occasionally mixed with nut-oil, and thus makes a useful varnish.

The *wood* of the juniper-tree is of a reddish colour, very hard, and so durable that it will last more than a hundred years without decay. It is employed in veneering, for making cabinets, and for ornamental furniture. Charcoal formed from it affords a heat so lasting, that live embers are said to have been found in the ashes of juniper-trees after they have been covered up for more than twelve months. Such is the fibrous nature of the *bark*, that it may be manufactured into ropes and other cordage.

455. *Gum Juniper*, a resinous exudation from the *Calibris quadrivalvis*, Vent. sometimes called *gum sandarach*, is of a pale yellowish colour, very brittle, and inflammable, of a pungent aromatic taste, and emits a fragrant odour when burnt. It is imported from Mogadore, in small drops about the size of peas. When powdered it is called *pounce*, which is used for rubbing upon writing paper in places where it has been scratched by the knife for the removal of ink marks or stains. Considerable quantities of this gum are consumed in the preparation of varnish, and particularly one kind used by cabinet-makers and painters, called *vernis*.

456. The *RED* or *COMMON CEDAR* is a species of juniper (*Juniperus virginiana*) which grows in North America and the West Indies.

It is distinguished by its leaves growing in threes, and being fixed by their base, the younger ones lying upon each other, and the older ones spreading.—*Sex. Syst.* Diœcia Monadelphia.

The wood of this tree is in much request for the outsides of black lead pencils. It is soft, and incapable of a high polish, but on account of its powerful fragrance, and consequently resisting the attacks of insects, it is not unfrequently used for the bottoms of drawers and the inside of cabinets. Some years ago it was in much request for wainscoting and cabinet work; but since the introduction of mahogany it has been in great measure neglected for those purposes. It is employed in the United States as a substitute for *Savin*.

457. *SAVIN*, another of the Juniper species (*Juniperus savina*), may be also mentioned; it is a powerful emmenagogue, but is not much used internally; with its leaves is made an ointment for keeping open blisters. It is a native of the midland and southern parts of Europe, and Asiatic Russia. It rarely blossoms in England.

PINES—(*Pinus*, Dec.)

Sex. Syst. Monœcia Monadelphia.

458. The *SCOTCH FIR* or *WILD PINE* (*Pinus sylvestris*), which has its name from growing wild in different parts of Scotland, is known from other trees of the same tribe, by having its slender and somewhat needle-shaped rigid leaves in pairs; its cones or seed-vessels somewhat egg-shaped, mostly in pairs, as long as the leaves, and the scales blunt.

This useful tree flourishes with greatest luxuriance on the north and north-east sides of hills in the northern parts of Europe, in a poor and sandy soil, especially where this is mixed with loam. It flowers in May and June. If planted among rocks, or in bogs, it seldom attains a large

size; in black soil it becomes diseased; and in chalky land it frequently pines away and dies. It yields *pitch*, *tar*, *common turpentine*, and *timber*.

The *timber*, under the name of *deal*, afforded by all the fir and pine tribe, is employed as the wood-work of houses; for rafters, flooring, doors, and frames of windows, tables, boxes, and other purposes, infinitely too various to be enumerated. Frigates, and other ships of large size, have sometimes been constructed of deal, especially by the Americans; but these are by no means so durable as vessels that are built of oak. Much of the deal which we use is imported from Norway, and other northern parts of Europe. *White*, *yellow*, and *red deal*, is frequently brought over in whole trees, but more commonly in boards, each about ten inches and a half in width, two inches and a half thick, and of various lengths. The wood of such trees as are raised in England is equal, indeed superior, to the foreign wood in weight and durability, but its grain is generally coarser. The amount of duty paid on timber, in 1839, was 1,603,194*l.*

The properties of the order *Coniferæ* seem very simply to be divided into two distinct kinds, viz. 1st, those which reside in the wood as timber; and 2ndly, those which reside in the eliminated juices¹.

The first consists of that kind of timber imported into this country under the several names of deals and deal ends, battens and batten ends, masts, lathwood, and fir timber.

The deals are the trunks of the trees sawn into planks, varying in length from six feet to forty-five and upwards, having a breadth of seven inches, and a thickness of from three and a quarter to four inches, and thus pay a duty, varying in accordance with the sizes of the deals, from 2*l.* to 10*l.* per 120, if imported from our British possessions in North America; but if imported from foreign countries the duties are much higher, varying from 8*l.* 2*s.* 6*d.* to 44*l.* per 120.

The deal ends are planks shorter than six feet, having similar width and thickness with the deals, and pay a less

¹ See Mr. W. M. Chatterley's Paper on "Botanical Statistics," illustrated by the Natural Order *Coniferæ*, in the Proceedings of the Botanical Society of London, vol. I. part i. p. 89.

amount of duty per 120 than the deals. When coming from British North America they pay a duty of from 15*s.* to 1*l.* 10*s.*; and from foreign countries from 6*l.* to 12*l.* The number of deals and deal ends imported has gradually increased from the year 1820 to 1835.

The following is the amount of importation and net revenue for several of the intermediate years, viz.

	Gt. Hunds.	Net Revenue.
1820	36,265	£405,751
1825 (a very large amount)	77,074	942,934
1830	56,204	560,521
1834	67,105	601,914
1835	61,731	582,485

The average importation, consumption, and revenue for the fifteen years from 1821 to 1835 inclusive, is as follows :

Import.	Consumption.	Net Revenue.
Gt. Hunds.	Gt. Hunds.	
53,868	53,440	£629,266

But it should be observed, that though the consumption is on the average less than the importations, still in many years it is much greater, and this must be attributed either to the working up of the old stock, or the use of home-grown timber; although I am not sure that the imports of the latter are included in this estimate. The amount of exportations it is scarcely worth while to consider in so general a view as the present, it being not more than 750 great hundreds, about one in every seventy-two.

The countries whence deals and deal ends are principally procured for our home consumption, are our North American possessions, as might be inferred from the immense difference in the duties on timber brought thence and that coming from foreign countries; this difference has been instituted for the purpose of protecting the trade in these colonies, which consists chiefly of timber; and the very great disproportion in the duties has been found necessary from the very great superiority of the Baltic timber, that is, the timber from the North of Europe; which superiority would counterbalance a very large increase of outlay in the first instance; hence we have an exorbitant duty laid upon

good timber, for the purpose of forcing us to use bad timber; or, as it is said, to protect the North American trade. It may be useful to compare the accounts of the importations of deals and deal ends for any one year from the countries bordered by the Baltic Sea, and those bordered by the St. Lawrence river; for instance, the year 1833, when we imported from

	Gt. Hunds.
Russia	10,815
Sweden	2,633
Norway	7,124
Prussia	4,229
—————	
Total from countries bordered by } the Baltic	} 24,101
British possessions, N. A.	30,974

So we import bad timber some 4,000 miles, at a great expense, while we could have a superior article from places less than one-fourth of that distance; in fact, the annual loss to the community has been under estimated at £1,000,000 sterling.

Deals are also obtained, though in small quantities, from the following countries, besides those already mentioned:—Germany, Holland, Belgium, France, Portugal, Italy, East India Company's territories, and Ceylon, British West Indies, Isles of Guernsey, Jersey, Alderney, and Man; but from all these, in the same year as that above quoted, viz. 1832, the whole amount of deals imported was not more than fifteen great hundreds.

The *outer bark* of the fir-tree may be used in the tanning of leather; and it is said that, in the northern parts of Europe, the soft, white, and fibrous *inner bark* is, in times of scarcity, made into a kind of bread. For this purpose it is dried over a fire, reduced to powder, kneaded with water and a small portion of corn flour, into cakes, and baked in an oven. Children in Norway are very fond of the fresh bark in the spring of the year, either shaved off with a knife or grated with a rasp.

459. The *Pinus pinaster*, or *Cluster Pine* of Acton¹, and

¹ See Pereira's *Materia Medica*, vol. ii. p. 701. 1840.

others, yields *Bordeaux turpentine*, *galipot tar*, and *pitch*. The *Pinus palustris*, Lambert, or *Swamp Pine*, furnishes by far the greater proportion of *turpentine*, *tar*, &c. consumed in the United States. The *Pinus Tæda* of Lambert, or the *Frankincense Pine* of Virginia, yields the *common turpentine*, but of a less fluid quality than that which flows from the preceding species. The *Pinus pinea* of Lambert, or *Stone Pine*, yields the cones called in the shops *pignoli Pines*, the seeds of which, termed *pine nuts*, are used as a dessert; it grows in the south of Europe and northern parts of Africa. The *Pinus Pumilio* of Lambert; the *Mugho*, or *Mountain Pine*, grows on the mountains of the south of Europe; an oleo-resin, called *Hungarian balsam*, exudes spontaneously from the extremities of the branches, and from other parts of the tree. By distillation of the young branches with water, there is obtained in Hungary an essential oil called *Krummholzöl*, or *Oleum templinum*. The *Pinus Cembra* of Lambert, or the *Siberian Stone Pine*: the young shoots by distillation yield *Carpathian balsam*. The seeds, like those of *Pinus Pinea*, are eaten.

460. *Crude turpentine* is the resinous juice of various kinds of the pine tribe, obtained by boring holes into the trunks of the trees, early in spring. It is of a pale yellowish colour; and has a strong odour and disagreeable taste. It is principally imported from New York. By the distillation of turpentine an essential oil is obtained, called *oil of turpentine*, which is extremely pungent. The substance which remains is known by the name of *yellow resin*, or *rosin*. This, when further heated, becomes, by expelling the water, *transparent rosin*. *Black* or *brown resin* is merely yellow resin deprived of more of its terebinthine oil by a still greater degree of heat. This is also termed *colophony*. *Hockton's Patent Resin* is a pale transparent product, obtained by drawing off melted rosin into shallow tanks containing cold water, and keeping the water cold until it is thoroughly solid. The amount of customs' duty paid, in 1839, on turpentine, was 82,936*l*.

461. *Common horse* or *strained turpentine*, is mostly employed as an ingredient in the plasters used by farriers. The oil is occasionally used in medicine; and lately it has been found efficacious in cases of worms. It is much employed

by painters for rendering their colours more fluid : as well as in the composition of different kinds of varnish used in floor-cloth, umbrella, and other manufactures. The spirit called gin was formerly flavoured with juniper berries : but as these are now too expensive, oil of turpentine, the taste of which in a slight degree resembles that of juniper, is applied to the same purpose ; and considerable quantities of turpentine are thus consumed. The common resin is used in plasters and ointments ; in the manufacture of soap ; and other arts ; musicians rub the bows and strings of violins with it, to take off the greasy particles which are there collected, as well as to counteract the effects of moisture.

462. *Tar* is obtained from the roots and refuse parts of the fir-tree, by cutting them into billets, piling these in a proper manner in conical pits or ovens formed for the purpose, covering them partly over with turf, and setting them on fire. During the burning a black and thick matter, which is the tar, falls to the bottom, and is conducted thence into barrels, which are placed to receive it. These barrels hold about thirty-one gallons and a half, twelve of which constitute a *last*. In 1830, 12,206 lasts were imported.

Tar is an article of great utility in manufactures, and for various economical purposes. It is much employed for smearing the rigging, and other external parts of ships, to prevent their receiving injury from moisture. It has been used in medicine both internally and externally ; *tar-water*, or water impregnated with tar, was some years ago a popular remedy in various disorders, and is now occasionally used in cutaneous diseases. *Tar-oil* and *Tar-ointment* are also used. Although some tar is prepared in this country, it is insufficient to supply the demand ; consequently we every year import great quantities of it from Russia, Sweden, America, and other countries.

463. *Pitch* is vegetable tar deprived of its volatile oil and an acid liquor (*pyroligeneous acid*) by distillation or otherwise. *Oil of Tar* is useful for various purposes.

By the ancients pitch was much employed for giving flavour and fragrance to their wines. With us it is of extensive use to mechanics, and in numerous manufactures ;

but the principal demand for it is in ship-building, to secure the joints and crevices of the planks and timbers, and for other purposes. When mixed with a certain quantity of oil and suet, it is made into *shoemakers' wax*; and in conjunction with whale fat, forms *carriage grease*, or the substance with which the wheels of carriages are smeared. The best pitch is of a glossy black colour, perfectly dry, and very brittle. It is also administered internally, and according to Bateman, it affords one of the most effectual means of controlling the languid circulation and the inert and arid condition of the skin. It is also externally applied in skin diseases. *Burgundy pitch* is yielded by the Spruce fir (466).

464. *Lamp-black* is a dry soot formed by burning the dregs and coarser parts of tar and turpentine in furnaces constructed for that purpose. The smoke is conveyed through tubes into boxes, each covered with linen, in the form of a cone. Upon this linen the soot is deposited: and it is from time to time beaten off into the boxes, and afterwards packed in barrels for sale. This substance is employed in printing and dyeing; and has its name from the practice that was formerly adopted, of making it by means of lamps.

465. The *WEYMOUTH PINE* (*Pinus strobus*) is chiefly distinguished by its leaves growing in fives, and its cones being smooth, cylindrical, and longer than the leaves.

This species of fir-tree grows wild in North America, and succeeds well in strong land in England. Its *timber* is white, of more open grain than Scotch fir, and not nearly so heavy. In America it is principally used for the masts of ships, for which, by its toughness, it is peculiarly calculated.

FIRS.—(*Abies*, Dec.)

Sex. Syst. Monœcia Monadelphia.

466. The *SPRUCE FIR* (*Abies excelsa*, Dec.), a native of Norway and other northern parts of Europe, is known by its short, and four-sided leaves growing singly, and surrounding the branches;

its cones being cylindrical, the scales somewhat square, flattened, jagged, and bent backwards at the margin. It grows to the height of 150 feet, and flowers in May and June.

The *wood* of the spruce fir is what the English carpenters usually denominate *white deal*. It is considered next in value to that obtained from the Scotch fir; and is remarkable for having few knots. On account of its lightness it is peculiarly adapted for packing-cases and musical instruments.

From the trunk of the spruce fir-tree a fine and clear *turpentine* oozes, and is called *Frankincense* or *Thus*, which after being boiled in water and strained through a linen cloth, acquires a somewhat solid consistence, and a reddish brown colour, and is called *Burgundy pitch*. This is employed as an ingredient in several kinds of ointments and plasters; it is principally manufactured in Saxony.

The article called *essence of spruce*, which is used in making spruce beer, is prepared from the concentrated aqueous decoction of the young branches of the *Abies nigra* of Michaux, or **BLACK SPRUCE**, a native of North America.

In the United States' Dispensatory the following receipt is given for making *spruce beer*:—"Take of essence of spruce *half a pint*; pimento, bruised; ginger, bruised; hops, of each *four ounces*; water, *three gallons*; yeast, *a pint*; molasses, *six pints*. Mix, and allow the mixture to ferment for twenty-four hours." As an agreeable beverage it is much used in summer; on account of its antiscorbutic properties it is given to sailors in long sea voyages. The amount of customs' duty paid, in 1839, on *spruce*, was 10,253*l.*

Pereira (*op. cit.*) enumerates the following useful species of the genus *Abies*, in addition to the above:—The *Abies balsamea* of Lindley, or the *Canadian Balsam Fir*, or *Balm of Gilead Fir*, which is an elegant tree, seldom rising more than forty feet in height. It inhabits Canada, Nova Scotia, Maine, Virginia, Carolina, and yields the *Canada Balsam*, of so much importance to the microscopic observer, in rendering transparent animal and vegetable tissues. The *Abies Canadensis* of Lindley, or the *Hemlock Spruce Fir*,

said to yield an oleo-resin analogous to Canada Balsam. The *Abies Picea* of Lindley, or the *Silver Fir*, is found in the mountains of Siberia, Germany, and Switzerland. It yields the *Strasburgh turpentine*.

467. The LARCH (*Larix Europæa, Dec*), a native of the Alps, and the mountains of Germany, is a species of fir, which has its leaves in tufts, deciduous, and its cones oblong, and of a somewhat oval shape, the margins of the scales bent back and jagged.—*Sex. Syst.* Monœcia Monadelphia.

The cultivation of the larch has been much attended to for some time in this country; the rapidity of its growth being not less remarkable than the durability of its timber. It is well calculated for masts, and the framework of vessels, being capable of sustaining much greater pressure even than oak. For wood-work constantly immersed in water, it is peculiarly calculated, as in such situations it is said to become almost as hard as stone. In Petersburg, larch timber is applied to no other use than that of ship-building. Line-of-battle ships are constructed of it in Archangel; these generally last about fifteen years; though in milder climates it is imagined that they would last much longer.

For gates, pales, and similar work, exposed to the vicissitudes of weather, they are admirably serviceable; and for flooring and other internal purposes, are at least equally durable. Buildings constructed of larch timber are said to have continued sound for two hundred years; and in some of the old palaces in Venice there are beams of larch yet existing that are as sound as when they were first placed. But the very combustible nature of this wood renders it objectionable for such uses. No wood with which we are acquainted affords more durable staves for casks than larch; and in the opinion of many persons it is further valuable by improving the flavour of the wine contained in them. The wood is of a delicate colour, not unlike the cedar used for black-lead pencils, but it is knotty almost throughout.

From the *inner bark* of the larch the Russians manufacture a soft and fine kind of white gloves. The trunk, if tapped between the months of March and September, yields an extremely pure turpentine, which, it is said, is the *Larch* or *Venice turpentine* found in the shops. This, however,

is by some considered a mistake : that article being, according to Jennings, a compound well known to every druggist¹. A brown gummy substance, known in Russia by the name of *Orenburgh gum*, is obtained by a curious process from the sap of this tree. On the large branches of the larch small sweetish grains exude, somewhat resembling sugar, which are frequently substituted for the drug called *Manna of the Larch*, or *Manna of Briancon*.

The cultivation of the larch was first introduced into Britain towards the conclusion of the seventeenth century. The trees will grow in almost any soil, and they arrive at useful timber size in thirty or forty years—one half the time which the pine requires.

In all the trees which produce DEAL TIMBER, it should not be forgotten, that the wood of those is the most lasting which has not been deprived, either naturally or artificially, of its valuable juice, the TURPENTINE.

468. *The CYPRESS-TREE (Cupressus sempervirens) is a dark-coloured evergreen, a native of the Levant, the leaves of which are extremely small, and entirely cover all the slender branches, lying close upon them, so as to give them a somewhat quadrangular shape.*

In some of the trees the branches diminish gradually in length from the bottom to the top, in such a manner as to form a nearly pyramidal shape. There are two other kinds.—Sex. Syst. Monœcia Monadelphia.

In many of the old gardens in this country cypress-trees are still to be found, but their generally sombre appearance has caused them of late years to be much neglected. They are, however, very valuable on account of their *wood*, which is hard, compact, and durable, of a pale or reddish colour, with deep veins, and a pleasant smell. Pliny states that the doors of the famous temple of Diana, at Ephesus, were of cypress wood, and that although they were four hundred years old at the time when he wrote, they appeared to be nearly as fresh as new. Indeed this wood was so much esteemed by the ancients, that the image of Jupiter in the capitol was made of it. The gates of St. Peter's church at

¹ See Jennings's Family Cyclopædia, article Turpentine.

Rome are stated to have been of cypress, and to have lasted more than one thousand years. As this wood, in addition to its other qualities, takes a fine polish, and is not liable to suffer from the attacks of insects, it was formerly much esteemed for cabinet furniture. By the Greeks, in the time of Thucydides, it was used for the coffins of eminent warriors; and many of the chests which enclose Egyptian mummies are made of it. The latter afford very decisive proof of its almost incorruptible nature.

The name of this tree is derived from the island of Cyprus, in the Mediterranean, where it still grows in great luxuriance. Its gloomy hue caused it to be consecrated by the ancients to Pluto, and to be used at the funerals of people of eminence. Pliny states that in his time it was customary to place branches of the cypress-tree before the houses in which persons lay dead.

NAT. ORD. 69. TAXACEÆ, *Lindl.*—THE YEW TRIBE.

469. *The YEW is a well-known evergreen tree (Taxus baccata), which has dark, narrow, pointed, and prickly leaves and red berries, in the hollow part of the extremity of which a green seed appears. It sometimes grows to a large size, and a great age, probably more than five hundred years.—Sex. Syst. Diœcia Monadelphia.*

The cultivation of the yew was formerly very extensive throughout nearly the whole of the British dominions, since of the *wood* of this tree, which is peculiarly hard, smooth, and tough, our ancestors manufactured their bows. Hence, as well as on account of its gloomy and funereal aspect, it was usually planted in church-yards. But when the introduction of fire-arms began to supersede the use of the bow, the yew was no longer cultivated than as an ornamental tree in parks and pleasure grounds.

In the formal style of gardening which was anciently prevalent, few trees were more the subject of admiration than this, from its bearing to be clipped without injury into almost any form. Yews were cut into the shape of men, quadrupeds, birds, ships, and other vegetable monsters, but such absurd fancies have of late years almost wholly disappeared. These trees are at present advantageously planted in hedges, as a fence for orchards and shrubberies, which nothing can injure.

The *wood* of the yew-tree is hard, beautifully veined, and susceptible of a high polish. Hence it is valuable as a wood for veneering, and is much used for card-boxes, small cabinets, and other articles. It is frequently used by turners and cabinet-makers; and might perhaps be advantageously substituted for box by engravers and other artists in that wood. From its hardness and durability it may be made into cogs for mill-wheels, into axle-trees, and flood-gates for fish-ponds, which are scarcely susceptible of decay. The *berries* are sweet and clammy, and are often eaten without inconvenience; though when eaten to excess, and particularly if the stones be swallowed, they are injurious. The leaves of the yew-tree are extremely poisonous both to man and cattle. The branches of the *Dacrydium taxifolium*, belonging to this order, may be manufactured into *spruce-beer* (466.)

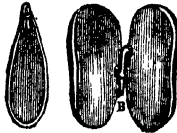
The yew is propagated by seeds.

FLOWERING PLANTS.

EXOGENS;

OR,

DICOTYLEDONOUS PLANTS.



(Seed-lobes.)

† Seed-lobes two or more to each seed, opposite.

†† Increased by the agency of sexes.

††† Germination taking place from a fixed point, the embryo.

Examples. OAK, ELM, CHESTNUT, AND ALL THE BRITISH FOREST
TREES, &c. &c.

Class F.

OUT-GROWING PLANTS.

Leaves reticulated. Stem with wood, pith, bark, and medullary rays. Flowers usually with a quinary division. Seeds in a pericarp. Cotyledons two or more, opposite.—Lindley.

SUB-CLASS III.—Single-Petalled Flowers.

NAT. ORD. 68. CINCHONACEÆ, *Lindl.*—THE COFFEE TRIBE.

470. *PERUVIAN BARK* is the produce of several trees which grow in South America, and chiefly in Peru, New Granada, and Bolivia, whence its name has been derived. *Cinchona* is the name of the genus.

The *Officinal Cinchona*, in size and general appearance, somewhat resembles our cherry-tree. Its leaves are in pairs, oval, pointed, nerved, and smooth on the upper side, with interpetiolate deciduous stipules; and the flowers hang in loose clusters, are fringed at the edges, and red in the inside (Pl. 1. Fig. 10.)

Four kinds of Peruvian bark have been for some time known in commerce, viz. the green, the yellow, the red, and the white; that obtained from the *Cinchona cordifolia*, the Heart-leaved, is called Yellow or Pale bark, and is, correctly speaking, the *C. lancifolia*; that from the *Cinchona lancifolia*, or Lance-leaved cinchona, now known to be *C. condaminea*, called the Yellow bark; and that from the *Cinchona oblongifolia*, or *C. magnifolia*, Oblong-leaved cinchona, called Red bark.—*Sex. Syst.* Pentandria Monogynia.

Formerly this valuable medicine had the name of *Jesuits' bark*, from its having been first introduced into Europe by the Jesuits who were settled in South America, and had learned the use of it from the inhabitants of Peru, to whom

it had long been known. For its officinal name of *Cinchona* it was indebted to the lady of a Spanish Viceroy, the Countess del Cinchon, who about two hundred years ago derived great benefit from taking it. It was introduced into Europe about the year 1640.

The *Heart-leaved cinchona* grows spontaneously, and in great abundance, in several of the mountainous forests of Quito and Peru. The proper time for cutting it is, according to Ruiz and Poppig, from September to November, the only season during which there is any considerable intermission from rain. The Indians, or *Cascarilloes*, as they are termed, as soon as they have discovered a spot where the trees are in sufficient number, build a few huts for themselves, and one large hut for containing the bark, to preserve it from wet. They then go forth, each furnished with a large knife, and a bag which will hold about fifty pounds' weight of bark. Each tree occupies two men. They first cut or slice down the bark as far from the ground as they can reach. They then tie to the tree several sticks a little distance apart, and each about half a yard in length, to serve as a ladder by which they ascend to the upper part, always slicing off the bark as far as they can reach before they fix a new step. In this manner one of the two mounts to the top, whilst the man below collects what his companion cuts. To relieve each other they ascend the different trees by turns, and they are generally able to fill their bags once in the course of the day. When they return to their huts they spread out the bark to dry quickly; they are very careful to preserve it from wet, which would greatly injure it.

Of the kinds of bark mentioned above, the *pale* and the *yellow* are most in use. The red is now very scarce, and is seldom brought into Europe. The pale bark is imported from the Spanish Main in large bundles closely packed in goat or other skins. The yellow is in much larger pieces, and flatter and thicker than those of the pale bark.

On its first introduction into Europe, its use was opposed by many eminent physicians; and for a long time afterwards it was believed to be a very dangerous remedy. But its character in process of time became perfectly established, and it is now considered one of the most valuable medicines

which we possess. It is exhibited in numerous complaints in which strengthening tonic medicines are required. In agues it is considered almost a specific. It is given in powder, as an extract, a tincture, and a decoction, but it is considered most efficacious in powder. Modern chemistry has, however, improved upon the forms of the administration of this useful medicine, in preparing a sort of essence of it, called *Quinine*, or rather, *sulphate of quinine*, a few grains of which are of greater efficacy than drachms of its other preparations. The bark, and all preparations of it, are more or less bitter, quinine particularly so, but affecting the tongue much more intensely than the bark itself.

The duty paid on this medicine is *one penny* per pound ; and according to the Trade List of 1837, 141,071 pounds were imported ; and in 1828, only 108,502 pounds ; and in 1839, but 50,548 pounds.

The distinctive characters afforded by the Cryptogamic vegetables (*Lichens*) on these barks, are of the utmost importance to the dealer, as they enable him at once to distinguish the several kinds.

471. *IPECACUANHA*, an important medicine, is the root of a perennial plant (*Cephaelis Ipecacuanha*), indigenous to various parts of South America, and particularly to Brazil. *Ipecacuanha* root is annulated, simple, brown, small, wrinkled, bent, and contorted into a great variety of shapes, from four to six inches long. It is given chiefly as an emetic ; but it is also very useful on other occasions. When fresh, it is pale brown externally.—*Sex. Syst.* Pentandria Monogynia.

There are three kinds of ipecacuanha : gray, brown, and the red. Of these, the brown is usually preferred for medicinal use. *Ipecacuanha* was first brought into Europe towards the middle of the seventeenth century : but it was not admitted into general use until about the year 1686, when it was introduced into practice under the patronage of Louis XIV. of France. Its taste is bitterish and somewhat acrid ; and it seems to cover the tongue with a kind of mucilage. It is one of the mildest and safest of emetics. It is administered in powder, as a wine, and as a tincture. It has this peculiar advantage, that if it does not operate as an emetic, it passes off without injury by the skin or bowels.

In very small doses it is efficacious in obstinate coughs, and in several other complaints.

The duty on ipecacuanha is one shilling per pound weight; and the quantity imported, in 1838, was 12,426 pounds.

472. *COFFEE* is the seed of an evergreen shrub which is cultivated in hot climates, and is chiefly imported from Arabia and the East and West Indies.

This shrub (*Coffea Arabica*, Pl. 1. Fig. 9) is from fifteen to twenty feet in height. The leaves are four or five inches long, and two inches broad, smooth, green, and glossy on the upper surface; and the flowers, which grow in bunches at the base of the leaves, are white and sweet-scented. The berries or fruit are of a somewhat oval shape (Fig. 58. b), about the size of a cherry, and of a dark red colour when ripe. Each of these contains two cells, and each cell has a single seed, which is the coffee as we see it before it undergoes the process of roasting.—Sex. Syst. Pentandria Monogynia.

Coffee is an article of only late introduction. To the Greeks and Romans it was wholly unknown. It is a native of Arabia Felix, Ethiopia, and is much grown in America and Asia. Its use appears to have originated in Ethiopia; and in 1554 it is stated to have been first introduced into Constantinople, whence it was gradually adopted in the western parts of Europe. In 1652 Mr. Daniel Edwards, a Turkey merchant, brought with him to England a Greek servant, named Pasqua Roffee, who understood the methods of roasting coffee, and making it into a beverage. This man was the first who publicly sold coffee in this country; and he kept a house for that purpose in George Yard, Lombard Street. At Paris, coffee was nearly unknown until the arrival of the Turkish ambassador, Solomon Aga, in 1669; about three years after which the first coffee house is said to have been established in that city. The coffee-shrub was originally planted in Jamaica about 1730. In 1839 the *dried berries* were imported from Demerara.

Great attention is paid to the culture of coffee in Arabia. The trees are raised from seed sown in nurseries, and afterwards planted out, in moist and shady situations, on sloping grounds, or at the foot of mountains. Care is taken to conduct little rills of water to the roots of the trees, which at certain seasons require to be constantly surrounded

with moisture. As soon as the fruit is nearly ripe, the water is turned off, lest the fruit should be rendered too succulent. In places much exposed to the south, the trees are planted in rows, and are shaded from the otherwise too intense heat of the sun by a branching kind of poplar tree. When the fruit has attained its maturity, cloths are placed under the trees, and upon these the labourers shake it down. They afterwards spread the berries on mats, and expose them to the sun to dry. The husk (as seen Fig. 58. b) is then broken off by large and heavy rollers of wood or iron. When the coffee has been thus cleared of its husk, it is again dried in the sun, and lastly winnowed with a large fan, for the purpose of clearing it from the pieces of husks with which it is intermingled. A pound of coffee is generally more than the produce of one tree : but a tree in great vigour will produce three or four pounds.

Fig. 58.



Coffee Tree.

The best coffee is imported from Mocha. This, which in Europe is called *Mocha*, or *Arabian coffee*, is small and dark yellow, and bears a higher price than any which our colonies are able to raise; owing, as it is supposed, to the difference of climate and soil in which it is grown. It is packed in large bales, each containing a number of smaller bales; and when good it appears fresh, and of a greenish olive colour. The coffee next in esteem to this is grown in Java and the East Indies, the berries of which are larger, and paler yellow; and that of the lowest price in the West Indies, which, like the Brazilian, has a bluish, greenish-gray tint.

The quantity of coffee annually supplied by Arabia is supposed to be upwards of fourteen millions of pounds. Almost all the Mahometans drink coffee at least twice a day, very hot, and without sugar. The excellence of coffee depends, in a great measure, on the skill and attention that are exercised in the roasting of it. If it be too little roasted, it is devoid of flavour; and if too much, it becomes acrid, and has a disagreeable burnt taste. In England the

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operation of roasting is usually performed in a cylindrical vessel, perforated with numerous holes, and fixed upon a spit which runs lengthways through the centre, and is turned by a jack, or other mechanical contrivance.

The outer part of the berry, and the inner membrane which immediately invests the seeds, are used by the Arabians, and of these the former is much esteemed, and constitutes what is called *Café à la Sultane*.

Its medical properties are those of preventing sleep by exciting the whole system; of relieving febrile symptoms, and in its *raw state* is nutritious. This last property is destroyed by roasting.

It is said that coffee loses much of its flavour by being imported in a ship with sugar, or in one in which sugar has been even some time previous; the *tasters* can immediately detect it.

The amount of customs' duty paid on coffee, in the year 1839, was 779,114*l*.

NAT. ORD. 67. CAPRIFOLIACEÆ, *Rich.*—THE HONEYSUCKLE
TRIBE.

473. *The COMMON ELDER* (*Sambucus nigra*) is an indigenous English tree, distinguishable by its winged leaves, with serrated and somewhat oval leaflets, its clusters of small white flowers divided into five principal branches, and the small black or purple berries by which these are succeeded.—*Sex. Syst.* Pentandria Trigynia.

The uses of the elder are numerous; there is scarcely any part of it which has not been employed in some way or other. The *wood* is yellow, and in old trees becomes so hard that it will take a polish almost as bright as that of box; and indeed it is often used as a substitute for box-wood. Its toughness also is such that it is made into skewers for butchers, tops for fishing-rods, and needles for the weaving of nets. It is likewise employed by turners.

Sir J. E. Smith calls the elder a whole magazine of physic to rustic practitioners; and it is not quite neglected even by professional men. Ointments are made of the *leaves* and flowers, the clusters of which, before they open, may be made into a delicious pickle, to eat instead of capers.

The juice of the *berries* is boiled with sugar into a rob, which is useful in sore throats, colds, and hoarsenesses. The *inner bark* is a violent purgative. Elder flowers have an agreeable smell, which they impart in distillation to water; they are likewise used to give a flavour to vinegar. The berries are said to be poisonous to poultry, but their juice, properly fermented, makes a pleasant wine; in Germany, a very pure and strong spirit is distilled from them. The juice of elder berries is sometimes employed to give a red colour to raisin or other sweet wine. The *young shoots* of this shrub are filled with an exceedingly light *pith*, which is cut into balls for electrical experiments; and is also made into toys for the amusement of children.

Elder will grow and thrive in almost any soil and situation; but as every part of it has an unpleasant smell, people should not sleep under its shade, as in such case it might prove injurious to them.

NAT. ORD. 66. STELLATÆ, *Lindl.*—THE MADDER TRIBE.

474. *MADDER* (*Rubia tinctorum*) is a rough, trailing, perennial plant, with an annual stalk, that grows wild in several parts of the Levant and south of Europe, and is much cultivated in Holland, France, &c., on account of its roots, which are used by dyers and calico-printers. It can be also cultivated in England, but its cultivation is not profitable.—*Sex. Syst.* Tetrandria Monogynia.

The land best adapted for the cultivation of madder is a soft, sandy loam. The roots are dug up for use in the third summer of their growth. They are then gradually dried in a stove built in the form of a tower containing several floors; from the uppermost they are progressively removed to the lowest; after which they are thrashed to remove the cuticle, then dried completely in a kiln, and subsequently pounded. Three kinds of madder are found in commerce, *mull*, *gemeens*, and *crop*; crop madder is the best.

Madder is extensively used in dyeing red colours, and also as a first tint for several other shades. The colour known among dyers as *Turkey red*, is chiefly, if not entirely, given by madder.

This root was formerly employed in medicine, but its virtues are of little importance. It tinges water a dull red colour, and spirit of wine a deep bright red. When eaten by animals it stains even their most solid bones.

Cows are remarkably fond of the madder plant; and when they freely eat of it their milk becomes red, yet the cream which it affords makes a yellow butter.

The duty paid in 1839, on madder and madder-root, imported into this country, amounted to 11,729*l*.

NAT. ORD. 65. VACCINACEÆ, *Lindl.*—THE BILBERRY TRIBE.

475. *CRANBERRIES* are a small red fruit, with purple dots, produced by a slender wiry plant (*Oxycoccus palustris*, *Rich.*), which grows in the peaty bogs of several parts of the north of England, and also in Norfolk, Lincolnshire, and Cambridgeshire.

The leaves are small, somewhat oval, and rolled back at the edges, and the stem is thread-shaped and trailing. The blossoms are small, but beautiful, each consisting of four distinct petals rolled back to the base, and of a deep flesh colour.—*Sex. Syst.* Octandria Monogynia.

The collecting of cranberries is a tiresome and disagreeable employment, as each berry, which seldom exceeds the size of a pea, grows on a separate stalk, and the morasses in which they grow are frequently very deep. Cranberries are much used in the northern counties, and great quantities of them are collected and packed in casks, or bottled and sent to London. So considerable a traffic in this fruit is carried on, that at Longtown, in Cumberland, the amount of a market day's sale, during the season for gathering them, is stated by Dr. Withering to be from 20*l*. to 30*l*. Cranberries begin to ripen about the month of August, and continue in perfection for some weeks.

They are much used in confectionary, but particularly in tarts, their rich flavour being very generally esteemed. The usual mode of preserving them is in dry bottles, corked so closely as to exclude all access of the external air; some persons, however, fill up the bottles with spring water. Others prepare this fruit with sugar. From the juice of cranberries, mixed with a certain portion of sugar, and properly fermented, a grateful and wholesome wine may be

made. The inhabitants of Sweden use this fruit only for the cleaning of silver plate.

A considerable quantity of cranberries is annually imported into this country from North America and Russia. These are larger than our own, of a different species (*Oxycoccus macrocarpus*), and by no means of so pleasant a flavour.

476. There are other species of fruit belonging to this tribe, which grow wild in this country, on heaths or in woods. The chief are BILBERRIES, or WHORTS (*Vaccinium myrtillus*), which are occasionally eaten in milk and in tarts, and which afford a violet-coloured dye: GREAT BILBERRIES, or BLEA-BERRIES (*V. uliginosum*), which in France are sometimes employed to tinge white wines red: and RED WHORTLE-BERRIES, or COW-BERRIES (*V. vitis idæa*), which though not of a very grateful flavour, are occasionally used in tarts, rob, and jelly.

NAT. ORD. 64. DIPSACEÆ, *Juss.*—THE SCABIOUS TRIBE.

477. *TEASEL* (*Dipsacus Fullonum*) is a biennial plant, with a somewhat egg-shaped head of flowers, and hard reflected scales, which is cultivated in several parts of England, to be used in the carding of woollen cloth

The Fullers' Teasel is distinguished from other plants of the same tribe, by having its leaves connected at the base, the flower scales hooked, and the general calyx reflected or bent back.—*Sex. Syst.* Tetrandria Monogynia.

The seeds of this plant are usually sown in strong rich land in the spring. The plants are sometimes transplanted, but the best heads are obtained from those which remain where they first grew. The next year the flowers appear in July; when the blossoms begin to decay the heads are cut off, and exposed daily to the sun until they are perfectly dried.

In the clothing counties of England the fullers' teasel is an article of considerable importance. The crooked scales accompanying the flowers are so hard and rough that the heads are employed for raising the nap of woollen cloths. For this purpose they are either tied together in rows, or set into flat boards like cards, or are fixed round the cir-

cumference of a large and broad wheel. The former are used with the hand ; and the latter is turned round whilst the cloth is held against it.

NAT. ORD. 63. COMPOSITÆ, *Juss.*—THE COMPOUND TRIBE.

478. The *ARTICHOKE* (*Cynara scolymus*) is a well-known perennial plant, which is grown chiefly for culinary purposes, and was originally imported into this country from the south of Europe in 1548.—*Sex. Syst.* Syngenesia Polygamia Æqualis.

Many fanciful derivations have been given of the word *artichoke* ; none can be relied upon. The parts of this plant that are eaten are the receptacle of the flower, which is called the *bottom*, and a fleshy substance on each of the scales of the calyx. The *choke* consists of the unopened florets, and the bristles that separate them from each other : these stand upon the receptacle, and must be cleared away before the bottom can be eaten.

With us artichokes are generally plain boiled, and eaten with melted butter and pepper ; and they are considered both wholesome and nutritious. The bottoms are sometimes stewed, boiled in milk, or added to ragouts, French pies, and other highly-seasoned dishes. For winter use they may be slowly dried in an oven, and kept in paper bags in a dry place. On the Continent artichokes are frequently eaten raw, with salt and pepper.

By the country people of France the *flowers* of the artichoke are sometimes used to coagulate milk, for the purpose of making cheese. The *leaves* and *stalks* contain a bitter juice, which, mixed with an equal portion of white wine, has been employed in the cure of dropsy ; prepared with bismuth, it imparts a permanent golden yellow colour to wool.

479. The *CARDOON* (*Cynara cardunculus*) is a species of the artichoke, originally a native of Candia ; it has smaller flowers than the common artichoke, and the scales of the calyx terminated by long, sharp spines.

The stems rise to the height of four or five feet, and are upright, thick, and cottony. The leaves are large and winged, and the flowers of a blue colour.—*Sex. Syst.* Syngenesia Polygamia Æqualis.

The parts of the cardoon that are eaten are the roots,

stalks, and middle ribs of the leaves ; and chiefly the latter, which are thick and crisp. But as all these are naturally very bitter, the plants, previously to being used, are blanched by being tied up like lettuces, about the month of September, and having earth thrown upon their lower parts, to the depth of eighteen inches or two feet.

Cardoons come into season for the table about the end of November ; and are either eaten alone or as a sauce to animal food, particularly to roasted meat ; or are introduced as a dish in the second course. They are, however, not so much used in England as on the Continent ; and this in consequence chiefly of the trouble attending their cultivation, and their preparation for the table, so as to render them palatable.

480. *LETTUCE* (*Lactuca sativa*) is an annual esculent vegetable, that is cultivated in nearly every kitchen garden in the kingdom.—*Sex. Syst.* Syngenesia Polygamia Æqualis.

The varieties of lettuce are extremely numerous: but those best known are the *cos lettuce* and *cabbage lettuce*, the former having upright leaves, and the latter having its leaves folded over each other like those of a cabbage. Their culture is very simple. The seeds are sown at various seasons of the year, that the plants may be ready in succession for the table. They are generally transplanted to allow of room for their expansion and growth. When the *cos* lettuces have attained a sufficient size, their leaves are tied together with strings of matting, to blanch them for use. From seeds sown towards the end of the summer, lettuces may with care be obtained in perfection during the ensuing winter and spring.

Lettuces have an odour somewhat resembling that of opium ; and they also possess somewhat similar narcotic properties, which reside in the milky juice. An *Extract of Lettuce* is now ordered by the London College ; it is useful in small doses for allaying the cough in pulmonary consumption.

The properties of this vegetable as a salad, if eaten without oil, are considered to be emollient, cooling, and wholesome.

481. *ENDIVE* (*Cichoria endivia*) is an annual plant, cultivated in kitchen gardens, having curled or crisped leaves.—*Sex. Syst.* Syngenesia Polygamia Æqualis.

We are supposed to have been originally indebted to the East Indies for this useful winter salad. It is chiefly cultivated in the south of England, being sown generally about June or July, and afterwards planted out like lettuce.

The chief excellence of endive consists in the whiteness of its inner leaves. It is therefore advisable either to cover the plants with flower-pots, or when full grown, to tie them loosely together for two or three weeks; they will thus become perfectly blanched. In winter they may be preserved either by covering them with straw and mats, or by putting them in sand in a dry cellar.

The French consume a great quantity of endive, eating it raw in salads, boiled in ragouts, fried with roast meat, or as a pickle. It is a wholesome vegetable, which seldom disagrees with the stomach.

482. *CHAMOMILE* (*Anthemis nobilis*) is a well-known perennial plant, the dried daisy-like flowers of which are frequently used in medicine.

Two varieties of the chamomile grow in this country: the wild, having a single flower, and most efficacious as a medicine; and the cultivated or double chamomile, the kind usually sold in the shops.—*Sex. Syst.* Syngenesia Polygamia Superflua.

Chamomile flowers are sometimes employed to excite vomiting and promote the operation of emetics. They have likewise occasionally been substituted for Peruvian bark in intermittent fevers, particularly on the Continent: they are also a valuable stomachic. Both the leaves and flowers are employed in fomentations and poultices. They each, but particularly the flowers, have a powerful, though not an unpleasant smell, and a bitter taste.

They are administered in substance as a powder or electuary, in infusion as tea, in decoction or extract, or in the form of an essential oil obtained by distillation.

So fragrant is the chamomile plant, that the places where it grows wild, on open gravelly commons (as Blackheath, &c.), may be discovered by the somewhat strawberry-like perfume which is emitted by treading on it. This quality

alone has sometimes induced the cultivation of chamomile for a green walk in gardens.

483. *TARRAGON* (*Artemisia dracunculus*) is a hardy perennial plant of the wormwood tribe, which grows wild in India and the southern parts of Europe, and is cultivated with us in gardens for culinary uses.

It has a somewhat shrubby stem; smooth, spear-shaped leaves, tapering at each end; and flowers roundish, erect, and on foot-stalks.—*Sex. Syst.* Syngenesia Polygamia Superflua.

This is a hot and bitter vegetable, which is sometimes eaten with lettuces, or other salad herbs; and sometimes used as an ingredient in soup. Its seeds are pungent, and may be advantageously substituted for the more costly spices obtained from the Indies. The Indians frequently eat the leaves of the tarragon plant with bread.

Tarragon vinegar is made by infusing for fourteen days one pound of the leaves of tarragon, gathered a short time before the flowers appear, in one gallon of the best vinegar: straining this through a flannel bag, and fining it by means of a little isinglass.

484. *The JERUSALEM ARTICHOKE* is a somewhat potato-shaped root, produced by a perennial plant, a species of sunflower (*Helianthus tuberosus*) which grows wild in several parts of South America.

This plant bears single stalks, which are frequently eight or nine feet high, and yellow flowers, much smaller than those of the common sunflower.—*Sex. Syst.* Syngenesia Polygamia Frustranea.

So extremely productive are these valuable roots, that betwixt seventy and eighty tons weight of them are said to have been obtained in one season from a single acre of ground. They succeed in almost any soil; and when once planted, will continue to flourish in the same place, without requiring either much manure or much attention to the culture. The season in which they are dug up for use is from about the middle of September till November; when they are in the greatest perfection. They may be preserved in sand, or under cover, for the winter.

The roots are generally eaten plain boiled; but they are sometimes served up with white fricassee-sauce, and in other

ways. Their flavour is so nearly like that of the common artichoke, that it is difficult to distinguish them from each other. We are informed that Jerusalem artichokes are a valuable food for hogs and store pigs; and that if washed, cut, and ground in a mill similar to an apple-mill, they may also be given to horses.

485. *The COMMON or ANNUAL SUNFLOWER* (*Helianthus annuus*) is a Peruvian plant, with large yellow flowers. It is well known in our gardens.—*Sex. Syst.* Syngenesia Polygamia Frustranea.

The uses to which this plant may be applied are such as to render it well deserving of attention in rural economy. Its stalks contain a white, shining, fibrous substance, which might be advantageously employed in the manufacture of paper; and the woody part of them makes excellent fuel. Its ripe seeds, when subject to pressure, yield a quantity of sweet and edible oil. These seeds may also be used for the feeding of poultry. The receptacles of the flowers, it is said, may be boiled and eaten like artichokes. The flowers, which are of a yellow colour, are reported to follow the course of the sun throughout the day; this is much more evident in a field of buttercups.

486. MIKANIA GUACO, or the BENDING or SUPPLE GUACO of the natives of South America, is a tree much used, according to Mr. James Harvey, for the cure of hydrophobia in the Andes. The following additional facts relative to its worth, as a cure for this disease and the bites of venomous reptiles, were communicated to the Botanical Society of London, Nov. 20, 1840¹, by Mrs. C. E. Wilson. The facts adduced in this communication, being on the authority of Mr. James Harvey, now of Jamaica, are deserving the attention and investigation of men of science, more especially as Humboldt and Bonpland have noticed and spoken of its virtues in the country where it is found. During Mr. Harvey's sojourn in South America (the Andes) his time was principally occupied, together with that of his companions and the native huntsmen, in the chase. The

¹ See the Report of the Meeting of the Botanical Society in No. 70 of the "Inventor's Advocate, and Journal of Industry."

latter pride themselves much on their fine sagacious dogs. He had a pack of hounds which much excited their admiration, and to secure them from the almost certainty of being attacked with hydrophobia in that climate (from over excitement in the chase, combined with other causes, so prevalent unless vigilantly guarded against), they recommended him to give them a decoction, prepared like sarsaparilla, from a plant indigenous to the country, the *Mikania Guaco*, called by the natives the *bending* or *supple guaco*, which they frequently mixed up with the food eaten by their own animals. Attention was paid to their advice, and never after the use of the guaco did canine madness deprive them of a single dog. Previously to the hounds taking the decoction they lost one of their finest dogs from hydrophobia, which occurred after hunting all the day without success; and, on his return home, he became quite sulky, paid no regard to his food or his master, and on the next morning he was in a state of furious madness. This occurred prior to the knowledge of the *guaco*, and Mr. Harvey is of opinion, that had that animal been disciplined by its salutary properties, the dog would not have evinced such *unlimited excitability* during the chase, yet have retained his full necessary ardour.

Of the virtues of this (so justly called by Baron Humboldt) "*precious vegetable*," in cases where the bite from a rabid animal has been inflicted, Mr. Harvey can truly vouch; not, he observes, from well authenticated hearsay, but from *personal experience*; for Colonel Johnson having one evening gone to see the hounds fed, one of them in a rabid state rushed at him and merely tore a part of his sleeve. Mr. H. hearing the alarm was soon at the Colonel's side; and the animal, still infuriated, sprang upon him, and while striking at the dog his thumb received a sharp bite from his terrific teeth, marks of which remain even to the present time. The dog was soon shot, and Mr. H. attended to; and, to use his own words, "*the mikania guaco* was my preserver. The places where the teeth had entered were seared with red hot wire; and I was made to drink freely, both at and between meals, for *forty days*, of the *guaco* decoction." Years have since transpired, and Mr. Harvey continues in health. The prescription of the

native huntsmen was not prescribed at hazard, nor even in the light of a doubtful remedy. They knew from trial its efficacy; inasmuch as one of them some time previous, had a great piece of flesh bitten quite out by a rabid animal, and the same regimen of drinking the guaco decoction prescribed for Mr. Harvey's cure, effected his.

Mr. Harvey states, that he allows but little credit to the red-hot wire, as it is well known that such applications have in similar cases, in most countries, been tried without avail. The person bitten having to wait until the wire is heated, during which time, be it ever so short, a portion of the saliva has commenced circulating with the blood.

The native hunters (for it is but little known to the new settlers) hold this plant in great esteem, not only as an antidote for hydrophobia when taken into the stomach, but when, by means of inoculation, introduced into the system, they consider it a most efficacious preventive of the injurious effects that occur from the sting or bite of venomous reptiles. A strong extract is made from the plant; which extract they introduce into slight incisions made on the back of the hand, between the finger and thumb, also on each breast and on each foot. The person operated upon, then drinks for fifteen days of the *guaco* decoction, and as that month returns in succeeding years (to keep up the full strength of the guaco in their system) the decoction is again for the same number of days drunk. The inoculation is but once performed.

Baron Humboldt asserts, that it is to the celebrated M. Mutis the world is indebted for the inestimable advantages offered to medicine by this plant, and states, that from numerous experiments that have been performed in Santa Fé by M. Mutis Zea, Don Pedro Vorges, and others, it appears fully proved that this is the most certain remedy that can be opposed to the bite of those venomous reptiles that infest the marshy parts of the New Continent. M. Mutis cultivated this plant at his residence in the neighbourhood of Bogota with his own hands; esteeming it "the most valuable plant in his possession, because of the power it gave him to protect the lives of so many of his fellow creatures."

NAT. ORD. 62. SCROPHULARIACEÆ, *Lindl.*—THE FIGWORT
TRIBE.

487. *FOX-GLOVE* (*Digitalis purpurea*) is a biennial stately British plant, with long, erect spikes of large, purple, and somewhat bell-shaped flowers, marked internally with dark spots in whitish rings, and containing four stamens, with large yellow anthers.

The calyx, or flower-cup, has five pointed divisions. The extremity of the blossom is divided into five segments; and the seed-vessel is egg-shaped, and contains many seeds. The leaves are large, wrinkled, and somewhat downy beneath.—*Sex. Syst.* *Didynamia Angiospermia*.

The gravelly or sandy-hedge-banks or hills of all the midland counties of England are adorned, in the latter months of summer, with this, one of the most beautiful, most dangerous, and yet, if properly applied, one of the most useful of all our wild plants. For its medicinal virtues it has long been esteemed. The Italians have an adage which implies that “the fox-glove heals all sores:” hence it is said, that they apply the bruised leaves, and the juice of the leaves, in the healing of different kinds of wounds, and particularly for the removal of scrofulous swellings.

The *juice* of this plant has a bitter and nauseous taste; and when taken internally, acts violently on the stomach and bowels, and brings on stupor and drowsiness; notwithstanding which, the dried *leaves*, the parts now usually employed medicinally, are, in careful hands, a valuable medicine in dropsy, consumption, and epilepsy. They are given in powder, tincture, and infusion; and such is their strength, that Dr. Woodville states the dose of the dried leaves in powder should not exceed from one to three grains per day. Its principal use is that of reducing the action of the heart in inflammations, hæmorrhages, &c. It is very apt to accumulate in the system, if not carefully attended to.

NAT. ORD. 61. BIGNONIACEÆ, *R. Brown.*—THE TRUMPET-
FLOWER TRIBE.

488. The *CALABASH-TREE* (*Crescentia Cujete*) is a production of the West Indies and America, about the height and dimensions of an apple-tree, with crooked horizontal branches,

wedge-shaped leaves, pale white flowers on the trunk and branches, and a roundish fruit, from two inches to a foot in diameter.—*Sex. Syst.* Didynamia Angiospermia.

The fruit of the calabash tree is applied to very numerous uses. Being covered with a greenish yellow skin, which encloses a thin, hard, and almost woody shell, it is employed for various kinds of domestic vessels, such as water cans, goblets, and cups of almost every shape and description. So hard and close-grained is this shell, that when it contains any fluid, it may even be put on the fire without injury. The vessels made of it are sometimes highly polished, and have figures engraven upon them, which are variously tinged with indigo and other colours. The Indians make also musical instruments with it.

The calabash contains a pale, yellow, juicy pulp, of an unpleasant taste, which is esteemed a valuable remedy in several disorders, both external and internal.

NAT. ORD. 60. VERBENACEÆ, *Juss.*—THE VERVAIN TRIBE.

489. The TEAK-TREE (*Tectona grandis*) is a valuable species of timber, which grows in the forests of the East Indies, Pegu, and many of the East Indian islands.

This tree attains the height of fifty feet and upwards. Its leaves are somewhat oval, slightly scalloped, rough on the upper side, and clad with a white down beneath; on young trees they are from twelve to twenty-four inches long, and from eight to sixteen broad. The flowers are in bunches, small, white, and fragrant.—*Sex. Syst.* Pentandria Monogynia.

For the building of ships, teak-wood is esteemed superior to every kind of timber except oak. It is said to be almost incorruptible in water; and its bitterness preserves it from the attack of worms. For all the purposes of carpentry, teak is the most useful timber that is produced in Asia. It is easily wrought, and is peculiarly strong and durable, and contains a very large quantity of *silex*. That which grows on the coast of Malabar is considered the best; but the greatest quantity is obtained from Pegu. In India much of the furniture is made of teak wood.

The attention of government has of late been called to the cultivation of this timber; and great encouragement is

now given to an extensive propagation of it. In the present scarcity of oak timber in England, the increase of teak in the East is become an object of importance to the prosperity of our navy. Its culture has also been recommended in our West Indian islands, the climate and soil of which are considered nearly similar to those of its native country.

NAT. ORD. 59. LABIATÆ, *Juss.*—THE MINT TRIBE.

490. *LAVENDER* is a well-known perennial garden plant (*Lavandula Spica*), which grows wild in the south of Europe, and the flowers of which yield a grateful perfume. There are three varieties.—*Sex. Syst.* Didynamia Gymnospermia.

Such is the fragrance of this plant, and so easy is its culture, that we can now scarcely enter a garden in which it is not found. It will grow in almost any soil, but it flourishes most luxuriantly in clayey ground; and in situations whence, without inconvenience, it can be conveyed to the metropolis, it is a very valuable crop. A considerable quantity has for years been grown at Mitcham, Surrey.

Lavender, when cultivated to any extent, should be planted in rows two or three feet apart, and the sets should be about two feet from each other. It is usually propagated from slips. The flowers should be gathered in the months of June or July, during dry weather, by cutting off the heads close to the stem; after which they must be tied in bundles to be distilled.

When distilled with water, the *flowers* of lavender yield an essential oil; generally in the proportion of about one ounce of oil to sixty ounces of flowers. This oil is of a bright yellow colour, and possesses the perfect fragrance of the lavender. But, if distilled with rectified spirit, the virtues are more completely extracted. From the leaves a very small proportion of oil can be obtained.

The preparations of this plant that are used in medicine are, the essential oil, a simple spirit, and a compound tincture. Lavender, however, is much more frequently and more extensively employed as a perfume than medicinally. The flowers are deposited in chests and wardrobes among linen, not only on account of their fragrant smell, but also

from an opinion that their odour will prevent the depredations of moths and other insects. The perfume called *lavender water* may be thus prepared:—Take of oil of lavender, oil of bergamot, of each three fluid drachms; otto of roses, oil of cloves, of each six drops; musk, two grains; oil of rosemary, one fluid drachm; honey, one ounce; benzoic acid, two scruples; rectified spirit, one pint: distilled water, three ounces. Mix the materials together, and filter them after they have stood for some time.

Lavender is supposed to have been first cultivated in England about the year 1558.

491. *COMMON or SPEAR-MINT* (*Mentha viridis*), one of our most frequent garden herbs, is a native British plant, and grows wild in watery places, and near the banks of rivers, in several parts of England.—*Sex. Syst.* Didynamia Gymnospermia.

The ancients ascribed many virtues to different kinds of mint, but it is not now possible to ascertain correctly the respective species, though there can be little doubt that green mint or spear-mint was one of the most important of them. Its flavour is to many persons peculiarly agreeable, and, on this account, it is employed for several culinary purposes, both in a green and dried state.

The *leaves* are used in spring salads, boiled with peas, and put into soup. In conjunction with vinegar and sugar they form a sauce for lamb; with sugar they are also made into a conserve. Spear-mint is occasionally used in medicine. The officinal preparations of it are an infusion, an essential oil, of which the recent plant contains only a five hundredth of the herb; a simple distilled water, and a spirit. In drying, the leaves lose about three-fourths of their weight, but without suffering much loss either in taste or smell.

492. *PEPPER-MINT* (*Mentha piperita*) is a British plant, which grows in moist places, and is cultivated chiefly on account of an oil and distilled water which are prepared from it.—*Sex. Syst.* Didynamia Gymnospermia.

This is the strongest, most aromatic, and most carminative of all the mints; and on this account is more used in medicine than any other species. When distilled with water it yields a considerable quantity of essential oil, of a pale

greenish-yellow colour. *Peppermint water* is an excellent stomachic; but is perhaps too often used in cases of impaired appetite, and for the relief of various imaginary complaints. *Essence of Peppermint* is made by simply mixing two ounces of oil of peppermint with eight ounces of rectified spirit of wine.

493. The PENNYROYAL is obtained from the *Mentha Pulegium*. It is usually met with in damp and moist places, as on heaths, commons, &c. It is a native of Britain, and also of Caucasus, Teneriffe, &c. It is occasionally empirically administered for the cure of hysteria, hooping-cough, and other disorders.

NAT. ORD. 58. APOCYNACEÆ, Lindl.—THE STRYCHNOS TRIBE.

494. NUX VOMICA, or VOMIC or POISON NUT, is a round, flat seed, about an inch or less in diameter, of a greyish yellow colour, and horny consistence, the produce of a tree (*Strychnos nux vomica*) which grows in Ceylon, Coromandel, and other parts of the East Indies.

The tree is of a middling size, and has somewhat oval leaves, in pairs, each marked with three or five strong ribs. The young branches have swelled joints. The flowers are in a kind of umbels at the extremity of the branches — Sex. Syst. Pentandria Monogynia.

The fruit which produces the vomic nut is a species of berry, about the size of a pretty large apple, and covered with a hard substance somewhat resembling that of the pomegranate, and of a beautiful orange colour when ripe. This fruit is filled with a pulp which contains the seeds.

Nux vomica is imported into this country from the East Indies in large quantities, and is said to be employed almost entirely in the distillation of spirits to render them more intoxicating; as well as, it is feared, also by ale and porter brewers for the same purpose. It is considered among the most powerful poisons of the narcotic kind, and acts by stimulating more especially the nerves of the spinal chord. It is also said to contract the arteries.

It is quickly fatal to dogs, foxes, wolves, and most other quadrupeds. When pounded and mixed with oatmeal, it is used for the killing of rats. Yet deleterious as this drug

is, it has been employed on the Continent as a medicine in some spasmodic affections, &c.; but its administration ought only to be attempted by medical men.

The poisonous principle of *nux vomica* was obtained in 1818, by Pelletier and Caventou, and named *strychnine*, with a little *brucine* and *Igasuric acid*; it is in white crystals, and intensely bitter; half a grain blown into the throat of a rabbit killed it in five minutes. About thirty-four grains of *strychnine* are contained in one pound of the seeds. The active principle is possessed of such bitter qualities, that *one grain* will impart bitterness to eighty pounds of water. The dose is from an eighth of a grain to two grains, very gradually increased.

An extract of *nux vomica* was formerly much imported from India; but it is not generally known for what purpose.

Another species of *Strychnos*, the *potatorum*, may also be here mentioned; it is called the *clearing nut strychnos*, because its nuts are used to clear muddy water in the East Indies, and is there sold for that purpose in every market.

The duty on the seeds is two shillings and sixpence per pound. In the year 1838, there were 1017 pounds of *nux vomica* imported, and in 1839 only 478 pounds.

495. *URARI*, or *WOORARA*¹, is obtained from the *Strychnos toxifera* of Schomburgh; a woody, twining plant, having a thick root, with ash-coloured bark, marked with fissures. It attains the height of thirty or forty feet before it gives off branches, and has opposite, ovate, oblong, acuminate leaves, which are covered with ferruginous hair, and vary from one to four and a half inches in length, and from one to two broad. Fruit about the size of a large apple, globular, and filled with a jelly-like pulp, in which from ten to fifteen seeds are found.—Sex. Syst. Pentandria Monogynia.

Although the effects of the Indian arrow poison have been long known, yet we remained ignorant of the plant which produced it until the return of Mr. R. H. Schomburgh from his travels in British Guiana. Some time after his return to this country, he published an account (and a plate in a succeeding number) in the 45th number of the *Ann. Nat. Hist.* 1841, an extract of which is subjoined:

“ The Wapisianas and Macusis (two tribes of natives in

¹ Also called *Wooraly*.

British Guiana) are generally acknowledged to be the best manufacturers of the poison; and from the corroborative testimony of these tribes, Mr. S. gathered the following particulars respecting its preparation. It is only the bark of the woody parts, and its alburnum, which are considered to possess the poisonous principle in the highest degree. The stem of the plant is therefore cut into pieces, about three feet in length, off which the bark is stripped, and after having been pounded it is steeped in water, for which purpose a new earthen vessel is used; here they allow it to remain for some time, well covered, until the water is of a yellowish colour, when it is filtered through a funnel-shaped matappa, lined with plantain leaves. Several other plants have been meanwhile procured, and after their juice has been extracted in a similar manner, this extract is kept ready to be added to the former at the moment it has been concentrated on a slow fire to the consistency of a syrup. The addition of that juice gives a darker colour to the Urari, which from the time of its becoming concentrated, has the appearance of tar: it is now put into small calabashes, which are covered with leaves to prevent the poison from coming in immediate contact with the air. The Indians pretend, that if it be well preserved it will keep its strength for a couple of years. If it is to be used, the quantity required is put into a separate calabash (488), and a little juice of the Cassada is added to it to make it more pliable. Mr. S. was told that the addition of Cassada-water (as the expressed juice of the poisonous root of the *Jatropha manihot* is termed) reawakens the slumbering powers of the poison. After that juice has been added to it, the Indian buries the calabash with the poison for a day or two under ground. Many heaps of the cut wood were observed, which had been left by the Macusis, who come to this place from a great distance, as the plant is known to grow only in two or three situations, at the Canuku mountains; they are therefore resorted to by the Indians from all quarters."

NAT. ORD. 57. GENTIANACEÆ, *Lindl.*—THE GENTIAN TRIBE.

496. BUCK-BEAN, or BOG-BEAN (*Menyanthes trifoliata*), is occasionally met with in shallow ponds; and is distinguish-

able by its leaves growing in threes, and its pink and white flowers being fringed on their inner surface.—*Sex. Syst.* Pentandria Monogynia.

This is one of the most beautiful of our indigenous plants; and nothing but the difficulty of propagating it in dry ground could prevent its having a place in every garden. The leaves are intensely bitter, and are occasionally used in the Highlands of Scotland as a tea, to strengthen the stomach. The inhabitants of some parts of Sweden employ them in place of hops, to impart a bitter taste to ale; two ounces of them being considered equal in strength to a pound of hops. By some persons the leaves of buck-bean are smoked instead of tobacco. It is still in our *Materia Medica*, and is tonic, diuretic, and purgative. It is given in agues, in scorbutic and scrofulous diseases, rheumatisms, and dropsy. There is an opinion that sheep, when compelled to eat of buck-bean, are cured of the rot. In Lapland it is said that the pounded roots, though very unpalatable, are sometimes converted into bread.

497. *GENTIAN*, the dried root of a perennial plant (*Gentiana lutea*), which grows wild on the Alps, in other mountainous parts of the Continent, and in North America.

The stem of the gentian is three or four feet high, strong, smooth, and erect. The lower leaves are spear-shaped and ribbed; the upper are concave, smooth, and egg-shaped. The flowers, which are large, yellow, and beautiful, grow round the upper part of the stem on strong foot-stalks, and are divided at the edge into five or more segments. The calyx (four) five cleft.—*Sex. Syst.* Pentandria Digynia.

This plant takes its name from Gentius, king of Illyria, who was vanquished by the Romans about 160 or 169 years before Christ.

Gentian is one of the principal bitters now used in medicine; and is of considerable service in such complaints as arise from weakness of the stomach. It is externally of a brown colour, and internally yellow and fleshy. Its taste is at first sweetish, but immediately afterwards intensely bitter and pungent, which is owing to the presence of a bitter principle called *gentianite*. It is rendered more grateful to the stomach by the addition of some warm aro-

matic ; for this purpose orange-peel is commonly employed. An extract, an infusion, and a tincture of gentian root, are kept in the shops.

The roots are collected by the peasantry of the Swiss Alps, are dried, and packed in bales, and imported from Havre, Marseilles, &c. The duty on the drug is four shillings per cwt., and the quantity imported in 1839 was 470 cwts.

NAT. ORD. 56. SOLANACEÆ, *Lindl.*—THE NIGHTSHADE TRIBE.

498. TOBACCO, in the state that we see it, is a narcotic drug, prepared from the dried leaves of an annual plant (*Nicotiana Tabacum*, Pl 1. Fig. 11), that is principally cultivated in North America. There are, however, several varieties.

The stalk of the tobacco plant is erect, strong, round, and hardy. The leaves are large, oblong, pointed, clammy, and of a pale green colour. The flowers, which terminate the stem and branches in loose clusters, are of a reddish colour, and funnel-shaped, with a long hairy tube ; and the seed vessel is oval, and divided into two cells, that contain many rounded seeds.—*Sex. Syst.* Pentandria Monogynia.

The cultivation of tobacco is carried on to a great extent in several parts of North America. The seed, mixed with ashes on account of its smallness, is sown a little before the beginning of the rainy season ; and, in order the better to cover it, the beds are raked over or trampled upon. In about a fortnight the young plants begin to appear, and, as soon as they have four leaves, they are drawn up and transplanted in lines, and about three feet asunder, into the tobacco field. Here they are kept clear of weeds ; and, as soon as they have eight or nine leaves each, the tops are nipped off, to make the leaves grow thicker and longer. When the plants are full grown, and the leaves are become somewhat brittle, they are cut with a knife close to the ground. They are suffered to lie upon the ground for a little while, after which they are carried to the drying shed, where they are hung by pairs upon lines or ropes. When perfectly dry, the leaves are stripped from the stalks, and made into small bundles tied round with another leaf. These bundles are laid in heaps, and covered with blankets or other woollen cloths for about seven days to heat ; after which they are closely stowed in casks for exportation.

The name of tobacco was given to this article, it is said, from its having been originally brought into Europe from Tobago, or Tabago, an island in the Bay of Panama, near the coast of America; but the most recent inquiries do not determine the origin of the word *tobacco*. The generic term *Nicotiana* is derived from the name of the individual (Jean Nicot) who, in 1559-60, forwarded some seeds to France from Spain and Portugal.

To the American Indians the use of tobacco has been known for many centuries; and the practice of *smoking* it is common to almost all the tribes. Tobacco forms a part of every entertainment; and, in the intervals of hunting, sleeping, and eating, it occupies no small portion of their time; and is used in many of their religious ceremonies.

The custom of smoking is said to have been first introduced into England by Sir Walter Raleigh, (this is, however, questionable,) during the reign of Queen Elizabeth, and a ludicrous story has often been told respecting it,—that Sir Walter having directed a servant to bring him a jug of water, the man, at his return into the room, found him smoking, and, alarmed at seeing his master apparently on fire, threw the whole contents of the jug into his face to quench it.

So extensive has smoking now become, in Europe generally, as well as in this country, that it constitutes a daily luxury with nearly all the peasantry, as well as with many of the more indolent and wealthy classes. To many constitutions it is, nevertheless, very injurious, nay poisonous. When first begun, it occasions, with some, vomiting, intoxication, and other unpleasant effects; but these, by repetition, discontinue, though its stupifying qualities are never entirely overcome. Smoking is, however, an idle, disgusting practice, which cannot be commended.

The basis of *snuff* is tobacco powdered; but many other matters are added, to give it a peculiar smell, or to impart pungency to it. When first applied to the nose, snuff excites sneezing, but, by repetition, this entirely ceases. The practice of taking snuff has, in some instances, been found injurious to the smell and the voice, although it has obtained some repute for the cure of some affections of the eyes.

But there is no mode of using tobacco so disgusting as

chewing it. By the labouring classes, and particularly by mariners, this practice is chiefly followed, from a notion that it will prevent the return of hunger, and, in some degree, supply a lack of food.

As a medicine tobacco is occasionally useful. By smoking and chewing, tooth-ach has often been relieved; and some persons consider the former a means of guarding against contagion. The occasional and moderate use of snuff has, in several cases, been found beneficial, particularly in headaches, and in diseases of the eyes and ears. Infusions of tobacco are sometimes administered in medicine; but this drug is principally given in the form of a vinous or watery infusion. Although a powerful, it appears to be, particularly when taken internally, an unmanageable medicine. Its chemical active principle, called *nicotin*, is a destructive poison.

The smoke of this herb, when blown against noxious insects, destroys them, and is the means which gardeners adopt for ridding hot-houses and green-houses of such as infest their plants.

The tobacco plant is sufficiently hardy to sustain the rigour of an European climate, and is cultivated in several parts of Spain and Portugal, and at present in Ireland. As, however, on importation, it pays a heavy tax to government, the culture of it in this country is restricted, by the legislature, to half a rod of ground in *physic gardens*; and if this be exceeded, the cultivator is liable to a penalty of ten pounds for every rod.

The different kinds of tobacco and snuff are attributable rather to the difference of climate and soil in which the plants have been grown, and to the different modes of management and manufacture, than to any essential distinction in the plants from which they are manufactured.

Tobacco is now also cultivated in Upper Canada, and in our settlements in New Holland. The duty paid in 1839 for that consumed in this country was 3,495,686*l.* sterling, for 124,637 cwts. of tobacco, and 176,422 lbs. of cigars. The following is the amount of duty per lb. paid on this article produced in the British possessions in America:— for common tobacco 2*s.* 9*d.* per lb.; of other parts 3*s.*; on snuff, 6*s.* per lb.; on cigars and other manufactured tobacco, 9*s.*

Pereira gives the following account in his *Materia Medica*, p. 867, of manufactured tobacco, including chewing and smoking tobacco and snuffs. *Shag* is prepared by moistening and compressing tobacco, and then cutting it with knife-edged chopping stamps. *Returns* is another variety of smoking tobacco. *Kanaster* is a favourite kind, prepared from Havannah tobacco; it received its name from *canastra* (a Spanish word signifying a *basket*), because it was sold in baskets. The term is now also applied to tobacco from Varinas. *Pig-tail* and *negro-head* are chewing tobaccos. *Cigars* and *cheroots* (the latter distinguished by their truncated extremities, while cigars have a pointed extremity called the *curl* or *twist*) are extensively manufactured in London. *Woodville's Havannahs* and *Manilla Cheroots* are in request by smokers.

In the manufacture of *snuff*, the tobacco is first fermented by placing it in heaps, and sprinkling it with water. It soon becomes hot, and evolves ammonia. The extent to which this process is allowed to proceed varies with different kinds of snuff. The immense varieties of snuffs found in the shops are reducible to two kinds—1st. *Dry Snuffs*, including the *Scotch*, *Irish*, *Welsh*, and the scarce *Spanish*.—2nd. *Moist snuffs* or *rappees*, under which are included *simple rappees* (as the *brown*, the *black*, the *Cuba*, the *Carotte*, the *Bolangero*, &c.), *mixed rappees* (as *Hardham's genuine No. 37*), and the *scented rappees* (as *Prince's mixture*, *Princeza*, &c.). The Scotch and Irish are prepared, for the most part, from the midribs; the Strasburgh, French, and Russian snuffs from the soft parts of the leaves. The rappees are usually kept moist by pearlsh. Sal ammoniac is frequently added to snuffs. The siftings, sometimes termed *thirds*, are usually reground.

Tobacconists employ, in the preparation of tobacco, a solution of sea salt, sp. grav. 1.107; this is termed the *sauce* or *liquor*. In the preparation of the *Macouba* snuff of Martinique, molasses, or a solution of the extract of liquorice, is added to the salt sauce, by which this snuff acquires a violet colour. (Ure.) The principal manufactories of tobacco are at Madrid and Seville; at the latter place between 3000 and 4000 persons are employed.

Royle states that the *Nicotiana repanda* is said to yield the small Havannah cigars; Lindley, the *Nicotiana Persica*,

that delicate and fragrant *tobacco* of *Shiraz* ; and also that *Nicotiana rustica*, or *common green tobacco*, is the mild, and is said to have been preferred by Sir Walter Raleigh ; the *Syrian* and *Turkish tobaccos* are also reported to be procured from it.

We are informed by Dr. W. H. Willshire, that “ there is a very strong and powerful snuff made in Barbary, which is of a light brown colour, somewhat resembling the Brazilian and Spanish snuffs. That of Tetuan is by many said to be the best. The Jews of Barbary take very large quantities of it, the Moors less. The Moors smoke comparatively little tobacco, but a preparation of hemp which they call *Keif*.”

499. *POTATOE* (*Solanum tuberosum*) is a well known edible root, or, more properly speaking, underground stem, which was originally imported into this country from America.—*Sex. Syst.* Pentandria Monogynia.

No root (underground stem) with which we are acquainted is so valuable to mankind, in temperate climates, as the potatoe. In some countries, particularly in Ireland, it forms a most important article of food for the lower classes of inhabitants. And in England also, the peasantry set a proper value on this estimable root, notwithstanding numerous attempts in former times to depreciate it : for there can be no doubt that an acre of potatoes affords more nutrition than an acre of wheat, taking an average crop of each. Besides being eaten alone, it is sometimes made, with various proportions of wheat flour, into a very palatable bread. In the use of potatoes as human food, it is requisite to prepare them in some manner by heat, as otherwise they are unpalatable, and, in a measure, poisonous. Potatoes are serviceable for feeding hogs, horses, bullocks, &c.

A spirit is distilled from potatoes. Starch may be made from potatoes, by merely rasping them into water, and well washing the pulp ; the pulp is composed of cellular tissue (303), each cell of which contains from ten to twelve grains of starch ; the starch settles to the bottom of the vessel. This starch is used for the same purpose as starch prepared from wheat : it is also valuable

as a size, which, unlike the size produced from animal substances, does not easily putrefy, and has no disagreeable smell. Bakers in Germany, by the addition of calcined oyster shells and burnt hartshorn, convert the pulp of potatoes into yeast. The *stalks* of potatoes have been made into paper. They are also used as manure. The *apples*, or seed-vessels, may be employed as a pickle: if properly prepared, they are said to be even more palatable than cucumbers. A spirit may also be obtained from their juice by fermentation.

There are numerous varieties of the potatoe. Of these the most remarkable are *kidney potatoes*, the *Aylesbury white*, and *Altringham early white*, which are chiefly grown for the table; the *ox noble*, *Irish purple*, and *red potatoes*, which are adapted for fodder.

This valuable root was originally brought to Europe from South America, during the sixteenth century. The inhabitants of Ireland assert that it was first introduced into that country by the accidental wreck, upon their coast, of a vessel which was laden with potatoes, and freighted for England, where they were known at least as early as 1597.

The usual mode of planting potatoes is by cutting the roots into pieces, reserving one eye or bud to each division, and setting these in the earth; the advantage of retaining a portion of the flesh with the *eye* or *bud* is to afford nourishment to this vital point until it is capable of absorbing nutriment for itself, by the development of its organs of nutrition, the root, stem, leaves, &c. They will succeed in any tolerable soil; but they flourish most luxuriantly in light sandy loams. The proper time for digging them up is during dry weather in autumn, when the leaves and stems begin to decay. When cultivated on a small scale, they are usually dug with a three-pronged fork or the spade; but when raised in fields, they are often turned up by a plough.

The *English arrow-root* is a potatoe starch, the particles of which vary much in size, viz. from one six hundredth to one thirtieth of a line in diameter. Their shape is likewise variable.

Potatoe starch is used in the neighbourhood of Paris for the manufacture of *potatoe sago*.

500. *CAPSICUMS* are South American and Indian plants easily known by their hollow pods, of a shining red or yellow colour, which contain many small, flat, and kidney-shaped seeds.

The principal species are, Heart or Bell pepper (*Capsicum grossum*), Chili or Common capsicum (*Capsicum annuum*, Pl. 1. Fig. 12), and Bird pepper (*Capsicum baccatum*).—*Sex. Syst.* Pentandria Monogynia.

All the species of capsicum possess the same general qualities. In hot climates, particularly in the East and West Indies, and Spanish America, the fruit of these plants is much used for culinary purposes, it is supposed with a view to rouse the torpid state of digestion, consequent on so many depressing causes. It is eaten in large quantities, both with animal and vegetable food; and is mixed, in greater or less proportion, with almost all kinds of sauces.

Cayenne pepper is made from the fruit of different species of capsicum, and particularly of the following kind (501): this fruit, when ripe, is gathered, dried in the sun, and then pounded (the powder is sometimes mixed with a certain portion of salt), and kept for use in closely stopped bottles: the salt does not appear, however, to be necessary to its preservation. Of late years Cayenne pepper has been introduced into most of the countries of Europe; and it is now very generally used as a poignant ingredient in soups and highly-seasoned dishes. Its taste is extremely acrimonious, leaving a burning heat on the palate, which is best removed by butter or oil. When taken in small quantity, it is, nevertheless, a grateful stimulant. It is used medicinally both externally and internally, to promote the action of the bodily organs when languid or torpid; and it is said to be efficacious in many gouty and paralytic cases.

501. The *GUINEA PEPPER, COMMON, or ANNUAL CAPSICUM* (*Capsicum frutescens*, Pl. 1. Fig. 12.) is a slender herbaceous plant, with smooth leaves, white flowers, single flower stalks, and smooth, shining fruit of an oblong shape, and usually of an orange-red colour; odour aromatic and pungent.—*Sex. Syst.* Pentandria Monogynia.

This plant is a native both of the East and West Indies, and is considered the most hardy of the whole tribe of cap-

sicums. It is also frequently reared in this country. In many parts of the South of Europe, its *fruit* is eaten green by the peasants at their breakfasts, and is preferred by them to onions or garlic. The fruit of all the species may be rendered useful in domestic economy, either as a pickle, or as cayenne pepper (500). For the latter, it may be dried before a fire, and ground to powder in a common pepper-mill.

502. *DEADLY NIGHTSHADE* (*Atropa Belladonna*) is an extremely poisonous plant, which grows in hedges and waste grounds, more particularly in chalky districts, in several parts of England, and has somewhat oval leaves of a dull green colour, purple bell-shaped flowers, and shining black berries, each about the size of a small cherry.—*Sex. Syst.* Pentandria Monogynia.

Every part of this plant is poisonous. The alluring appearance and sweetish taste of the *berries* have, in many instances, particularly with children, been succeeded by the most fatal consequences. The *leaves* are more powerful than the berries. The usual symptoms of this poison are a deep and deadly stupor, giddiness, delirium, great thirst, retching, and convulsions. An emetic given immediately is in general the best remedy, then purgatives, and afterwards, when the poison is evacuated, vinegar or any of the vegetable acids may be administered.

Some writers have supposed it was the deadly nightshade which produced those strange and dreadful effects that are described by Plutarch to have been experienced by the Roman soldiers, under the command of Antony, during their retreat from the Parthians :—“ Their distress for provisions was so great that they were compelled to eat of plants unknown to them. Among others, they found an herb of which many ate ; these, shortly afterwards, lost their memory and their senses, and wholly employed themselves in turning over all the stones they could find ; then, being seized with vomiting, they fell down dead.”

The *leaves* of the deadly nightshade are sometimes used externally, and with good effect, in cases of cancer ; and in ulcers and tumours of different kinds. They are likewise given internally, in powder and in infusion : an inspissated juice is also prepared from them. As the plant is now admitted into our *Materia Medica*, we must consider

it a medicine of some importance ; but it, nevertheless, requires great judgment in its administration. In diseases of the eyes it is very serviceable, producing dilatation of the pupil. It has also been found advantageous in ulcerated or inflamed tonsils, in scarlatina, &c. ; when used for such purposes it is recommended to dissolve it gradually in the mouth, in order that it may stand a better chance of covering the parts. The *Extract* is the preparation sanctioned by the College of Physicians.

Under this Order might also have been mentioned the acro-narcotic poison *Mandrake* (*Mandragora officinalis*), did our space permit.

NAT. ORD. 55. JASMINACEÆ. THE JASMINE TRIBE.

503. The COMMON JASMINE (*Jasminum officinale*) is a well known shrub, with white, salver-shaped flowers, and opposite, winged leaves, the leaflets somewhat pointed ; and is a native of Malabar and other parts of the East.—*Sex. Syst.* Diandria Monogynia.

As an ornamental shrub, jasmine has long been cultivated in Europe. It is chiefly trained against walls and trellis-work, and is interesting, not only from the elegance of its foliage, but also from the number of beautiful white flowers with which it is adorned throughout the summer and autumn. These exhale a sweet and penetrating odour, particularly after rain, and in the night.

The Italians, by a very simple operation, prepare from the flowers of jasmine a grateful perfume. They soak cotton-wool in some kind of scentless vegetable oil, and then place, in glass vessels, alternate layers of this and of the flowers. After having been left in this state some days, the flowers are found to have given the whole of their fragrance to the oil in the cotton : they are then separated, and the oil is pressed out and removed into small glass bottles for use.

Many other species of the genus *jasminum* are also cultivated in this country.

NAT. ORD. 54. OLEACEÆ. Lindl.—THE OLIVE TRIBE.

504. The EUROPEAN OLIVE (*Olea Europea*) is an ever-green tree, which, in its general form and appearance, somewhat resembles a willow. It seldom exceeds thirty feet in height. It is cultivated in several parts of the south of Europe, and has spear-shaped leaves, and clusters of small white flowers that arise at the junction of the leaves and branches (Pl. 1. Fig. 1).

There are several species of the genus *Olea*, or Olive. Of the European olive five varieties have been described. The cultivated olive came originally from Asia, and grows abundantly about Aleppo and Lebanon; it is naturalized in the south of France, Spain, and Italy. The *Longifolia*, or Long-leaved olive, is the variety chiefly cultivated in France and Italy; the *Latifolia*, or Broad-leaved olive, is chiefly cultivated in Spain; the fruit of this last is nearly twice the size of the olives of Provence and Italy, but the oil is of so rank a flavour as not to suit many English palates.—*Sex. Syst.* Diandria Monogynia.

The olive in Britain grows readily by cuttings, or may be grafted on the privet. With protection during frost, it may be maintained against a wall in the latitude of London. In Devonshire some have stood the winter as standards, but never ripened their fruit.

The unripe fruit of this tree is known in this country by the name of *olives*. These are usually about the size of a damson plum, and each contains a hard, rough stone. When first gathered they have an acrid, bitter, and unpleasant taste; and it is not until they have been steeped for several days in a ley of wood ashes, and then pickled in salt and water, that they are in a state to be introduced at table after dinner, in desserts. Lucca olives, being smaller than any others, have the weakest taste. The larger ones are imported from Spain, and are the strongest; but those most esteemed are the olives of Provence, which are of a middle size. If olives be eaten by persons of delicate habits, especially after a solid or heavy dinner, they are considered injurious, on account of the great quantity of oil which they contain.

It is to this fruit that we are indebted for the *salad* or *olive oil*, which is so much in use throughout every part of Europe. The preparation of it is as follows:—The olives, when sufficiently ripe, are carefully picked by hand off the trees, and those that are bad are taken out and thrown aside.

After having been left a little while to wither, they are first bruised, and then more completely crushed by a conical or upright millstone rolling upon a horizontal plane. The paste thus formed is submitted to the operation of the press. The finest oil flows first; when no more is found to flow, the pulp is moistened with boiling water, and the mass is again pressed. This done, the remaining oil is drawn from the surface of the water; but it contains some impurities from which it cannot, without difficulty, be cleared. What remains of the pulp is squeezed into lumps or balls, and dried for fuel. If the olives be indiscriminately gathered and heaped together, sound and unsound, without selection, the oil is always bad. The wild trees yield a very small kind of fruit, which furnishes, though in less quantity, a peculiarly excellent oil.

The olive tree has ever been considered the symbol of peace; and the ancient poets have asserted that Minerva well merited the honour of giving her name to the city of Athens for having planted it in Attica. As a *wood*, this tree is in considerable request by cabinet-makers, from its being beautifully veined, and taking an excellent polish. In some parts of Spain ornamental boxes are made of the roots of the olive tree.

Olive oil is employed in various branches of culinary and domestic economy. When united with soda it is manufactured into soap. It is likewise used in medicine; is adopted as a softening ingredient in almost all kinds of ointments and plasters, and is supposed to be efficacious as a remedy against the poison of the viper. Persons copiously anointed with oil are said to have escaped the infection of the plague and yellow fever.

Several kinds of olive oil are found in the shops: *Lucca* or *Florence oil*, usually called *eating oil*; *Genoa oil*; and *Gallipoli oil*. The last has a very offensive smell, and is used chiefly by clothiers. *Sicily oil* is very inferior, and *Spanish oil* the worst of all. A sediment from the olive oil is known as *droppings of sweet oil*; this kind is mostly used for lubricating machinery. A common source of adulteration is said to be that of poppy oil.

505. MANNA is a concrete juice, procured from several species of ash-tree, but particularly from the FLOWERING ASH (Ornus

Europea, *Pers.* Pl. 7. Fig. 76), which is much cultivated in Calabria and Sicily.

This tree somewhat resembles the common ash. It has winged leaves, with an odd one at the end, the leaflets oblong, pointed, serrated, and veined, standing on foot-stalks, and of a bright green colour. The flowers are whitish, and appear in close bunches, about the month of May or June.—Sex. Syst. Diandria Monogynia.

The trees that are cultivated for the production of manna are chiefly planted on the eastern sides of hills. This substance exudes spontaneously from them; but as the supply thus obtained would be insufficient for the demand, incisions are made in the bark to obtain it more copiously. These incisions are formed, in the summer time, lengthwise in the tree, and each about a span long. They are begun at the lower part of the trunk, and repeated upward, at a little distance from each other, as high as the branches. One side of the tree is first cut; the other side being reserved until the ensuing year, when it undergoes a similar treatment. From the wounds thus made a thick whitish juice immediately begins to flow, which gradually hardens on the bark, and in the course of a few days acquires a sufficient consistence to be taken off. The collecting of manna begins in June and terminates in September.

Manna has different names, according to its purity, rather than from any essential difference in the article itself. The best Calabrian or Flake manna is in oblong, light, and crumbly flakes, of a whitish or pale yellow colour, and somewhat transparent appearance. The inferior sorts are moist, unctuous, and of a darker colour.

Manna is a mild and agreeable laxative medicine, particularly with the addition of a little cinnamon water, or other warm aromatic. It is, however, chiefly used as a laxative for children.

The miraculous substance mentioned in the Old Testament by the name of manna, cannot, of course, be considered to have any alliance whatever with the manna thus produced. It would be desirable to bear this remark in mind, as young persons sometimes inconsiderately confound the two substances.

In 1839, duty (3*d.* per lb.) was paid on 13,493 lbs.

506. *The ASH-TREE* (*Fraxinus excelsior*, Pl. 7. Fig. 79) is a well-known British tree, with winged leaves; the leaflets in four or five pairs, with an odd one, serrated, and without foot-stalks; and the flowers without petals. There are several varieties.—*Sex. Syst.* Polygamia Diœcia.

Of late years this valuable tree has been much planted in several parts of England. It is of a hardy nature, and thrives even in barren soils; it is reputed to impoverish land to some considerable extent; if such be the case it must be owing to the excrementitious matter given off from its roots to the soil. If planted in moist situations, the roots, spreading wide in every direction near the surface, have a tendency to render the ground dry and firm. The timber, which has the rare advantage of being nearly as good when young as when old, is white, and so hard and tough as generally to be esteemed next in value to oak. It is much used by coach-makers, wheel-wrights, and cart-wrights; and is made into ploughs, axle-trees, felloes of wheels, harrows, ladders, and other implements of husbandry. It is likewise used by ship-builders for various purposes, and by coopers for the hoops of tubs and barrels. Where by frequent cutting the wood has become knotty, irregular, and veined, it is in much request for cabinet-work by mechanics on the Continent. The best season for felling ash-trees is from November to February. As fuel, this tree burns better whilst wet and green than other wood; its ashes produce excellent alkali.

In some parts of this country, when grass is scarce, the small farmers cut off the tops of ash-trees to feed their cows with the leaves and tender branches; but these are said to spoil the taste of the milk. The leaves of ash-trees were formerly much used in the adulteration of tea, under the name of *smouch*; but this practice has of late been prohibited by act of parliament.

The bark of the ash-tree is employed in the tanning of calf-skins, and sometimes in dyeing black and other colours.

The ash is a very serviceable tree for forming *natural living fences* to plantations, &c. as recently done in this country by Mr. Breese, at Dagnam Park, Essex, the seat of Sir Thomas Neave. It consists of training and planting, for the purpose, trees or shoots of the same species, or species of the

same *genus*, or *genera* of the same natural family, and causing them to unite by means of the process of "*grafting by approach or inarching*," a process well understood by gardeners and horticulturists. In the selection of trees for this purpose, those which grow the fastest, and produce new wood soon, answer the best. The following is an account of the plan to be adopted¹:—"The shoots or small trees are run up (as termed by gardeners) and kept trimmed so as to produce stems as straight as possible. These are trained to the height required, depending upon the intended height of the fence. As soon as they have acquired sufficient age they are carefully transplanted, a trench of two feet in width being previously made in the line of the intended fence, it being found necessary to surround the roots with earth of a richer nature than that usually met with where fences are to be placed, such as the outskirts of woods, plantations, parks, &c. The trench having been made and prepared, the stems are then carefully removed; one set being planted at the required distance, a foot, for instance, from each other, these, we may suppose, to slope to the north; the other set, for example, are planted sloping towards the south, at the same distance from each other, so that when the shoots proceed from the ground, they are in contact by their internal part.

"The several stems having been thus arranged, the next and most important step is that of causing them to unite; this is, of course, requisite, in order to produce strength, and is accomplished by the process of *grafting by approach*, or what is the same thing, that of *inarching*. For this purpose it is necessary to remove a small plate of bark, at the proper season, on each stem, where their inner portions are in contact; this having been carefully performed, approximate the two stems, so that the denuded portions of each shall exactly meet; tie the stems together at these places, and keep them for a short time from the action of the atmosphere by means of a piece of clay. In the course of a few weeks, if these precautions have been attended to, adhesion takes place, and the result is, that a natural living fence

¹ See the Proceedings of the Botanical Society of London, vol. i. part i. p. 76, "*On a principle of Fencing formed according to the laws of Vegetable Physiology*," by Daniel Cooper.

has been formed, having openings of a diamond shape, which may be made, of course, of any size that may be required; it being only requisite to place the stems in the earth at a greater or less distance from each other." This rustic and durable fencework increases in strength annually, and does not require any expense in keeping in order. The several advantages possessed by the natural living fence are recorded in the work just quoted.

NAT. ORD. 53. AQUIFOLIACEÆ, Dec.—THE HOLLY TRIBE.

507. *HOLLY* (*Ilex Aquifolium*) is a small evergreen tree, with shining, irregular, and spinous leaves, and white flowers, which grow in clusters round the branches, and are succeeded by small red berries. It is found in various parts of the world; plentifully in this country and Europe generally.

Eight varieties of this tree have been described; such as the *Variou-leaved*, the *Silver-edged*, the *Gold-edged*, &c. most of which are propagated by grafting on the common holly; but many other varieties have been produced by cultivation.—*Sex. Syst.* Tetrandria Tetragynia.

The common holly is propagated by seeds which are gathered in November, mixed with sand in a heap in the open garden, turned frequently over till the October following, and then the stones may be sown; they will germinate the following spring. In this tree some are male, some female, and some hermaphrodite.

In the country where hollies are abundant they afford a cheerfulness to the scenery in winter which is extremely pleasing. On this account they are planted in gardens and shrubberies. Our ancestors, from a misdirected taste, frequently clipped them into the shape of birds, quadrupeds, and other fantastic representations.

When formed into hedges holly is eminently serviceable; it admits of being cropped, and retains its verdure and beauty, without injury, even through the severest winters. Its growth is slow, and its duration longer than that of most other trees. The *wood*, which is hard and close-grained, is much used in veneering, and is frequently stained black, to imitate ebony. It is advantageously used as handles for knives, cogs for mill-wheels, and other

articles. The *leaves* in winter afford a grateful food to sheep and deer; and the *berries* yield a subsistence, during this inclement season, to the feathered tribes.

The *bark* of the holly is replete with a viscid mucilaginous substance, from which *bird-lime* is made. For this purpose it is boiled ten or twelve hours; and when the green rind is separated, it is covered up in a moist place, to stand for a fortnight. It is afterwards reduced to a tough paste, and washed in a running stream until no impurities are left. It is next suffered to ferment for four or five days; after which it is mixed, over the fire, with a third part of nut-oil, or some other oily fluid, and is thus rendered fit for use.

Bird-lime has a remarkably adhesive quality, particularly to feathers and other dry substances. It is on this account employed for the smearing of twigs to ensnare birds. In its elasticity and inflammable nature it has much resemblance to Indian rubber; and, if any means could be adopted to harden it, there is little doubt but it might be substituted for that article.

Holly deserves to be much more extensively cultivated than it is. Some years ago a person who purchased a holly wood in Yorkshire sold the bird-lime prepared from the bark to a Dutch merchant, for nearly the whole sum of his original purchase.

Among the ancient Romans it was customary to send branches of holly to their friends, with new years' gifts, as emblematical of good wishes. We decorate our houses and churches with it at Christmas, to give, as it has been observed an air of spring in the depth of winter.

NAT. ORD. 52. EBENACEÆ.—THE EBONY TRIBE.

508. *EBONY* is the wood of a tree (*Diospyros ebenum*), or *SMOOTH DATE PLUM*, which grows in the island of Ceylon, and has smooth, leathery, oblong, and pointed leaves, and rough-haired buds.—*Sex. Syst.* Octandria Monogynia.

The black and valuable substance known to us by the name of ebony, is the central part (*duramen*) only of the trees. The outside wood (*alburnum*) is white and

soft, and either decays soon, or is destroyed by insects, which leave the black part untouched. Ebony is imported into this country from the East Indies. It is exceedingly hard and heavy, admits of being highly polished, and is principally used by cabinet-makers and inlayers for the veneering of cabinets and other ornamental work. The wood of the pear-tree and holly stained black, is frequently substituted for ebony.

The ripe *fruit* of the ebony tree is eaten by the natives of Ceylon; but it is astringent, and not very palatable.

Several other species of the genus *Diospyros* supply a sort of ebony.

Sub-ORDER. STYRACEÆ.—THE STYRAX TRIBE.

509. *BENZOIN*, or *GUM BENJAMIN*, is a resinous and fragrant balsamic substance, the produce of a tree (*Styrax Benzoïn*) which grows chiefly in the island of Sumatra, Borneo, &c.

This tree has oblong leaves which taper to a point, and are smooth on the upper surface and downy beneath. The flowers are in loose bunches; they usually hang all on the same side; and are generally closed, which gives them the appearance of buds.—*Sex. Syst.* Decandria Monogynia.

In some of the northern parts of Sumatra, particularly near the sea coast, there are several extensive plantations of Benzoin trees. The seeds or nuts are sown in the rice fields, and they afterwards require no other attention than that the surrounding shrubs should be cleared away from about the young plants.

When the trees have attained the age of six or seven years, incisions are made into the bark; and from these the Benzoin exudes, in the form of a thick, whitish, resinous juice. By exposure to the air, this juice soon hardens; it is then pared from the bark with a knife or chisel. For the first three years the trees yield the purest resin; this is of a white colour inclining to yellow, is soft and fragrant, and is called *head benzoin*. Afterwards, for the next seven or eight years, an inferior sort is yielded; this is of a reddish yellow colour, degenerating to brown, and known by the name of *belly benzoin*. At length the trees, unable to

bear a repetition of the process, are cut down, and split into pieces. From these is procured, by scraping, a still worse sort of benzoin, which is dark-coloured, hard, and mixed, more or less, with parings of the wood and other impurities.

The inferior sorts of benzoin are exported to Arabia, Persia, and some parts of India, where they are burned, to perfume, with their smoke, the temples and the houses of the inhabitants; to expel troublesome insects, and obviate the pernicious effects of unwholesome air, or noxious exhalations.

Benzoin is brought for sale to the mercantile parts of Sumatra, in large cakes, covered with mats. In order to pack it in chests, it is necessary to break these cakes, and to expose it to the heat of the sun. The greater part of the benzoin which is brought to England is re-exported to countries where the Roman Catholic and Mahometan religions prevail, to be there burned as *incense* in the churches and temples. The annual exportation of benzoin from London to Mogadore was estimated ten years since at about 30,000 pounds' weight per annum. In 1839, duty (4s. per cwt.) was paid on 108 *cwts* only.

That which is consumed in England is chiefly employed in medicine, in perfumes, and as cosmetics. It is an ingredient in *Turlington's* and *Friar's balsam*, the salutary effects of which, particularly in stopping the flow of blood from recent wounds, are well known. This last balsam is composed of benzoin, storax (510), balsam of Tolu, Socotrine aloes (419), and rectified spirit of wine. Benzoin is also sometimes used in the preparation of *court plaister*; but in this it is supposed to be unnecessary, if not prejudicial. The mode of making court plaister is very simple. Five ounces of isinglass are dissolved in a pint of water. A quantity of thin black sarsnet being then stretched on a frame, a warm solution of the isinglass is applied with a brush equally over the surface; and, when dry, this is repeated a second or third time. It is finally brushed over with a weak solution of benzoin in spirits of wine, which communicates to it a pleasant aromatic smell.

If powdered benzoin be put into an earthen vessel over a slow fire, and the fumes of it be made to sublime into a paper cone fixed to the top of the pot, the substance thus

obtained is the *flowers of benzoin* of the shops, or *Benzoic acid*, as it is termed by chemists.

510. *STORAX* is a *fragrant resin*, obtained from a tree (*Styrax officinalis*) which grows in the *Levant*, and in some parts of *Palestine, Syria, Greece*, and is cultivated in the south of *Europe*.

This tree grows to the height of *fifteen feet and upwards*: it is much branched, and has *broad, alternate, oval leaves*, somewhat pointed, smooth above, and downy beneath. The flowers are large, white, in clusters on short footstalks, and terminate the branches.—*Sex. Syst.* Decandria Monogynia.

The best storax is obtained from Asiatic Turkey, in small transparent masses, of a pale red or yellowish colour, and generally abounding in whitish tears, resembling those of benzoin. The drug, however, which is commonly sold in the shops as storax, consists of large, light pieces, very impure, from the sawdust with which it is mixed.

The mode of obtaining this balsam is similar to that employed for benzoin (509): incisions are made in the trees, and, on its oozing from the wound, it is scraped off, and collected together to be packed for sale. It was formerly customary to enclose it in reeds.

Storax is one of the most fragrant of the balsams, and is much used in some countries in perfumes, and for fumigation. It is also compounded in various ways with other substances, for medicinal use.

NAT. ORD. 51. CONVULVULACEÆ, R. Brown.—THE CONVULVULUS TRIBE.

511. *SCAMMONY* is the *dried juice* (a gum-resin) obtained from the roots of a climbing plant of the *Convolvulus* tribe (*Convolvulus scammonia*, Pl. 1. Fig. 7), which is cultivated in *Asiatic Turkey, Syria, and Persia*.

This plant is known by having *arrow-shaped leaves*, notched in a particular manner at the base, and each flower-stalk bearing two or three large and somewhat purplish white flowers.—*Sex. Syst.* Pentandria Monogynia.

The roots of the scammony plant are thick, black on the surface, white within, and full of an acrid milky juice,

which, being dried, constitutes the scammony of the shops, an efficacious and generally safe though violent purgative in a variety of complaints. To obtain it, the earth, at a certain season of the year, is removed from the upper part of the roots whilst they are growing, and the tops are cut obliquely. The juice flows from the wound into a small vessel sunk into the earth, at the lower end of the gash, to receive it. But as each root furnishes only a very small quantity, the produce of several roots is usually mixed together for the greater convenience of being exposed to the sun and dried. Still, however, the quantity thus obtained is sometimes insufficient to supply the demand. In this case an addition is made to it by the pressure of juice from the leaves and stalks. It is adulterated at times with ashes, wheat flour, fine sand, chalk, &c.

The concrete juice of this plant is a drastic purgative, and anthelmintic. There are several preparations in the Pharmacopœias.

In 1839, the quantity on which a duty of 2s. 6d. per lb. was paid, amounted to 8,551 lbs.

512. *JALAP* is a dark-coloured root, which is usually imported, in transverse slices, from South America.

The plant that produces it (Ipomœa jalapa, Pl. 1. Fig. 8.) belongs to the Convolvulus tribe, and has generally somewhat heart-shaped leaves, and flowers that are reddish on the outside, and dark purple or yellowish within.—Sex. Syst. Pentandria Monogynia.

The name of jalap is derived from Xalapa, a town in South America, situated betwixt Vera Cruz and Mexico, where the plant, of which it is the root, was originally discovered, and whence it has been imported, in great quantities, into Europe. The jalap plant is now cultivated in the botanical garden at Charlestown, and in several other parts of America. When recent, the root is large, whitish, and full of juice; but when dried, the best pieces are compact, hard, weighty, and of a dark colour, with black, circular marks. Both in smell and taste, it is very nauseous. This root is used as an active cathartic on many occasions; it is generally given in powder: but a tincture and an extract are also prepared from it.

It is principally imported into this country, either direct

from Vera Cruz, or indirectly by New York, &c. In 1839, 37,211 lbs. were brought to this country, on which a duty of 6*d.* per lb. was paid.

NAT. ORD. 50. BORAGINACEÆ, *Lindl.*—THE BORAGE TRIBE.

513. *ALKANET ROOT* is a dyeing drug, the product of a rough perennial plant (*Anchusa tinctoria*), a species of bugloss, with downy and spear-shaped leaves, and clusters of small purple or reddish flowers, the stamens of which are shorter than the corolla. The colouring matter of this root is found chiefly in the bark.—*Sex. Syst.* Pentandria Monogynia.

Though this plant is sometimes cultivated in England, by far the greater portion of the alkanet which we use is imported either from the Levant, or from the neighbourhood of Montpellier in France.

Alkanet root imparts a fine deep red colour to all unctuous substances, and to spirits of wine; but it tinges water with a dull, brownish hue. Its chief use is for the colouring of oils, plaisters, lip-salve, and other similar articles. It is likewise employed in compositions for rubbing, and giving colour to mahogany furniture. Wax tinged with alkanet, and applied to the surface of warm marble, stains it flesh colour, and sinks deep into the stone.

SUB-CLASS II.—INCOMPLETÆ, OR APETALOUS
PLANTS.

Flowers devoid of Petals.

NAT. ORD. 49. MYRISTICACÆ, Lindl.—THE NUTMEG TRIBE.

514. *The NUTMEG is the kernel of the fruit of a tree (Myristica moschata) which grows in several islands of the East Indies.*

The nutmeg is immediately surrounded by a dark-coloured hard shell, over which grows a membranous cuticle, which in drying divides into several irregular parts, and is the spice called MACE.

The outside husk is thick · the whole fruit is of the size of a small peach ; when ripe the husk separates into two parts, and displays the nutmeg in its shell covered with the mace (Pl. 7. Fig. 80).

The nutmeg tree is not unlike the orange tree, growing about 25 or 30 feet in height. Its leaves are nearly oval, but pointed, waved, obliquely nerved, of a bright green colour above, and whitish beneath. The flowers are small and inodorous, and are present at the same time with the fruit, and male and female on the same and separate trees. Several varieties are cultivated in the East Indies.—Sex. Syst. Diœcia Monadelphia.

The nutmeg tree is a native of many of the East Indian islands (Moluccas), and is abundant at *Banda*, where a sufficient quantity was reared to supply the whole of Europe, Sumatra, Java, Penang, and other parts of the East Indies, as well as the Isle of France and Bourbon. Some of the West India islands also yield it at the present day. In the Moluccas it yields three crops annually, the first in April, which is the best, the second in August, the third in December. The fruit requires nine months to ripen. When

gathered, the husk is first stripped off, then the mace is carefully separated and dried; the nutmegs in the shell are next exposed to heat and smoke for three days, then the shells are broken, and the kernels bored with a hole, which is afterwards stopped up with powdered Sassafras (520), thrown into a strong mixture of lime and water, which extracts a great quantity of the essential oil, this is termed the *sweating* preparation, after which they are cleaned and packed up. This process is necessary to their preservation; with the same intention the mace is sprinkled with salt water. There are several varieties of this tree, but the *Queen nutmeg* is said to be the best.

Nutmegs have been long known and employed both for culinary and medical purposes. Their medicinal properties depend chiefly on the essential oil which they contain, and which they readily yield by distillation. It is stimulant and carminative, and, in large doses, narcotic; hence, when nutmegs or their oil have been taken in large quantities, injurious effects have been produced. Oil of nutmegs will sometimes ease the tooth ache; and sometimes a piece of nutmeg kept for some time in a carious tooth has had the same effect.

The *prepared oil of nutmeg*, commonly called *oil of mace*, is of little or no use. It is obtained from the seed by heat and pressure.

Mace has a very fragrant and agreeable odour, and, to most persons, a pleasant, though somewhat acrid, taste. It possesses nearly all the virtues of the nutmeg, but with less astringency; and, like that, is employed, in numerous ways, both in culinary preparations and medicine.

In the island of Banda it is sometimes customary to boil the *entire fruit* of the nutmeg tree, and afterwards to preserve it in syrup, and also to pickle it in spiced vinegar, in nearly the same manner as we pickle walnuts. In several parts of the East the inhabitants preserve the *outer husk* of the nutmeg as a sweetmeat, or eat it stewed with other food.

In 1838 the duty of 2s. 6d. per lb. was paid on 114,093 lbs. of nutmegs and on 19,297 lbs. of mace. And in 1839 the amount of customs duty paid on nutmegs was 16,874*l.*

NAT. ORD. 48. LAURACEÆ, Lindl.—THE CINNAMON TRIBE.

515. CINNAMON is the bark deprived of its skin, &c. of the branches of a tree of the bay tribe (*Laurus cinnamomum*, Pl. 4, Fig. 40), which is chiefly found in the island of Ceylon, but which also grows in Malabar and other parts of the East Indies, and now in several parts of South America and Jamaica.

This tree attains the height of twenty or thirty feet. Its leaves are oval, each from six to nine inches long, and marked with three principal longitudinal nerves, which extend from the base to the apex. The flowers stand on slender footstalks, and are white; and the fruit is shaped somewhat like an acorn: in taste similar to a juniper-berry — *Sex. Syst.* Enneandria Monogynia.

It is said there are two principal seasons in Ceylon for the barking of the cinnamon trees. The first is in April, and the last in November: others, however, state that the barking begins in May and continues till late in October. In this operation the branches of two or three years' growth, and about from one to two inches in diameter, are selected, and the outside skin or epidermis of the bark is scraped away. The twigs are then split up lengthways with a knife, and the bark is gradually loosened till it can be entirely taken off. It is then cut into slices, which, after being scraped on a convex piece of wood, on being exposed to the sun, curl up in drying. The smaller pieces or quills, as they are called, are inserted into the larger ones, and the whole are afterwards tied into bundles of about 30lbs. weight.

Cinnamon is examined and arranged, according to its quality, by persons appointed for this purpose, who used to taste and chew it, which was a very troublesome office, few persons being able to continue it more than two or three days successively, as the cinnamon excoriated the mouth. The tasting, it is said, is now discontinued. The bundles are subsequently made up in bales of 92lbs. each.

From the roots of the trees numerous offsets shoot up. These, when they have attained the height of about ten feet, are cut down and barked, being then about the thickness of a common walking-stick. The cinnamon which they yield has the odour of cinnamon with the pungency of camphor. In Ceylon the cinnamon trees are said to be

so common as to be used for fuel and other domestic purposes.

The smell of cinnamon, particularly the thinnest pieces, is delightfully fragrant; and its taste is pungent and aromatic, with considerable sweetness and astringency. If infused in boiling water in a covered vessel it gives out much of its grateful flavour, and forms an agreeable liquid. An oil is extracted from cinnamon, which is heavier than water. This is prepared in Ceylon, and almost wholly from the small and broken pieces. It is, however, obtained in such small quantity that the oil of cassia is generally substituted for it. Indeed, the cassia bark is sometimes substituted for cinnamon, to which it has some resemblance, although it is easily distinguishable from cinnamon, this last having a more fragrant smell, a more irregular fracture, and does not become mucilaginous when chewed; the taste of cinnamon is also more bitter, and less biting than cassia.

The virtues of cinnamon are not confined to the bark. The *leaves*, the *fruit*, and the *root* all yield oil of considerable value. That from the fruit is highly fragrant, of a thick consistence, and in Ceylon, was formerly made into candles for the exclusive use of the king.

There are more than ten varieties of the cinnamon tree of which four only are barked for the cinnamon, and known in commerce as, 1. The *Ceylon*. 2. The *Chinese*. 3. The *Cayenne*. 4. The *Flat*. According to Marshall this tree, on account of its bitterness, is never barked. The cinnamon tree grows in hot-houses in this country.

In 1838 duty (6*d.* per lb.) was paid on 16,605 lbs. of cinnamon. That exported from the island of Ceylon is subject to a duty of 3*s.* per lb.

516. CASSIA is the bark of a tree of the bay tribe (*Laurus cassia*), which grows in the East Indies and China, and is distinguished by having spear-shaped leaves, waved at the margin, each with three nerves, given off from the midrib. It is not so odorous as the cinnamon tree.—*Sex. Syst.* Enneandria Monogynia.

It was well known to the ancients, and highly esteemed by them: but since the use of cinnamon has been generally adopted, the cassia bark is not so much esteemed; it is of a lighter colour, thicker, and shorter in its fracture than

cinnamon, and abounds more with mucilaginous matter. For many purposes, however, cassia, being cheaper, is substituted for cinnamon, but more particularly for obtaining oil of cinnamon: nearly the whole of what is at present sold under the name either of simple or spirituous cinnamon water is prepared from cassia or *cassia buds*.

The cassia in the market is said to be obtained from different parts of the same tree that yields the cinnamon.

The *buds*, as well as the *bark*, of this tree are used in culinary preparations, and for several other purposes.

In 1838 duty (6*d.* per lb.) was paid on 88,971 lbs.

517. *CAMPHOR* is a white semi-transparent substance, of a peculiar and powerful smell, which is obtained from two or three kinds of trees of the bay tribe that grow in the islands of the East Indies, and in China.

Of these one of the principal is *Laurus camphora* (Pl. 4, Fig. 41). It is of considerable height, much branched, and has spear-shaped leaves, with nerves, of a pale yellowish green colour on the upper side, and bluish green beneath. The flowers are small and white, and stand on stalks which issue from the junction of the leaves and branches.—*Sex. Syst.* Enneandria Monogynia.

By the latest information concerning camphor, we learn that most of the camphor of commerce is obtained from the *Dryobalanops camphora*, a tree growing in the islands of Sumatra, and Borneo, in the East Indies, to the height of one hundred feet.

Camphor is found in every part of the trees; in the interstices of the perpendicular fibres, and in veins of the wood; in the crevices and knots, in the pith, and in the roots. The modes by which it is extracted differ in different countries. In Borneo and Sumatra, the largest pieces are picked out with sharp instruments; and the smaller ones are procured by rasps, to which, along with bits of wood and other impurities, they adhere. The Chinese cut off the branches, chop them very small, and place them in spring water for some days. They then put them into a kettle, and boil them for a certain time, during which they keep constantly stirring them with a stick. As soon as the camphor, in a white and frosted appearance, is observed to adhere to the stick, the whole is strained. The liquor is subsequently poured into a basin, and, after some hours, the camphor coagulates into a solid mass. It is also ob-

tained by sublimation, by placing the chips in an iron vessel surmounted by an earthen head lined with rice straw, to which a moderate heat is applied.

Crude camphor is in irregular lumps of a dirty white colour. It is imported into Europe in chests or casks, and refined by our English chemists. The best camphor is imported from Sumatra.

The principal use of this drug is in medicine; it operates as a cordial, and is beneficially employed in typhous fevers. It has often been found to relieve tooth-ache and rheumatism. Several preparations of camphor, in combination with other substances, are also used in medicine; the most common is that with spirit of wine. To insects the effluvia of camphor is so disagreeable that they quickly avoid it. Hence it is customary to place pieces of it in collections of natural history, to prevent their destruction by these voracious little creatures. It is also an ingredient in sealing wax, causing it to burn well.

For carpenters' work the *wood* of the camphor tree is much in request. It is light and durable; and, in consequence of long retaining its aromatic smell, is not liable to be injured by insects.

Several shrubs and plants of our own country contain camphor in considerable quantity. The principal of these are *rosemary*, *sage*, *lavender*. and *marjoram*; the roots of *cinnamon*, and most of the Nat. Ord. LABIATÆ.

51E. The COMMON SWEET BAY (*Laurus nobilis*) is an evergreen shrub, which grows in Italy and other southern parts of Europe, to the height of fifteen or twenty feet, and is principally celebrated as that which was anciently used to form the crown of victory among poets.

Its leaves are of a shining green colour, somewhat spear-shaped, and often waved towards the edge. The flowers appear in April and May, in clusters of three or four together on short footstalks. The corolla is in four segments of a yellowish white colour, and is succeeded by an oval berry of a dark purple or black colour when ripe.—Sex. Syst. Enneandria Monogynia.

This handsome shrub is common to our gardens and shrubberies. The *leaves* are employed in cookery, to flavour custards, puddings, stews, and pickles; and Dr. Woodville assures us that they may thus be used not only with safety,

but even with advantage, as assisting digestion. They nevertheless contain *prussic acid*, and are therefore not perhaps quite so safe a condiment as Dr. Woodville would persuade us to believe.

The *berries*, which have an aromatic smell, and a warm, bitterish, and pungent taste, were much used by the ancient Romans for culinary purposes. We import them chiefly from the coasts of the Mediterranean. In a recent state, the people of Spain and Italy obtain from them, by decoction, a green aromatic oil, which is employed in medicine, externally, as a stimulant in nervous and paralytic disorders. They are very seldom used.

519. The *ALLIGATOR PEAR* is the pear-shaped fruit of a species of bay tree (*Laurus persea*), much cultivated in the West Indies.

This tree, which is an evergreen, has a straight stem, and grows to a considerable height. Its leaves are somewhat oval, leathery, transversely veined, and of a beautiful green colour: the flowers grow in bunches.—Sex. Syst. Enneandria Monogynia.

To the inhabitants of the West Indian islands, particularly the negroes, this *fruit*, which ripens in the months of August and September, is an agreeable, and, in some respects, an important article of diet. When ripe the pulp is of a yellow colour, of a consistence somewhat harder than that of butter, and in taste not much unlike marrow. The negroes frequently make their meals of these pears, a little salt, and plantains; and they are occasionally served up at the tables of the white people as dessert.

Their exterior surface is covered with a green skin; and in the centre there is a large round seed or *stone*, extremely hard and woody, with an uneven surface. This stone is used for the marking of linen. The cloth is held or tied over the stone, and the letters are pricked by a needle through the cloth, into the outer covering of the stone. By this means it is stained of an indelible reddish-brown colour, in the direction along which the needle has passed. The *leaves* are used by the negroes medicinally.

520. *SASSAFRAS* is the wood of a North American tree of the bay tribe (*Laurus sassafras*), and is imported into Europe in long straight pieces, which are of a light and porous texture, and covered with a rough fungous bark.

This tree is sometimes twenty or thirty feet high. The branches are crooked, and the leaves various both in form and size, some of them being oval and entire, and others having two or three lobes. They are pale green, and downy beneath. The flowers, which are of a dingy yellow colour, appear in pendent spikes.—Sex. Syst. Enneandria Monogynia.

This wood, its bark, and the smaller twigs, and the roots, all of which are imported into this country, have a fragrant smell, and an aromatic, and somewhat acrid, though sweetish taste. Infusions and decoctions of sassafras are frequently taken as a medicine for improving the tone of the stomach and bowels, in persons whose secretions are in a vitiated state. Soon after its introduction into Europe, in the year 1560, this medicine was in such repute as to be sold on the Continent at the rate of fifty livres per pound. It is, however, now considered of little importance; and seldom employed but in conjunction with other medicines which are more powerful. Infusions of sassafras are sold in the streets of London under the name of *Salooop*.

We are informed that in many parts of America, where the sassafras trees not only grow in great numbers in the woods, but are planted along the fences of enclosures, it is not unusual to make bed-posts of the wood, for the purpose of expelling bugs. Its powerful scent, it is said, drives away these disagreeable insects; and some persons put chips of sassafras into their wardrobes and chests, to prevent the attack of moths.

The bark of the sassafras tree is used by the American women for dyeing worsted, which it does of a permanent and beautiful orange colour.

The medicinal properties depend on the presence of a volatile oil, which may be extracted by water or alcohol. Six pounds of the rasped root yield about two ounces of volatile oil, at first colourless, but which after a while becomes yellow.

NAT. ORD. 47. PRIMULACEÆ. Vent.—THE PRIMROSE TRIBE.

521. *The COWSLIP is a plant (Primula veris) which grows in most meadows and pastures, and is too well known to require any description.—Sex. Syst. Pentandria Monogynia.*

The flowers of the cowslip, when picked and dried, are

sometimes used as tea. When infused in a certain proportion of water and sugar, and afterwards fermented, they may be made into a peculiarly pleasant wine.

The *roots* have a fine odour; and when immersed in ale or beer are said to add considerably to the strength of the liquor. The *leaves* are sometimes eaten as a potherb, and in salads; and both the *leaves* and flowers are an excellent food for silkworms.

NAT. ORD. 46. URTICACEÆ. *Endl.*—THE NETTLE TRIBE.

522. *The COMMON NETTLE.* *There are two kinds of nettle common in England, one of which (Urtica dioica) has heart-shaped leaves, and the other (Urtica urens) has oval leaves.—Sex. Syst. Tetrandria Monogynia.*

Although generally considered a noxious weed, the nettle is a plant of some utility. By the country people the young and tender *leaves* and *tops* are boiled and eaten as food. A kind of rennet is made in the highlands of Scotland, by adding a quart of salt to three pints of a liquor produced by the boiling of nettles. A table-spoonful of this is said to be sufficient to coagulate a bowl of milk. From the fibrous *stalks* of the nettle, dressed in the manner of flax or hemp, cloth and paper may be made. The *roots*, when boiled, communicate a yellow colour to woollen cloth, linen, and cotton.

The *stings* of nettles, examined by a microscope, are extremely curious objects. They consist of a slender, tapering, sharp, and hollow substance, with a minute hole at the point, and a bag at the base. When the sting is pressed, it perforates the skin, and the same pressure forces up from the bag into the wound a corrosive liquor, which there excites a burning and painful inflammation. If the nettle be suddenly and strongly grasped, the stings are bent or broken, and in this case occasion no pain.

In consequence of their stinging quality, nettles were formerly employed to restore sensation in paralytic limbs, by whipping them with these plants.

523. *HOPS are the dried flower-buds (strobiles) of a pistilli-*

ferous climbing British plant (*Humulus lupulus*, Pl. 7. Fig. 81), with a rough and angular stem, and leaves generally in three or five lobes or divisions, and serrated.

Several varieties of the hop are cultivated; the Flemish, the Canterbury, the Goldings, &c., are the chief.—*Sex. Syst.* Dicoecia Pentandria.

Although the hop has been cultivated in Europe an unknown length of time, its cultivation was first introduced here from Flanders, in 1524; and the hop, it is said, was first used in English beer in the latter part of the reign of Henry VIII. But the prejudice against it was for some time so great, that the city of London, a hundred years afterwards, petitioned parliament to prevent its use! whereas now severe penalties are inflicted on brewers who use any other bitter in their beer!

The hop is usually propagated by cuttings; and as the male and female flowers grow on distinct plants, the *female* only is that which is cultivated for hops.

A hop plantation requires the growth of some years before it is in perfection. The plants begin to push up their young stems about the month of April. When these are three or four inches above the ground, poles about twenty feet high, charred at their base, are driven in to support them during their growth. The season for picking hops usually commences about the middle of September. This work is performed by men, women, and children. Proper baskets, bins, or cribs, being in readiness, the plants are cut off within a few inches of the ground, and the poles are drawn up. These are placed upon the bins, with the plants upon them, and three or more persons on each side pick off the hops. After this they are dried in a kiln, and when dry are carried into and kept, for five or six days, in an apartment called the stowage-room, until they are in a state to be put into bags. This is done through a round hole cut in the floor of the stowage-room, exactly equal in dimensions to the mouth of the bag, and to which this mouth is fastened. In each of the lower corners of the bag a small handful of hops is tied; and a person called the packer places himself in it, and by a heavy leaden weight, which he constantly moves round in the places where he is not treading, presses and forces the hops down, in a very close manner, into the bag, as fast as they are thrown to

him by another labourer. The work thus proceeds till the bag is quite full, when each of the upper corners has a few hops tied in it in the same manner as those at the bottom. These serve as handles for moving the bags. The bag is then taken away, and its mouth is properly sewed up and secured.

The hops of the finest colour and the best sample are put into bags of finer manufacture than the others, under the denomination of *pockets*; and the inferior sorts are packed in canvas of a coarser kind, called *bags*.

As the hop-plants are liable to be injured during their growth, from the attacks of insects, from honey-dew, from blight, from hot sunny weather after rain, and by winds and storms, they are considered a very precarious crop.

The principal *use of hops* in brewing is for the preservation of malt liquor, and to communicate to it an agreeably aromatic bitter flavour. The best hops are used for ale and the finer kinds of malt liquor, and inferior kinds are used for porter. The *young shoots* and tops are often gathered from the hedges, by poor people, and boiled and eaten in the manner of asparagus. Of the woody part of the *hop-bines*, after having been steeped in water, and worked into a pulp, a coarse kind of paper may be made. The odour of hops, when they are used as a pillow, promotes sleep in the delirium of fever and in madness. A pillow stuffed with hops was the only means of procuring repose for George III., when he suffered from the effects of inflammation of the brain.

The active principle is secreted by the scales in the form of a yellow powder known as *Lupulin*; by rubbing and sifting they yield from one-sixth to one-tenth of their weight. The properties doubtless reside in the volatile oil and bitter principle. It is esteemed a tonic and narcotic medicine, particularly serviceable in diseases of local or general debility, when existing with nervous derangements.

524. *HEMP is the cortical part of the stalks of an annual plant (Cannabis sativa, Pl. 7. Fig. 82.) which grows wild in the East Indies, and is much cultivated in different parts of Europe.*

It has the lower leaves in slender finger-like divisions; the male flowers in small loose spikes, at the end of the stem and branches;

and the female flowers single, at the junction of the leaves with the stem.—Sex. Syst. Pentandria Digynia.

The principal country for hemp, as an article of commerce, is Russia, few other countries of Europe growing a quantity sufficient for their own consumption. It is cultivated in some parts of Britain, but particularly in the counties of Suffolk and Norfolk. The soil best adapted to it is a moist but loose sandy loam, or the black mould of low lands near water. The seed is sown in April or May; and the plants, which rarely attain more than five or six feet of height in this country, while in warmer climates they are sometimes eighteen feet high, are in a state to be pulled up in three or four months; the male plant, or *fimble hemp*, as it is called, being ready some time before the female plants, which have the name of *karle* or *seed-plant*.

As soon as the hemp is pulled, it is tied in bundles and set up to dry; and at the end of about ten days, the bundles are loosened at the top, and the heads are held upon a hurdle by one person, whilst another, with a small threshing-flail, beats out the seed.

In the preparation of hemp for the manufacturer two modes are pursued. One of these is to spread it out on stubble or pasture ground, that the fibrous parts may be rendered separable by the gradual operation of the weather; the other is to immerse the bundles, for some days, in stagnant water. The next process consists in separating the bark, or hemp, from the stalks; this is effected either by pulling out the stalk with the hand, or by machinery similar to that adopted in the preparation of flax. After some other preparations the hemp is beaten in mills, and then combined or dressed by drawing it through instruments called *hackles*, which are somewhat similar to the combs of wool-manufacturers.

Thus prepared, the hemp is spun into thread, which is made into twine, ropes, and cordage of every description; and woven into canvass, and strong cloth of various kinds. Indeed so great is the importance of this production, particularly for the cordage, cables, and the rigging of ships, that, to encourage its growth, an act of parliament was passed in 1783, directing a bounty of three pence per stone to be paid on all hemp raised in Great Britain; and

imposing heavy duties on hemp imported from foreign countries.

From *hemp-seed* a valuable *oil* is expressed, which is peculiarly adapted for burning, as it is perfectly limpid and without smell: it is also used for making *green soap*.

The seeds themselves are sometimes employed in the feeding of poultry, from a curious notion that they cause the hens to lay a greater number of eggs than they otherwise would do. They are also given as food to singing birds; but, if in great quantity, they are said to alter the plumage. The *stalks*, after the hemp is taken from them, are used as fuel. The water in which hemp has been soaked is in a high degree poisonous.

The *New Zealand flag* (*Phormium tenax*) has of late been much used as a substitute for hemp, over which it is reputed to possess properties, that render it equally, if not more advantageous for the purposes to which hemp is applied.

525. *The COMMON MULBERRY-TREE* (*Morus nigra*, Pl. 6, Fig. 72) is a native of Persia, and is known by its heart-shaped and rough leaves, and its large juicy berries, each consisting of several smaller ones.—*Sex. Syst.* Monœcia Tetrandria.

The flowers of the mulberry appear in June, and the *fruit* becomes ripe in September, the berries continuing to ripen in succession for about two months. These, if eaten before they are ripe, are astringent; but, when ripe, are pleasantly acid, though of a very peculiar flavour. A *syrup*, made from the *juice* of the ripe fruit, was formerly kept in apothecaries' shops for medicinal use. The juice itself is employed to impart a dark tinge to liquors and confections; and, when properly fermented, it becomes a pleasant wine. In cider counties mulberries are sometimes mixed with apples for cider, by which is made a delicious beverage called *mulberry cider*.

In Italy, and other countries where silkworms are bred, the *leaves* of the mulberry-tree, but particularly those of the *WHITE MULBERRY* (*Morus alba*), which is distinguished by its having obliquely heart-shaped and smooth leaves, are requisite for the feeding of these insects; and they are very extensively cultivated for this purpose. The *wood* is

hard and of a yellow colour; and is applied to numerous uses in carving and turnery. The *bark* is so fibrous, that it may be manufactured into cordage, ropes, and coarse paper. Mulberry-trees flourish best in a light and rich soil, and in open situations.

526. The *BREAD FRUIT* is a large globular fruit of a pale green colour, about the size of a child's head, marked on the surface with irregular six-sided depressions, and containing a white and somewhat fibrous pulp, which, when ripe, becomes juicy and yellow.

The tree that produces it (*Artocarpus incisa*, Pl. 5. Fig. 57) grows wild in Otaheite and other islands of the South Seas, is about forty feet high, has large and spreading branches, and large bright green leaves, each deeply divided into seven or nine spear-shaped lobes. There are several varieties of this tree.—*Sex. Syst.* Monœcia Monandria.

The edible part of this fruit lies between the skin and the core; it is as white as snow, and somewhat of the consistence of new bread. The inhabitants of the South Sea Islands prepare it as food, by dividing the fruit into three or four parts, and roasting it in hot embers. Its taste is insipid, with a slight sweetness, and somewhat resembles that of the crumb of wheaten bread mixed with Jerusalem artichoke (484). Of this fruit the Otaheitans make, however, various messes. It continues in season eight months of the year.

Not only does this tree supply food, but clothing, and numerous other conveniences of life. The *inner bark*, which is white, and composed of a net-like series of fibres, is formed into a kind of cloth. The wood is soft, smooth, of a yellowish colour, and is used for the building of boats and houses. In whatever part the tree is wounded, a glutinous milky *juice* issues, which, when boiled with cocoa-nut oil, is employed for making bird-lime, and as a cement for filling up cracks in vessels intended for holding water. Some parts of the *flowers* serve as tinder, and the leaves are used for wrapping up food, and for other purposes.

The climate of the South Sea Islands not differing much from that of the West Indies, it was many years ago thought desirable that some of the trees should be transferred, in a growing state, to our islands there. Consequently, his

Majesty's ship the *Bounty*, in 1787, sailed for this purpose to the South Seas, under the command of Lieutenant, afterwards Admiral Bligh. But a fatal mutiny of the ship's crew prevented the accomplishment of this benovolent design. The commander of the vessel, however, returned in safety to his country; and a second expedition, under the same person, and for the same purpose, was fitted out in the year 1791. Captain Bligh arrived in safety at Otaheite, and, after an absence from England of about eighteen months, landed in Jamaica with 352 bread fruit-trees, in a living state, having left many others at different places in his passage thither. From Jamaica these trees were transferred to other islands; but the negroes, having a general and long-established predilection for the plantain (445), the bread fruit is not much relished by them. Where, however, it has not been generally introduced as an article of food, it is used as a delicacy: whether eaten as bread, or in the form of pudding, it is considered highly palatable by the European inhabitants.

527. *The JACK FRUIT is a species of bread fruit that is grown in Malabar and other parts of the East Indies.*

The tree which produces this fruit (Artocarpus integrifolia, or Jaca-tree) differs from the common bread fruit tree, in having the leaves entire, each about a span in length, oblong, blunt, serrated at the edges, bright green, and very smooth on the upper surface, paler beneath, and clad with stiff hairs.—Sex. Syst. Monœcia Monandria.

Few of the fruits even of eastern climates are so large as this. Its weight is sometimes upwards of thirty pounds; and it generally contains between two and three hundred nuts or seeds. These are each about three times as large as an almond, of a somewhat oval shape, blunt at one end, sharp at the other, and a little flattened on the sides. Some varieties of the fruit, however, contain no nuts.

The season in which the jack fruit is in perfection is about the month of December. Though esteemed by many persons, it is so difficult of digestion, that great caution is requisite in eating it. The unripe fruit is sometimes pickled; it is also cut into slices, and boiled as a vegetable for the table; and sometimes fried in palm oil. The *nuts* are eaten roasted, and the *wood* serves for building materials.

528. The FIG is the pulpy fruit of a shrub, or low tree (*Ficus carica*, Pl. 7. Fig. 83), which is a native of the South of Europe, and some parts of Asia.

Fig-trees are branched from the bottom, and the leaves are large, smooth, and irregularly divided into from three to five deep and rounded lobes. The fruit grows on short and thick stalks, of a purplish colour, and contains a soft, sweet, and fragrant pulp, intermixed with numerous small seeds.—Sex. Syst. Polygamia Diccia.

It appears from history, both sacred and profane, that the fig-tree was an object of attention in the earliest times. This fruit was one of the most common and favourite aliments of the ancient Greeks, and constituted a very valuable food with the peasants of some parts of Italy. Fig-trees are now much cultivated in Turkey, Italy, and the Levant, as well as in Spain and some of the southern parts of France. All the islands of the Archipelago yield figs in abundance, but these are in general of very inferior quality.

The first fig-trees introduced into England are still in the Archbishop of Canterbury's garden at Lambeth, and now bear excellent fruit. They are supposed to have been planted by Cardinal Pole, who died in 1558.

The trees are propagated either by suckers, by layers, or by cuttings. The artificial process of increasing and ripening the fruit is an art which requires much attention. This, as it is practised in the Levant, is called *caprification*, and is performed by wounding the buds of the figs, with a straw or feather dipped in sweet oil at a certain period of their growth. It is naturally done by an insect, known as the *Cynips Ficus* of Hasselquist.

Figs are dried either by a furnace or in the sun, after having been dipped in a scalding ley made of the ashes of the fig-tree. In this state they are used both in medicine, and as food. They form a considerable branch of commerce, and are exported to nearly all the northern parts of Europe. When we receive them, their surface is usually covered with a saccharine matter which has spontaneously exuded from the fruit. A small and cheap kind of fig is imported from Faro.

There are numerous varieties of the fig, but the common purple kind is the hardiest of the whole. This is frequently

cultivated in our gardens ; and, if screened from the north-east winds, it ripens, even with us, in tolerable perfection.

The wood of the fig-tree is of a spongy texture, and, when charged with oil and emery, is much used on the Continent by locksmiths, gun-smiths, and other artificers in iron and steel, to polish their work. It is almost indestructible, and on this account was formerly employed in eastern countries as coffins for embalmed bodies. The amount of Customs duty paid on figs in 1839 was 13,519*l*.

529. The BANYAN-TREE, of India and the island of Cuba, (*Ficus Religiosa*) is also a species of fig. It is a native of the East Indies, and has the singular property of sending its shoots down to the earth, where they take root, and become trees surrounding the parent stem ; so that this tree, with its numerous stems, is an object of considerable ve-



The Banyan Tree.

neration among the Hindoos. It bears a small fig of a scarlet colour : birds, monkeys, and other animals, live in this tree, and feed upon its fruit.

NAT. ORD. 45. BETULACEÆ. *Dumort.*—THE BIRCH TRIBE.

530. The COMMON, or WHITE BIRCH (*Betula alba*) is an indigenous forest-tree, easily known by the smooth appearance and silvery colour of its bark, by its leaves being somewhat triangular, but acute, their smallness in comparison with those of other timber trees, and by the small branches being tender and flexible.—*Sex. Syst.* Tetrandria Digynia.

Although the birch is by no means considered a valuable timber tree, yet its wood is used for numerous purposes. Being of a white colour, and firm and tough in texture, it is

variously employed by hoop-benders and wheel-wrights. Turners use it for trenchers, bowls, ladles, and other wooden ware. Ox yokes, small screws, women's shoe-heels, patens, and in France wooden shoes, are made of it. The North American Indians use the wood of the birch-tree for canoes, boxes, buckets, baskets, kettles, and dishes, curiously joining it together with threads made of roots of the cedar-tree. Birch-trees are not unfrequently planted with hazels, for the purpose of the wood being converted into charcoal for forges. This charcoal is much esteemed; and the soot which is formed on burning the wood constitutes a good black substance for printers' ink.

Nearly all the other parts of the birch-tree are applicable to useful purposes. The inhabitants of Sweden employ the *bark* in the tanning of leather; and after burning it to a certain degree, they also use it as a cement for broken china and earthenware. The navigators of the river Volga construct of it portable boats, cradles, &c. It is serviceable in dyeing a yellow colour. In Norway it is dried, ground, mixed with meal, and boiled with other food for swine. The roofs of houses or huts, in many parts of the north of Europe, are covered with the bark. It is spun into a coarse kind of rope, woven into shoes and hats; and in Kamschatka even made into drinking cups. The Laplanders fasten together large pieces of it as outer garments to keep out the rain. Abounding with much resinous matter, slices of the bark are sometimes twisted together to make torches. During a scarcity of corn, the bark of the birch-tree has in several instances been ground with bread corn, and used as food.

In most parts of England the *twigs* of this tree are made into besoms. They are also made into the tops of fishing rods; and when smeared with bird-lime are used by bird-catchers. The Norwegians frequently employ them as fodder for their horses. The *leaves* afford a yellow dye.

A wholesome wine is occasionally made from the *sap* of the birch-tree, which is obtained by boring holes in the trunk, about the beginning of March, before the leaves appear. Into each hole a piece of elder stick, hollowed through the middle, by clearing out the pith, is placed. This conducts the sap, as it flows from the wound, into a vessel put to receive it. If a tree be large, it may be tapped

in four or five places at once; from several trees many gallons may be obtained in a day. The juice thus procured is boiled with sugar, in the proportion of four pounds to a gallon, and treated in the same manner as other made wines. A good spirit might no doubt be obtained from the fermented juice by distillation.

531. *The COMMON ALDER* (*Alnus glutinosa*, Pl. 6. Fig. 63), is a tree which grows in wet situations, and is distinguished by its flower-stalks being branched, and its leaves being roundish, wavy, serrated, and downy at the branching of the veins beneath. There are two varieties, both natives of Britain.—*Sex. Syst.* Tetrandria Digynia.

There are few means of better employing swampy and morassy grounds than by planting them with alders: for although the growth of these trees is not rapid, the uses to which they are applicable are such as amply to repay the loss of time requisite before they come to perfection.

The *wood* of the alder is frequently wrought into cogs for mill-wheels, and is peculiarly adapted for all kinds of work which are to be constantly kept in water: for pumps, sluices, pipes, drains, conduits, and for the foundation of buildings situated in swamps. The water-pipes in many of our large towns were formerly made of alder: for its utility in the formation of sluices it is much cultivated in Holland. It is commonly used for bobbins, women's shoe-heels, ploughmen's clogs, and numerous articles of turnery-ware are formed of it. This wood serves also for many domestic and rural uses; as coppice wood it is cut down every ninth or tenth year for poles. The roots and knots furnish a beautifully veined wood, well adapted for cabinet work and furniture.

The *bark* may be advantageously used in tanning and leather-dressing, and by fishermen for staining their nets. This and the young twigs are sometimes employed in dyeing, and yield different shades of yellow and red. With the addition of copperas it yields a black dye, which the dyers of cotton use to a considerable extent; and for this purpose it is purchaseable in some countries at the rate of seven pence or eight pence per stone.

In the highlands of Scotland we are informed that *young branches* of the alder, cut down in the summer, spread over

the fields, and left during the winter to decay, answer the purpose of excellent manure.

NAT. ORD. 44. POLYGONACEÆ. *Lindl.*—THE BUCKWHEAT TRIBE.

532. *RHUBARB* is the root of the *Rheum palmatum*, or *Pal-mated Rhubarb*, a perennial plant, which grows wild in various parts of Asia.

The leaves which issue from this root are large, and deeply cut into lobes. The stem is erect, and six or seven feet high. The leaves stand on foot-stalks that are somewhat grooved above, and rounded at the edge. Those which proceed from the stalk supply at the joints a kind of membranous sheaths. The flowers terminate the branches in clusters.—*Sex. Syst.* Enneandria Monogynia.

Much diversity of opinion exists, even to the present day, as to the exact species which yields the *Official* rhubarb. Several species grown in England are reputed to yield it, but nothing decisive on this point has been settled. The plant now under consideration is the one which is generally admitted.

The importance of this *root* and its properties in medicine are universally known. Rhubarb is imported from Turkey, Russia, China, and the East Indies. That from *Russia* and *Turkey* is in small pieces, usually with a hole cut through each; it is of a yellowish-marble colour. *India* or *China* rhubarb is in larger pieces, more compact, and generally of a darker colour; the first kind is by far the dearest; the last, for medicinal use, is equal perhaps, if not superior, to the former.

In some of the mountains of Tartary rhubarb plants are found in great abundance. The roots, when first dug out of the ground, are thick, fleshy, externally of a yellowish brown colour, and internally of a bright yellow streaked with red veins. When they have attained a sufficient size they are dug up, and the small fibres and the rind being cut off, they are divided into proper pieces. Each piece is then perforated in the middle, and they are strung on cords in such a manner as not to touch each other, and are suspended to dry either upon adjacent trees or in the tents.

The sum expended for the importation of this drug is said to exceed 200,000*l.* per annum, a great proportion of

which, it is presumed, might be saved to the country by cultivation of the plants in Great Britain. This was first attempted, about sixty years ago, by Dr. Hope, in the botanic garden at Edinburgh, and with success, even in the climate of Scotland. In 1791, Sir William Fordyce received from the Society of Arts a gold medal, for having raised more than three hundred plants of the true rhubarb from seed. And in 1783, Mr. Davis, of Minehead, in Somersetshire, brought to perfection as many plants as yielded three hundred pounds' weight of dried rhubarb. Since this period rhubarb has been grown in different parts of England. The principal difficulty has attended the curing of it; but this, after numerous experiments, has at length been performed in such a manner, that the English drug has been found equal, or nearly equal, to that which is imported from Turkey and China, yet the public do not appear to like *English* rhubarb.

The *bark* of rhubarb has been used for tinctures, and found in every respect as efficacious as the best part of the roots: and the *seeds* possess nearly the same qualities. The *leaves* impart an agreeable acidity somewhat similar to that of sorrel; and a marmalade, which may with advantage be adopted for children, is made from the fresh *stalks*, by stripping off the bark and boiling the pulp with an equal quantity of sugar.

According to the Trade list, a duty of one shilling per pound was paid on 37,026 pounds of East India rhubarb, and 7,402 pounds of foreign rhubarb, in 1838.

533. The COMMON RHUBARB (*Rheum rhaponticum*) is a plant which is cultivated in kitchen gardens, and has large, blunt, and smooth leaves, and the leaf-stalks furrowed on the upper side, and rounded at the edge. The *Rheum hybridum*, or Bastard rhubarb, is now also cultivated for its leaves, which are sometimes four or five feet long.—*Sex. Syst.* Enneandria Monogynia.

This species of rhubarb is a native of Asia, and was introduced into this country in 1573. It is chiefly in request for the *footstalks of the leaves*, which are used (in the early part of the year when there is little fruit) for pies and tarts, as a substitute for green gooseberries. The *root* has some of the qualities of the true rhubarb, and has occasionally been imposed upon purchasers for that drug.

Concerning rhubarb, both as a medicinal *root* and as culinary *leaves*, it should be stated, that the *Wave-leaved rhubarb* (*Rheum undulatum*), as well as the *Palmated rhubarb* (*Rheum palmatum*), are said to produce equally good rhubarb for medicinal use. The *leaves of most of the species* of rhubarb (*six* have been described) are useful for tarts, &c.

534. **BUCKWHEAT, or BRANK**, is a black and triangular grain, produced by a plant (*Polygonum Fagopyrum*), with somewhat arrow-shaped leaves, and purplish white flowers. It usually grows in cornfields, or open waste places, in a sandy or chalky soil.—*Sex. Syst.* Enneandria Monogynia.

Although buckwheat may now be considered as in some degree naturalized in this country, it was originally introduced from the northern parts of Asia, and was first cultivated here about the year 1600. The flowers appear about July, and the seeds ripen generally about the latter end of September, and so tender are the plants, that a single night's sharp frost will destroy a whole crop.

Buckwheat has been principally cultivated for oxen, swine, and poultry; and although some farmers state that a single bushel of it is equal in quality to two bushels of oats, others assert that it is a very unprofitable food. The flour of buckwheat is occasionally used for bread, but more frequently for the thin cakes called crumpets. In Germany it serves as an ingredient in pottage, puddings, and other food. Beer may be brewed from it; and by distillation it yields spirit.

The best mode of harvesting this grain is said to be by pulling it out of the ground like flax, stripping off the seeds by the hand, and collecting these into aprons or cloths tied round the waist.

Buckwheat is much cultivated by noblemen and gentlemen as a food for pheasants. Some farmers sow buckwheat for the purpose only of ploughing it into the ground as manure for the land. Whilst green it serves as food for sheep and oxen; and, mixed with other provender, it may also be given with advantage to horses. It produces little straw for manure. The *blossoms* may be used for dyeing a brown colour.

The principal advantage of buckwheat is, that it is capable of being cultivated upon land which will produce scarcely any thing else, and that its culture, comparatively with that of other grain, is attended with little expense.

NAT. ORD. 43. ULMACEÆ. *Mirb.*—THE ELM TRIBE.

535. *ELMS* are forest-trees well known in almost every part of England. There are several species, of which four, the COMMON ELM (*Ulmus campestris*, Pl. 6. Fig. 61), WYCH HAZEL or BROAD-LEAVED ELM (*Ulmus montana*, Pl. 6. Fig. 62), the DUTCH or CORK-BARKED ELM (*Ulmus suberosa*), and the SMOOTH ELM (*Ulmus glabra*), are natives of this country. They are easily distinguishable from most other forest-trees by their leaves being rough and doubly serrated at the edge.

Of these trees the flowers of the first are four-cleft, and have each four stamens, and the fruit is oblong; those of the second are five or six cleft, and have each five or six stamens—the fruit is roundish, and the leaves are broad; those of the third are four-cleft, and have four stamens, and the bark of the branches has a corky appearance; of the fourth, the leaves, though doubly serrated, are smooth, the flowers are five-cleft, the fruit obovate.—*Sex. Syst.* Pentandria Digynia.

The Dutch elm grows in most parts of England. The common elm, though plentiful in Worcestershire, Middlesex, and some other southern counties, is said to be rare further north than Grantham or Stamford. The wych hazel is common in woods and hedges throughout the whole of South Britain.

The use of the elm as *timber* is chiefly confined to rough and inferior work. It is employed for waggons, carts, mill-wheels, water-pipes, low-priced chairs, blocks for hat-makers, and various other purposes; and among the lower and middling classes almost exclusively for coffins. The preference which it has obtained for the latter purpose is supposed to have originated in its peculiar durability in moist situations.

It is said that from the *inner bark* of the elm, if stripped off in the spring, and boiled in water, a very palatable kind of beer may be brewed; and that this bark, dried and ground to powder, has, in times of scarcity, been mixed

with meal to make bread. It is occasionally administered in a decoction for obstinate cutaneous complaints, but it is not much esteemed in medical practice. Its properties are demulcent and probably alterative. The young *leaves* may be used for the feeding of silk-worms.

Few trees are better adapted than the elm for planting in hedge rows, by the sides of roads, and along shady walks; but in the latter case the numerous suckers which grow up from its roots give much trouble to keep the ground clear. The elm may be readily propagated by such suckers.

NAT. ORD. 42. CHENOPODIACEÆ. *Lindl.*—THE GOOSEFOOT TRIBE.

536. *BARILLA* is an impure carbonate of soda, obtained chiefly from the ashes of the *Salsola* soda and *Salicornia* herbacea, plants which are cultivated in Spain for the purpose of yielding this salt. A more impure carbonate of soda is obtained at various places in Great Britain by burning several species of the sea-wrack, called Kelp (201).

On the shores of the Mediterranean, where the preparation of soda is pursued to a considerable extent, the seeds of the plants from which it is obtained are regularly sown in places near the sea. When at maturity the plants are pulled up by the roots, dried, and afterwards burnt in simple furnaces, the heat of which is just sufficient to cause the ashes to melt and concrete into compact masses, which, when cold, are hard, dry, sonorous, and of a greyish-blue colour. Exposed to the air, barilla (201) becomes covered with a saline efflorescence; its taste is sharp and alkaline; it contains from twenty to forty per cent. of carbonate of soda. The best barilla is brought from Spain; some is also brought from Sardinia and Sicily.

Barilla is chiefly employed in glass and soap manufactories; it is also used by dyers. For further information on this head, see the uses of minerals, vol. i. p. 135.

537. *BEET* is the well-known succulent root of the *Beta vulgaris*, or Red beet, a biennial plant, which is cultivated in our kitchen gardens, and is a native of the sea-coasts of the south of Europe.

There are numerous varieties of this plant, but the Common long-rooted, the Short or Turnip-rooted, and the Green-leaved red-rooted, are the chief.—*Sex. Syst.* Pentandria Digynia.

The roots are boiled and sliced, and eaten cold, either by themselves or in salads; they are also used as garnish, and as a pickle, and sometimes are stewed with onions. The green-leaved variety is by some preferred. The roots may be taken out of the ground for use about the end of August, but they do not attain their full size and perfection till October. When good they are large, and of a deep red colour; and when boiled, are tender, sweet, and palatable.

Beet-root has been dried, and made a substitute for coffee; an infusion of the root has been made into a cheap and palatable beer.

From the *Beta cicla*, or WHITE BEET, having a red skin but *white flesh*, a sugar is obtained in some parts of France and the Netherlands. The practice of obtaining sugar from beet in France, was begun during the late war, when our colonial produce was prohibited. From one hundred and ten pounds of the root forty-one pounds and a half of juice were obtained; this, by evaporation and purification, produced four pounds of well grained white sugar. From the residuum was obtained several quarts of spirit somewhat similar to rum. But the manufacture of beet sugar is now, it is said, on the decline.

The SEA BEET (*Beta maritima*) is, or may be used, as a spinach plant, or as greens. It is a native of our own sea coasts.

538. *MANGEL WURZEL, or ROOT of SCARCITY, is a variety of Beta cicla, or White Beet, with large and red-veined leaves; those arising from the root being on footstalks, and those of the stem being without stalks, and the flowers growing in threes.*—*Sex. Syst.* Pentandria Digynia.

The farmers, in some parts of Germany, cultivate this plant as food for cattle, and they are said to prefer it for that use to potatoes, turnips, carrots, and indeed to most other vegetables. It was introduced to public notice in England by the late Dr. Lettsom; and it has been strongly recommended, not only for the feeding of cattle, but also for the use of man. Both the *leaves* and *root* grow to a very large size. The former may be eaten as spinach. The

root is insipid and unpalatable ; but the *stalks*, and the stronger middle part of the leaves (midrib), may be stewed, or eaten plain-boiled as asparagus, in which state it is called *chard*.

NAT. ORD. 41. SANTALACEÆ. *R. Brown.*—THE SAUNDERS-WOOD TRIBE.

539. SANDAL WOOD, or YELLOW SAUNDERS, is a yellowish, odoriferous wood, which is imported from the East Indies in logs or short pieces, chiefly as a perfume, or for the manufacture of ornamental articles.

The tree that produces it (*Santalum album*) grows principally on the coast of Malabar, and in the island of Timor. It has somewhat the appearance of a large myrtle, with stiff branches, and smooth, shining, spear-shaped leaves, each about two inches long. The flowers grow in clusters, small and red, and are succeeded by berries about the size of peas.—*Sex. Syst.* Tetrandria Monogynia.

When the tree is cut down, it is stripped of its bark ; after which the wood is usually chopped into billets or small pieces, and buried in a dry place for about two months. During this time the ants, it is said, eat the outer part of it, without penetrating to the heart-wood (*duramen*), which is the sandal. The billets are then taken up, smoothed, and sorted ; the deeper the colour, the higher is found the perfume. It is manufactured into musical instruments, cabinets, &c.

In China this wood is sometimes made into coffins for the principal persons ; and such coffins are said to resist the effects of air and moisture for many years. The Chinese also reduce the wood to powder, and with the addition of water convert it into a paste, which they apply to their bodies, their furniture, &c., as a perfume. The powder of sandal-wood is likewise employed as an incense in their idolatrous temples. Hence a considerable trade in this wood exists between the East Indies and China.

Besides the logs, the chips and cuttings of the roots of sandal-wood are an article of commerce. From these chips, and from the waste wood, an odoriferous oil is sometimes obtained, which is considered nearly equal in fragrance to oil of roses.

The medicinal qualities of this wood are very trifling. It has a bitterish aromatic taste, accompanied by a degree of pungency which is by no means unpleasant.

NAT. ORD. 40. JUGLANDACEÆ. *Lindl.*—THE WALNUT TRIBE.

540. The WALNUT is a well-known shell fruit, produced by a tree (*Juglans regia*, Pl. 6. Fig. 69), which grows wild in the northern parts of China and Persia, and has winged leaves; the leaflets, about nine in number, large, oblong, smooth, thick, and the end one with a stalk. It is propagated by budding and grafting, as well as by seed.—*Sex. Syst.* Dodecandria Digynia.

Although greatly admired, both for the beauty of its foliage, and for the excellence of its fruit, the cultivation of the walnut-tree in England is by no means attended to so much as it was formerly, when its wood was considered the most ornamental timber produced in our island. It is pleasingly veined, and admits of a fine polish, but its colour is much less rich than that of mahogany; and consequently, except for the making of gunstocks, it has, of late, been wholly superseded by that more favourite wood. On the Continent, however, the walnut-tree is still in request for furniture of various kinds.

The outside green shells of the nuts, as well as the root of the walnut-tree, are employed in dyeing.

The fruit of the walnut-tree is covered externally with a thick and smooth green husk, the juice of which stains the fingers black. In an unripe state, before the shells are formed, it is often pickled; with its juice is made a ketchup. An extract made from the unripe fruit is considered of use for the destruction of worms.

Walnuts become ripe about the beginning of October. The kernel, which is covered with a tough, yellow, and bitter skin, is more esteemed than that of either the hazelnut or filbert. It yields, on pressure, a sweet oil, which, in quantity, amounts to about half the weight of the kernel, and is of a very drying character.

There are several varieties of walnut, which are well known to the cultivators of that tree. The county of Kent abounds in walnut-trees.

541. The **HICKORY NUT** (*Juglans alba*) is a North American species of walnut, the shell of which is very hard, does not split asunder like that of the walnut, and is of a smoother and lighter colour.

Its kernel is sweet and well tasted, and affords a considerable portion of oil.

NAT. ORD. 39.—CUPULIFERÆ. Rich.—THE NUT TRIBE¹.

542. The **COMMON** or **EDIBLE CHESNUT** (*Castanea vesca*, Pl. 6. Fig. 65), is a stately tree, which grows wild in some of the southern and western parts of England, and is distinguished by having spear-shaped and pointed leaves, with tapering serratures at the edge.

The flowers appear, in long hanging spikes or clusters, about the month of May; and the fruit, which is ripe about the end of September, is enveloped in a husk defended by a great number of complicated prickles.

Notwithstanding the long life of the oak, it is probable that the chesnut exceeds it; the celebrated chesnut tree, at Tortworth, in Gloucestershire, known as a boundary mark in the reign of King John, is supposed to have then been more than 500 years old, making its age at this time to exceed 1100 years. The diameter of its trunk is fifteen feet, and it still continues to bear fruit.

Few of our forest trees are more beautiful than the chesnut. Although the generality of painters prefer the oak for its picturesque form, in the landscapes of Salvator Rosa, and other celebrated masters, chesnut-trees are very conspicuous.

The *timber* of this tree was formerly much in use. The beams and rafters of many of our most ancient churches are formed of it; and its appearance so nearly resembles that of the oak, that it requires the eye of a good judge to distinguish them from each other. For the heads and staves of casks, the wood of the chesnut is considered peculiarly excellent; and pipes, made of it for the conveyance of water under ground, are said to be more durable than those either

Also called **CORYLACEÆ** by Mirbel.

of elm or oak. For furniture it may be stained so as somewhat to resemble mahogany. Hop-poles, and poles for espaliers and dead fences, made of young chesnut-trees, are preferred to most others.

The chesnut is consumed as food by the poorer classes on the Continent, particularly by those of Spain and Italy; when dried and powdered, it is no mean substitute for flour, in bread and puddings. Chesnuts are imported into this country in considerable quantities, both from France and Spain, and are roasted and eaten in desserts: those which are grown here being much smaller than what we receive from abroad. On the Continent they are sometimes used for making starch, and in the bleaching of linen.

A great number of very fine chesnut-trees are in *Greenwich park*.

543. *HAZEL-NUTS* are the well-known fruit of a native shrub (*Corylus avellana*, Pl. 6. Fig. 67), which grows in hedges and thickets.

The *FILBERT*, of which there are five varieties, is a variety only of the hazel; the *Frizzled filbert* is esteemed the best. The *filbert* is cultivated almost everywhere in this country, particularly in orchards and in kitchen-gardens. Both that and the hazel are propagated by suckers — *Sex. Syst.* Octandria Digynia.

Each of these kinds of *nuts* is much esteemed, but particularly the latter; the flavour of its kernels being very delicious. They are, however, said to be very difficult of digestion, and when eaten in considerable quantities, sometimes produce very unpleasant effects. The oil obtained from hazel-nuts by pressure is little inferior in flavour to that of almonds, and, under the name of *nut-oil*, is often used by painters.

If nuts be put into earthen pots and well closed, and afterwards buried eighteen inches or two feet deep in the earth, they may be kept sound through the winter. A pan in a moist cellar also preserves them well through the winter.

Hazels are planted in coppices and hedge-rows for several purposes; but particularly to be cut down, periodically, for charcoal, for poles, fishing-rods, &c. Being extremely tough and flexible, the branches of the hazel are used for making hurdles, crates, withs or bands, and springles to

fasten down thatch ; handles for implements of husbandry ; and, when split, are bent into hoops for casks. Charcoal made from hazel is much in request for forges ; and, when prepared in a particular manner, is used by painters and engravers to draw their outlines.

In countries where yeast was scarce, it was not unusual to twist loosely together the slender branches of this shrub, and to steep them in ale-yeast during its fermentation. They were then hung up to dry ; and, at the next brewing, were put into the wort instead of yeast. The *roots* are used by cabinet makers for veneering ; and, in Italy, the *chips* of hazel are sometimes put into turbid wine for the purpose of fining it.

The amount of Customs duty paid on nuts, imported into this country in 1839, was 18,337*l.*

544. The *HORNBEAM* (*Carpinus betulus*, Pl. 7. Fig. 73), is a native of our woods, which grows to a considerable height, yet seldom exceeds fifteen or eighteen inches in diameter, has smooth white bark, marked with grey spots, and leaves about three inches long and two broad, oval, pointed, and serrated.—*Sex. Syst.* Dodecandria Digynia.

As a timber-tree the hornbeam is more esteemed on the Continent than in this country. It grows readily in stiff soils, particularly on the sides of hills ; and is easily transplanted. The *wood*, which is white, hard, and tough, is used by turners ; and is wrought into cogs for mill-wheels, screw-presses, the heads of beetles, handles of working tools, and other instruments and machinery in which great strength is required. As fuel it is preferred, on account of its readier inflammability, than that of most other kinds of wood. The *inner bark* is used, in some countries, for dyeing yellow.

From the foliage of the hornbeam being luxuriant, and admitting of being clipped, without injury, into any of those forms which the old French garden style required, this tree was formerly much more planted in England than it is at present. It preserves a great portion of its withered leaves through the winter ; and, if properly planted as a hedge, it forms an excellent fence. The German husbandman, when he erects a fence of hornbeam, throws up a parapet of earth, with a ditch on each side, and plants his sets (which he

raises from layers) in such a manner that every two plants may be brought to intersect each other, in the form of a St. Andrew's cross. In that part where the plants cross, he scrapes off the bark, and bends them closely together with straw. In consequence of this operation the two plants consolidate into a sort of indissoluble knot, and push, from the place of junction, horizontal slanting shoots, which form a living palisado or *chevaux de frise*; so that such a protection may be called a rural fortification. These hedges, being annually and carefully pruned, will, in a few years, become impenetrable in every part. It is not uncommon in Germany, to see the high roads thus guarded for many miles together. Great advantage might be derived from adopting this plan in many parts of our own kingdom.—(See the account of a *natural living fence*, p. 57 of this volume.)

545. The BEECH (*Fagus sylvatica*, Pl. 6. Fig 64) is an indigenous forest tree, known by its waved and somewhat oval leaves, and its triangular fruit, consisting of three cells, and enclosed, by pairs, in a husk which is covered with simple prickles.—Sex. Syst. Dodecandria Trigynia.

There are beech woods in many parts of England, but the trees flourish best in rich, calcareous soils. These woods, it has been observed, are peculiarly dry and pleasant to walk in; and under their shade afford to the botanist many interesting plants, such as the bird's nest (*Monotropa Hypopitys*), winter green (*Pyrola minor*, &c.), and some rare *Orchideæ*. Beech-trees bear lopping well, and may be trained so as to form lofty hedges, which are the more valuable for shelter, as the leaves, though faded, remain through the winter, and the twisted branches may be formed into a very strong fence.

The wood is hard and brittle; but if exposed to the air it soon decays. It is, however, peculiarly useful to cabinet-makers and turners. Carpenters' planes, tool-handles, and mallets, are made of it. When split into thin layers it is used to make scabbards for swords. Chairs, bedsteads, and other furniture, are frequently formed of beech.

The fruit, *beech-mast*, ripens in September, and is palatable to the taste; but if eaten in great quantity it occasions giddiness and head-aches; but when dried and powdered, it

may be made into a wholesome bread. It is readily eaten by deer and swine. The inhabitants of Scio, one of the Ionian Islands, were once enabled to endure a memorable siege by the beech-mast which their island supplied. This fruit has occasionally been roasted and used as a substitute for coffee. It yields a sweet and palatable *oil*, which is, it is said, equal in quality to the best olive-oil, and has the advantage of continuing for a greater length of time without becoming rancid. It is expressed in several parts of France; and is used by the lower classes of Silesia instead of butter. The cakes which remain after the oil is extracted are a wholesome food, and may also be advantageously employed for the fattening of swine, poultry, and oxen.

In France the *leaves* are used by the country people instead of straw for their palliasses.

546. The OAK (*Quercus Robur*, Pl. 6. Fig. 68) is a well-known timber tree, of native growth in this country, as well as other countries in northern temperate climates. It is sometimes more than seventy feet high. Several varieties are cultivated.—*Sex.* Octandria Tetragynia.

It is to this valuable tree that our navy is indebted in a measure for its existence; and without it this invincible barrier of the country could hardly be supported. *Oak timber* being hard, tough, tolerably flexible, and not very liable to splinter, is in Europe preferred to every other kind for the construction of ships of war. It is also well adapted to every purpose of rural and domestic economy, particularly for staves, laths, and the spokes of wheels. Until the introduction of mahogany it was very generally used for furniture; and in large mansions it was customary even to line the walls of rooms with *wainscot*, or panelling of oak. The *Quercus sessiliflora*, another British species, is said by some to yield a superior wood to the *Q. Robur*.

This tree is remarkable for the slowness of its growth, for its great longevity, and the dimensions to which it attains. It is stated that an oak belonging to Lord Powis, and growing in 1764 in Bromfield Wood, near Ludlow, measured sixty-eight feet in girth and twenty-three feet in height, and contained in the whole 1455 feet of timber.

Oak timber is usually felled in the spring, because the bark is then most readily separated from it. There is, however, great reason for believing that oak felled in the *winter* is considerably more lasting: indeed, it has been said, that the *dry rot* in our ships of war is to be principally attributed to oak being now always felled in the spring, in order that the bark may be more readily stripped off. At any rate oak timber, after being felled, ought to be thoroughly dried before it is used.

Oak bark is extensively used in the tanning of leather; it afterwards serves as fuel, and for making hot-beds for the growth of pines and other plants. The astringent properties of oak bark render it of use for medical purposes. The *saw-dust* of this tree, and even the *leaves*, though much inferior to the bark, have been found useful in tanning. The former of these is the principal vegetable production of this country which is used in the dyeing of fustian.

Acorns, the seeds of the oak, possess an astringent quality, and have a bitter taste, both of which may be extracted by steeping them for some time in cold water, or by boiling them. After this simple process they are not unpalatable. With the Ancient Britons they constituted an important part of their food; and there can be little doubt that, carefully prepared, dried, and reduced to powder, they might in times of scarcity be adopted as a substitute for bread-corn. An oil can be obtained from them which may be used for lamps; and a kind of coffee is prepared from them in some parts of the Continent.

The branches of the oak, as well as those of several other kinds of trees, are burned for the formation of *charcoal*; the durability of the leaves of oak and others which remain on the ground for a long time without decaying, is owing to the *carbon* (48) they contain; and it is a remarkable circumstance that the properties of charcoal, from whatever wood it may be made, are nearly the same; one of which is that it is not liable to decay by age. Hence it was customary with the ancients (and is so also at the present day) to char or burn the outside of stakes, or other wood, which were to be driven into the ground, or placed in water. Charcoal remains without injury for an almost indefinite length of time. In the ancient tombs of the inhabitants of northern

nations, entire pieces of charcoal are at this day frequently discovered.

Besides the great use of charcoal in the composition of gunpowder, and to artists and manufacturers of different kinds, it was formerly employed with considerable success in correcting the rancid and disagreeable smell of train oil, so as to render it fit to be burned in chamber lamps. Newly-made charcoal, if rolled up in clothes which have contracted a disagreeable odour, will effectually destroy it: and if boiled with meat beginning to putrefy will take away the taint; this is particularly the case with animal charcoal (48).

This substance is used by artists in the polishing of brass and copperplates, for the drawing of outlines, and numerous other purposes. When purified it forms, perhaps, the best tooth-powder known. The mode of purifying it is to reduce it to powder, wash it repeatedly with water, and then dry it by means of a strong heat in close vessels.

The vapour of burning charcoal (carbonic acid, 26) is extremely pernicious; persons exposed to it in confined rooms are liable to be suffocated in a very short time. Under such circumstances expose them to the strongest draught of cold air, loosen all their garments, and apply volatile spirits to their nostrils, and cold water or snow to their bodies.

On the shoots of the young boughs of the *Quercus infectoria*, or DYERS' OAK, a native of Asia Minor, are formed, in consequence of the puncture of insects (the *Cynips quercifolia*), as the lodgment for their eggs and a habitation for their future young, the well-known substances called GALLS, so much used in dyeing black colours, and in making ink, as well as occasionally in medicine.

The Chapel-oak, growing in the Cemetery of Allonville, is estimated to be about 800 years old. The trunk is hollow; in 1696 a chapel was erected in it, the interior of which is upwards of twelve feet across; the entrance is by a flight of steps (*Mem. Soc. Linn. Par.* 1822. Vol. i. Pl. 12)

From the *Quercus tinctoria*, or QUERCITRON OAK, a native of North America, is obtained the *Quercitron bark*, which dyes a rich golden yellow.

547. *CORK is the external bark of a species of oak (Quercus Suber) which grows in Spain, Portugal, and the south of France ; and is distinguished by the spongy texture of its bark, and by its leaves being evergreen, oblong, somewhat oval, downy underneath, and waved. The cork is usually stripped off the tree every eight or ten years ; such a procedure is said to be essential to the life of the tree.—Ser. Syst. Octandria Tetragynia.*

The chief of the cork consumed in Europe is obtained from Catalonia, in Spain ; the culture and the preparation of it yield to the inhabitants of that province nearly 250,000*l.* per annum.

In the collecting of cork it is customary to slit it with a knife, at certain distances, in a perpendicular direction from the top of the trees to the bottom ; and to make two incisions across, one near the top and the other near the bottom of the trunk. For stripping off the bark, a curved knife with a handle at each end is used. Sometimes it is stripped in pieces the whole length, and sometimes in shorter pieces. In some instances the perpendicular and transverse incisions are made, and the cork is left upon the trees until, by the growth of the new bark beneath, it becomes sufficiently loose to be removed by the hand.

After the pieces are detached they are soaked in water ; and when nearly dry are placed over a fire, which blackens their external surface, and renders them smooth, all the small blemishes being thereby concealed ; the larger holes and cracks are filled up by the artful introduction of soot and dirt. The pieces are next loaded with weights to make them even ; and lastly they are dried, stacked, or packed in bales for exportation.

Many of the uses of cork were well known to the ancients. Its elasticity renders it peculiarly serviceable for the stopping of vessels of different kinds. Its use for stopping glass bottles is generally considered to have been introduced about the fifteenth century. The practice of employing this substance for jackets to assist in swimming is very ancient ; and it has lately been applied in various ways towards the preservation of life, when endangered by shipwreck. The floats of nets used for fishing are frequently made of cork : pieces fastened together make buoys, which,

by floating on the surface of the water, afford direction for vessels in harbours, rivers, and other places. In some parts of Spain it is customary to line the walls of houses with cork, which renders them warm and dry. The ancient Egyptians sometimes made coffins of it. Cork is used for false legs; it is also sometimes placed betwixt the soles of shoes to keep out moisture. When burnt it constitutes *Spanish black*.

In the cutting of *cork*, the only tool employed is a broad, thin, and sharp knife; and as the cork tends very much to blunt this, it is sharpened upon a board by one whet, or stroke on each side, after every cut; and now and then upon a common whet-stone. The corks for bottles are cut in the lengthway of the bark, and consequently the pores lie across. Bungs, and corks of a large size, are cut in a contrary direction: the pores in these are therefore downward, a circumstance which renders them much more defective in stopping out the air than the others. The parings of cork are sold to the makers of Spanish black.

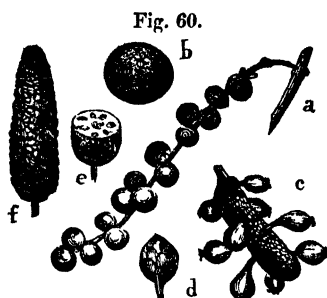
The amount of Customs' duty paid on cork in 1839, was 25,806*l*.

NAT. ORD. 38. PIPERACEÆ. *Kunth*.—THE PEPPER TRIBE.

548. *BLACK PEPPER* is the dried berry of a climbing plant (*Piper nigrum*), Pl. 1. Fig. 3) which grows in the East Indies, and in most of the islands of the Indian Sea.

Its stem has numerous joints, and throws out roots at every joint. The leaves, which are somewhat egg-shaped, and pointed, are of a brownish colour, and have each seven very strong nerves. The flowers are small and white.—*Sex. Syst.* Diandria Trigynia.

In the cultivation of pepper it is customary to mark out the grounds into regular squares of about six feet each, which is the usual distance allowed for the plants; and as these have not sufficient strength to support themselves in an upright growth, they are generally placed near a thorny kind of shrub, among the branches of which they creep like ivy. When they have run to a considerable height, the twigs, on which the berries hang, bend down, and the fruit



The black, long, and Cubeb Peppers.

appears in long, slender clusters (Fig. 60. a) of from twenty to fifty grains, somewhat resembling, but much more compact than, bunches of currants. The berries are green when young, but change to a bright red colour when ripe. As soon as they begin to redden, they are in a fit state to be gathered. When gathered, they are spread upon mats in the sun, where they are suffered to remain till they become dry, black, and shrivelled, as we see them. In this state they have the denomination of *black pepper*. (Fig. 60. b.)

White pepper is nothing more than the best and soundest of the berries, gathered when they are fully ripe, and stripped of their external coat or skin. To effect this they are steeped for about a week in salt water, by the end of which time the skins burst. They are then dried in the sun, rubbed between the hands, and winnowed. Thus cleared from their skins, they are rendered smaller and more smooth than black pepper.

As the acidity of pepper lies principally in the skin, this kind becomes, of course, much less pungent than the other; but it has one recommendation, that it can be made only of the best and soundest grains, taken at their most perfect state of maturity.

Pepper is an article of considerable traffic between this country and the East Indies. That which is imported from Malabar is considered better than any other. The quantity of pepper vended at the East India Company's sales has, in some years, exceeded six millions of pounds weight, of which seven or eight hundred thousand pounds have been retained for home consumption.

Both black and white pepper are in daily use, not only as a spice, but also in cookery. When coarsely ground, pepper is eaten with peas, cabbages, cucumbers, and other flatulent and cold vegetables; and occasionally also with fish. It is sometimes employed in medicine as a stimulant.

Pepper used to be much more adulterated than it now is, it being sold at the present time under the supervision of the Excise. In 1836, the duty of one shilling per pound, was paid on 2,169,438 pounds. The amount of Customs' duty paid on pepper, in 1839, was 66,016*l*.

549. *LONG PEPPER* is the fruit of a slender climbing shrub (*Piper longum*) which grows in the East Indies.

It is of a cylindrical shape, about an inch and half in length, and a quarter of an inch in thickness (Fig. 60. e. f); and is formed by the union of a great number of small rounded grains. The shrub that produces it, has dark green and heart-shaped leaves, each with seven strong nerves.—*Sex. Syst.* Diandria Trigynia.

A considerable quantity of long pepper is annually imported into this country from Bengal and other parts of the East, for use, both in domestic economy and in medicine. It is found of two kinds in the shops; one is called *long pepper*, and the other *short long pepper*.

The inhabitants of India drink water in which long pepper has been infused, and esteem it a valuable remedy for some disorders of the stomach. They also distil an ardent spirit from it; and they pickle this fruit in vinegar, for use at table. The excitant properties of this and the former species are due to the presence of an *acrid fixed oil*.

The fruit that is collected for exportation is gathered before it is quite ripe.

550. *BETEL* is the leaf of a climbing East Indian plant (*Piper betel*) which belongs to the same tribe as pepper; and in shape and appearance is not much unlike that of ivy, but is more tender, and full of juice.—*Sex. Syst.* Diandria Trigynia.

There is an almost incredible consumption of betel over the whole continent of India. The inhabitants chew it almost incessantly, and in such quantity that their lips become quite red, and their teeth black, a colour greatly preferred by them to the whiteness which Europeans so much affect. They carry it in little white boxes about their persons, and present it to each other, by way of compliment and civility, in the same manner as the Europeans do snuff. This is done by women as well as by men; and it would be considered an offence, if those to whom it was offered should

refuse to accept of, and chew it. The leaves are sometimes used alone, but much more commonly covered with a kind of lime made of sea shells, and wrapped round slices of the *Areca* nut (436).

551. *CUBEB PEPPER* is the fruit of a shrubby climbing plant (*Piper Cubeba*), which has leaves, with foot-stalks, of an ovate, oblong rounded, or obliquely heart-shaped form at the base, with nerves, which are either leathery or smooth. The berries have long foot-stalks (Fig. 60. c. d).—*Sex. Syst.* Diandria Trigynia.

This plant, which is a native of Java, the Isles of Bourbon, France, and Guinea, is imported in some quantity into this country for medicinal purposes. This kind of pepper may always be distinguished in its natural state by the berries having a wrinkled surface, a blackish colour, and the presence of a footstalk, a pedicle to the fruit (Fig. 60. c. d), from which circumstance they have received the name of *tailed pepper*. The taste is acrid, warm, and camphorous; the odour is aromatic, and rather peculiar. Powdered Pimento (All-spice) is used to adulterate this drug when it is sold in the form of powder.

Cubeb was known in England in the time of Edward I. He granted to the Corporation of the city of London the power of levying a toll of one farthing a pound on this article in its passage over London Bridge, an account of which will be found at p. 155, of the "*Chronicles of London Bridge*."

The genus *Piper* contains numerous species besides the four preceding ones; many of them have been introduced into the stoves of this country, and are readily propagated by cuttings.

NAT. ORD. 37. SALICACEÆ. *Lindl.*—THE WILLOW TRIBE.

552. *WILLOW, OSIER, or WITHY*.—*Sex. Syst.* Dicœcia Diandria.

Of this very extensive genus, *Salix*, upwards of sixty distinct species have been discovered in our own island. The slender branches of many of these are much used for making baskets, birdcages, and what is called wicker-work;

springles for fastening down thatch, wheels or traps for catching lobsters and eels; hoops, crates, and for many other purposes. The *wood* is used for posts, stakes, &c., but when exposed to the weather it soon decays. It also furnishes shoemakers with cutting and whetting boards.

As willows generally flourish in wet situations, some of the species are planted with a view to prevent the banks of rivers and brooks from being washed away by floods.

The *bark* of the great round-leaved willow (*Salix caprea*), and that of some other kinds, has been tried with effect, as a substitute for Peruvian bark, in the cure of intermittent fevers. It is also useful in the tanning of leather; and, in combination with alder, for striking a deep black colour in the dyeing of linen.

The bark of other species may be manufactured into paper. Mr. Greaves, of Milbank, near Warrington, Lancashire, made, some years ago, fifteen reams of coarse paper from the bark of withy twigs, mixed with a few nettles. The latter, however, he afterwards discovered, would better have been left out. This paper was considerably cheaper than that which is made from ropes; and it was found that pasteboard, for book covers, made of withy bark, would be much cheaper than similar pasteboard manufactured from ropes. The process by which this paper and pasteboard were manufactured was as follows: the bark was stripped off from the twigs in September, the time at which they are usually cut for making white baskets; it was then hackled, like flax or hemp, and dried in the sun, which gave it somewhat the appearance of brown hemp; but this having been attended with considerable trouble, other parts of the bark were dried with the leaves, as they were stripped off from the twigs, and were then submitted to the operations of the paper-mill.

The flowering branches of one species, the *common grey willow* (*Salix cinerea*), are called palms, and are gathered by children, in many parts of England, on Palm Sunday.

The **WEeping Willow** (*Salix Babylonica*), a well-known ornamental tree, is a native of the Levant, and readily propagated by cuttings, as indeed most, if not all, of the willow tribe may be. The first weeping willow brought to this country is said to have been accidentally imported,

as a twig, in a basket of figs from Armenia, which was sent to the poet Pope.

553. *The ABELE, or GREAT WHITE POPLAR TREE* (*Populus alba*, Pl. 7.), is a British tree which grows in hedges and woods, near brooks, sometimes to the height of forty feet, and is known by its leaves being nearly triangular, irregularly jagged at the edges, of a dark green above, white-downy underneath. —Sex. Syst. Octandria Monogynia.

The quickness of growth of this tree is so great, that it will sometimes make shoots from eighteen to twenty feet in length in one year; and the trees attain their full growth in the course of twenty years. The *wood* is white and soft, but tough and of close grain, and not subject to warp or shrink. Hence it has been found useful for the flooring of rooms, and for making laths and packing-boxes. For turnery ware it is preferred to most other kinds of wood, on account of its peculiar whiteness, and the ease with which it is worked in the lathe. "Of this wood," says Evelyn, "people also made shields of defence, in sword and buckler days."

The *bark* of the abele-tree is said to be serviceable as a remedy in intermittent fevers; and Dioscorides vaguely informs us, that if it be chopped small and sowed in drills, well and richly manured, it will yield a plentiful crop of mushrooms. This however is contrary to principle.

554. *The ASPEN, or TREMBLING POPLAR* (*Populus tremula*), is a tree which grows in moist woods, to the height of fifty feet; has nearly circular leaves, which are toothed and angular at the edges, smooth on both sides, and attached to footstalks so long and slender as to be shaken by the slightest wind —Sex. Syst. Octandria Monogynia.

There is scarcely any situation in which the aspen will not flourish, but it succeeds best where the soil is moist and gravelly. Its *wood* is light, porous, soft, and of a white colour; and though inferior in excellence to that of the white poplar, is applicable to many useful purposes, particularly for field-gates, the frames of pack-saddles, for milk-pails, clogs, and the wood-work of pattens. It is improper for bedsteads, as it is liable to be infested by bugs. In

some countries the *bark* of the young trees is made into torches. It is a common opinion with the poorer classes of society in the country, that this was the tree of which our Saviour's cross was made, and on that account it is the leaves are never at rest. This motion, which the poet expresses,

“ Rustling turn, the many twinkling leaves of aspen tall,”

is due to the peculiar arrangement which exists between the footstalk and the limb of the leaf.

555. The **BLACK POPLAR** (*Populus nigra*, Pl. 7.) is a native tree of this country, known by its somewhat trowel-shaped leaves, which taper to a point, and are serrated, and smooth on both sides.—*Sex. Syst.* Octandria Monogynia.

This tree grows rapidly, and attains a considerable size. Its *wood* is soft and light, and in some respects useful to engravers; and is occasionally sawed into boards, though these are not in general much esteemed. The *bark* is so thick and light that it is not unfrequently used by fishermen as buoys or floats to support their nets. The inhabitants of Kamptschatka dry and pulverize the *inner rind* of the black poplar-tree, and use it as an ingredient in bread. The *buds*, when they first appear, are covered with and contain a viscous and fragrant juice, which may be advantageously used in plasters.

556. The **LOMBARDY or ITALIAN POPLAR** (*Populus dilatata*) grows wild in Lombardy and the northern parts of Italy, and is distinguished by its somewhat trowel-shaped and serrated leaves, being smooth on both sides, and wider than they are long: grows sometimes seventy feet high.—*Sex. Syst.*—Octandria Monogynia.

From its slender and perpendicular growth, the Lombardy poplar is found useful for hop-poles, and may be formed into masts for small vessels. The *wood*, which is soft and free from knots, is employed by joiners, carpenters, and cartwrights. It is recommended as peculiarly valuable for the floors of granaries, some persons believing it so obnoxious to insects, that weevils will not continue in such granaries. It may be wrought into very flexible shafts for

carriages, or felloes for wheels ; and not being liable to split, is peculiarly adapted for packing cases. The growth of this tree is so rapid, and the space of ground which it occupies is so small, that it is in almost universal request as an ornamental tree, in places that are not sufficiently spacious to admit of trees of more spreading form.

The CANADIAN POPLAR (*Populus monilifera*) should also be mentioned. It is a native of Canada, but grows freely in this country, and produces a useful wood. The wood of all the poplar tribe, as well as that of the willow and other fast growing trees, is not, however, calculated for exposure to the *weather*, where it soon decays, unless it happens to contain a preservative juice, analogous to the *turpentine* in most of the *pine* and *fir* tribes.

NAT. ORD. 36. PLATANACEÆ. *Lindl.*—THE PLANE TREE.

557. The PLANE-TREE (*Platanus orientalis*, Pl. 6. Fig. 71), a native of the Levant, is distinguished by having broad leaves, each with about five principal divisions, and these subdivided into smaller ones.—*Sex. Syst.* Polyandria Monogynia.

By the ancient Greeks and Romans the plane-tree was highly valued, on account of its grateful shade ; and the latter were much delighted by training it in such a manner as to admit of their sitting beneath its branches. Wherever they built their magnificent colleges for the exercise of youth, in the gymnastic arts, as riding, wrestling, running, leaping, throwing the discus, &c., and where also the gravest philosophers met to converse together and improve their studies, they planted avenues and walks of plane-trees for refreshment and shade.

Though now frequently planted in parks and pleasure grounds, the sycamore (567) is, in many instances, preferred to it. The plane, though a native of Asia and the southern parts of Europe, is very hardy, grows rapidly, and will flourish in any common soil, and in any aspect.

Its *wood*, at a certain age, becomes much veined ; and, consequently, is valuable for many kinds of domestic furniture, but particularly for tables.

SUB-CLASS I.—MANY-PETALLED PLANTS.

NAT. ORD. 35. AURANTIACEÆ. *Corr.*—THE ORANGE TRIBE.

558. The *CITRON*, *LIME*, and *LEMON*, are the fruit of different species of the genus *Citrus*, evergreen shrubs or trees, natives of Asia, and introduced into the southern parts of Europe in the earlier centuries of the Christian era.

The *citron* (*Citrus medica*) is oblong, with a very thick rind; the *lemon* (*Citrus limonum*) is oblong, with a small lump or protuberance at the end; the *lime* (*Citrus limetta*) has no protuberance, a very thin rind, and is about the size of a small egg. These are the principal marks of discrimination between these fruits, but they are not quite constant.

The *Lemon-tree* (Pl. 5. Fig. 56) has large and slightly indented shining leaves, of a somewhat oval shape, but pointed; and on the foot-stalks of the leaves there is no remarkable appendage. The flowers are large and white, but purplish on the outside of the petals.—*Sex. Syst.* Polyadelphia Polyandria.

It is generally supposed that the *citron-tree* was first introduced from Assyria and Media into Greece, and thence into the Southern parts of Europe, where it is now cultivated to considerable extent. It is also grown in the West Indies. The fruit, partaking of the same quality as the lemon, with the exception of being somewhat less acid, is seldom eaten raw; but, preserved in sugar as a sweetmeat, it is much used by confectioners and others. The principal consumption of citron is on the Continent, where it is also occasionally employed in medicine.

The *lemon-tree* is a native of Upper Asia, whence, like the citron, it was brought into Greece, and afterwards transplanted into Italy. Lemons are imported in chests from

the Azores, Portugal and Spain (the latter are the most esteemed); each fruit is wrapped in paper. The *juice*, which is one of the sharpest and most agreeable of all acids, is used in cookery, confectionary, and medicine. By calico-printers, as a discharger of colour, and in various other ways. Its juice is procured by simply squeezing the fruit, and straining it through linen or any loose filter: in Sicily, and other parts of the Mediterranean, it forms an important article of commerce. Being a valuable remedy for the scurvy, it generally constitutes part of the sea-store of ships that are destined for long voyages, but is very liable to decompose owing to the mucilage and extractive matter it contains.

Several modes have been recommended for preserving lemon juice. One of these is, to put it into bottles with a small quantity of oil, which, floating on the surface, prevents the immediate contact of the air, and retards the decomposition of the acid. Owing to its proneness to spoil, an *artificial lemon-juice* has been recommended for use at sea; it consists of sixteen ounces of water to eight and a half of citric acid, to which add as much of the oil of lemon as will give it a proper flavour. In the East Indies lemon juice is sometimes evaporated, by a gentle heat, to the consistence of a thick extract. Lemon-juice is advantageously employed in the formation of effervescing draughts. The relative proportions of the citric acid, lemon-juice and alkalies are here given according to Pereira.

<i>Citric acid.</i>	<i>Lemon-juice.</i>	<i>A scruple of alkali.</i>
Grains 14	or 3½ fluid drachms	Bicarbonate of potash.
Grains 17	— 4 fluid drachms	Carbonate of potash.
Grains 24	— 6 fluid drachms	Sesquicarbonate of Ammonia.

In its purest state *citric acid* is a crystallized solid, and thus should be obtained in the shops; but what is sold under the name of *essential salt of lemons*, for taking out ink-stains and iron-mould spots from linen, is a preparation from the salt of sorrel. (*Binoxalate of potash.*)

The external part of the *rind* has a grateful, aromatic, and bitter taste, which renders it useful in cookery. When dried it is considered a good stomachic, promotes the appetite, and is otherwise serviceable as a medicine. It is often

candied and used as a sweetmeat. Lemon peel yields an oil, which in smell is nearly as agreeable as the fresh peel, and is frequently employed as a perfume, under the name of *Essence of Lemon*.

Lemons are sometimes preserved in syrup. Small ones with thick rinds are converted into a grateful pickle; and a marmalade and syrup are also made of them. For the purpose of keeping the fruit, it is recommended that a fine packthread about a quarter of a yard long, should be run through the protuberance at the end of the lemons: the ends of the string are to be tied together, and suspended on a hook in an airy situation, and in such a manner that each lemon may hang perfectly free and detached.

The cultivation of the *lime* is much attended to in several parts of North America and the West Indies. Its juice is a more grateful acid than that of the lemon, which is there in little repute, and is, comparatively, but seldom seen. A plate of limes is said to be a constant dish at entertainments in the West Indies; the juice is used for all the same purposes as that of lemons is with us. In 1839 the duty of one halfpenny per gallon was paid on 37,388 gallons of lime and lemon juices.

559. *ORANGE* (*Citrus aurantium*, Pl. 5. Fig 55). *The difference between orange and lemon-trees is immediately known by the former having a kind of winged appendage on the leaf-stalks, of which the latter are destitute. The orange is a native of Asia. It has been cultivated in England since the year 1621. It is said that the orange-trees at Margram in Glamorgunshire have been there since the time of Henry VII.; they are the largest in Britain.—Sex. Syst. Polyadelphia Polyandria.*

It is said that the first orange-tree introduced into Europe was sent as a present, from some part of Asia, to the Conde Mellor, prime Minister of the King of Portugal. It was the only one, of a great number which were contained in the same chest, that survived; and it became the parent stock of multitudes of subsequent trees.

The delightful perfume of an orange grove is such as to scent the air for miles, the *flowers* appear in succession during the whole of summer; and flowers and ripe fruit are found on the same tree. Orange flowers are valued as a perfume, and yield their flavour to rectified spirits; and in distillation both to spirits and water. In Portugal and

Italy a fragrant red-coloured oil is obtained from them, which, by some persons, is considered of a more delicate and agreeable perfume than even attar of roses.

“Many of the trees in one garden at the Azores are a hundred years old, still bearing plentifully a highly prized thin skinned orange, full of juice, and free from pips. The thinness of the rind of a St. Michael's orange, and its freedom from pips, depend on the age of the tree. The young trees, when in full vigour, bear fruit with a thick pulpy rind, and an abundance of seeds; but as the vigour of the plant declines, the peel becomes thinner, and the seeds gradually diminish in number until they disappear altogether. Thus the oranges that we esteem the most, are the produce of aged trees, and those which we consider the least palatable come from plants in full vigour.” (*A Winter in the Azores*).

The *juice* of the orange, when ripe, and of a good kind, is extremely sweet, grateful, and wholesome. In fevers, and other complaints, it is of considerable use for allaying heat and quenching thirst; and in scurvy it has been found a very valuable remedy.

In cookery and by confectioners, oranges are used in numerous ways; for marmalade, in biscuits, cheesecakes, jelly, puddings, and tarts; and an agreeable wine is prepared from oranges, with water, sugar, and some other ingredients. The amount of Customs duty paid in 1839 on oranges and lemons, was 64,327*l*.

Essence of Bergamot is a well-known perfume, obtained from the rind of an orange, *Citrus Bergamis* (Risso), much cultivated near the town of Bergamo in Italy; whence it has obtained its name. The rind is cut into small pieces, and the oil is distilled or pressed out into glass vessels. Sometimes a fragrant water is distilled from the peel.

Seville Oranges, the fruit of the *Citrus Vulgaris* (Risso), are large, dark-coloured and rough skinned, with an acid juice, and are employed in domestic economy; the rind is intensely bitter, and esteemed a stomachic, either dried or as a *conserve*. It is besides preserved in various ways; *candied orange-peel* and *orange-chips* are well known in puddings and in desserts.

560. *The SHADDOCK* (*Citrus decumana*) is a yellowish green fruit, of the orange kind, as large as the head of a child, with twelve or more cells, and contains a red or whitish pulp. It is a native of the East, whence it was carried to the West Indies by Capt. Shaddock, and thence derived its name.—*Sex. Syst.* Polyadelphia Polyandria.

In hot climates the shaddock is much esteemed on account of its agreeable flavour, which is a pleasant mixture of sweet and acid. It is safely eaten, even in considerable quantities, and is esteemed very salubrious. The rind is thick, and has a disagreeable bitterish taste. This fruit sometimes weighs as much as fourteen pounds.

NAT. ORD. 34. CEDRELACEÆ. *Lindl.*—THE MAHOGANY TRIBE.

561. *MAHOGANY* is the wood of a well-known tree (*Swietenia Mahogani*, Pl. 4. Fig. 44) of large dimensions, which grows in Jamaica, Honduras, Cuba, St. Domingo, and the Bahama Islands.

The branches of this tree are numerous and spreading. Its leaves are alternate and winged, with four or five pair of leaflets, which are somewhat spear-shaped. The flowers are numerous, small, white, and in spikes or clusters, which arise at the junction of the leaves with the branches. This tree sometimes grows to the height of eighty feet.—*Sex. Syst.* Decandria Monogynia.

The cutting of mahogany constitutes a principal occupation of the British settlers in the vicinity of Honduras. The gangs of negroes employed in this work consist of from ten to fifty each, one of whom, styled the "huntsman," is generally selected from the most intelligent of his companions; his chief employment is to search for these trees in the woods, the principal of which lie adjacent to the river Balize. About the beginning of August, the huntsman is despatched into the woods, and he cuts his way through the thickest parts, to the highest spots he can find. Here he climbs the loftiest tree, and thence attentively surveys the surrounding forest. At this season the leaves of the mahogany trees are of a reddish yellow hue, and an eye accustomed to them can discover, at a great distance, the places where they are most abundant. He now descends, and to such places directs his steps; and having well

marked the way, returns to his companions, to point out the places to them, to which they proceed and set to work.

After the branches are lopped, and the useless parts of the wood are cut off, the trees are conveyed, with great difficulty, by cattle and trucks, to the water's side. A sufficient number of pieces to form a raft being here collected, they are pushed from the bank into the water, and suffered to float singly upon the current to large cables which are placed across the river at some distance below. As numerous gangs of mahogany cutters are usually employed near the banks of the same river, their trees also float to the same spot. Here, therefore, the whole are collected, amounting sometimes to more than a thousand immense logs; and, each party claiming his own, the trees are formed into separate rafts for their final destinations.

The profit of cutting mahogany at this settlement is very great. A single tree has occasionally produced upwards of 1,000*l.* sterling.

The body of the tree is of course the most valuable; but for ornamental purposes, the limbs or large branches are generally preferred, their grain being much closer, and their veins being more rich and variegated than those of the other parts.

The Honduras mahogany is considered inferior to that now produced in Jamaica, where it was formerly much more abundant and consequently much less expensive than it is now, because the low lands have gradually been thinned of such trees as could readily be carried to market, or conveyed on board vessels for exportation.

The best mahogany is that which grows on the most rocky soils, such being the more curiously veined: a very superior kind is said to come from St. Domingo and the Bahamas.

Mahogany was first introduced into England in 1724. Since this period it has been in very general request for making the more valuable kinds of household furniture, &c. In Jamaica, mahogany is employed as a strong and durable timber for beams, joists, planks, and boards. Many attempts have been made to stain other kinds of wood so as to resemble it, but none of these have been attended with complete success.

It has been for some time ascertained that the *bark* of

the mahogany tree may be employed in medicine, as a substitute for Peruvian bark.

Another species of mahogany (Swietenia febrifuga), or FEBRIFUGE MAHOGANY, grows in the East Indies, is also a very lofty tree, and similar in appearance to the preceding. Its wood is remarkably hard, heavy, and durable, and is used in India for various purposes. Its bark is bitter and astringent; in India it is employed in the cure of agues and other complaints; but it is little known in Europe.

NAT. ORD. 33. ERICACEÆ. Lindl.—THE HEATH TRIBE.

562. *The COMMON HEATH, or LING (Calluna vulgaris), is a well-known plant, with numerous small rose-coloured flowers, which grows wild on heaths and mountainous wastes, in nearly every part of England. There are two varieties; one with white, the other with double flowers.—Sex. Syst. Octandria Monogynia.*

The principal use to which the heath is applied, is for making brooms, or besoms. It is likewise bound into fagots, and employed as fuel, particularly for ovens; and is, not unfrequently, employed in the filling up of drains and the morassy parts of roads, previously to their being covered with earth, stones, and other durable materials.

In the Highlands of Scotland, the poorer inhabitants make walls for their cottages with alternate layers of heath and a kind of mortar made of black earth and straw: they likewise thatch their cabins with it, and make their beds of it. The inhabitants of Islay, one of the western islands of Scotland, are said to brew a wholesome kind of beer from one part of malt, and two parts of the young tops of heath. The *stalks* and *tops* may be rendered of considerable service in the tanning of leather; and in dyeing woollen cloth an orange colour. Bees are partial to the *flowers*; but the honey which they form, after having fed upon these flowers, acquires a brown colour and an indifferent taste. The *leaves* and *seeds* of heath afford a grateful food to grouse, and other animals.

NAT. ORD. 32. *ÆSCULACEÆ*. Lindl.—THE HORSE CHESTNUT
TRIBE.

563. *The HORSE-CHESTNUT* (*Æsculus Hippocastanum*, Pl. 6. Fig. 66) is a very common tree in parks and pleasure grounds, bearing leaves each composed of seven large lobes; and having large and elegant clusters of light-coloured flowers.

Each flower consists of five petals of a white colour, irregularly spotted with red and yellow; they are roundish, but undulated or waved at the edges. The fruit, which is of a bitter and unpleasant taste, is enclosed in a round kind of capsule or seed vessel, beset with spines, and divided into three cells.—*Sex. Syst.* Heptandria Monogynia.

There is no tree of British growth more admired, or more deserving of admiration on account of its brilliant appearance at a very early season of the year, than the horse-chestnut. Its beautiful flowers, in upright conical spikes, terminate the branches on all sides, in such a manner that sometimes almost the whole tree appears as if it were covered by them, each flower having not only the appearance but the smell of a fine hyacinth.

Horse-chestnuts have been found of considerable use in the fattening of cattle, the tallow of which it is said to render peculiarly firm. For this purpose, however, as well as for the feeding of sheep, it has been considered advantageous to macerate them in lime water, or in caustic alkali, to deprive them of their bitterness; and, afterwards, to wash them in water, and boil them into a paste. Goats and deer are partial to these nuts; but they are said to be unwholesome for swine. In Turkey they are ground and mixed with provender for horses; and, if they could be wholly divested of their bitterness and acrimony, it is supposed they might be converted into bread. Starch may also be obtained from them; and a paste or size has been manufactured, which is preferred by bookbinders, shoemakers, and paper-hangers, to that made from wheaten flour. They contain a soapy quality, and are used, in some parts of France and Switzerland, for cleaning woollens, and for the washing and bleaching of linen; and, if ground and made into cakes or balls, it is supposed they might answer the purpose of soap, both in washing and fulling. The nuts, dried and powdered, have been recommended as a sort of

snuff in complaints of the eyes. The prickly *husks* may be advantageously employed in the tanning of leather.

The *wood* of the horse-chestnut tree is white, soft, and of little value. It, however, serves occasionally for water-pipes, for mill-timber, and turners' ware. And if it be dipped into scalding oil, and well pitched, it becomes extremely durable. On the Continent the *bark* of this tree is used in the cure of intermittent and other fevers; some writers have considered it superior to the Peruvian bark.

This tree was first brought into Europe from the northern parts of Asia, about the year 1550: its growth is so rapid, that trees, raised from nuts, have, in twelve or fourteen years, attained nearly their full dimensions. It is further remarkable, in the growth of the horse-chestnut, that the whole of the spring shoots are said to be completed in little more than three weeks from the first opening of the buds.

NAT. ORD. 31*. TERNSTROMERIACEÆ. Dec.—THE TEA TRIBE.

564. *TEA*, both black and green, consists of the dried leaves of an evergreen shrub (*Thea bohea* and *Thea viridis* of Linnæus, Pl. 5. Fig. 49)¹, with indented and somewhat spear-shaped leaves and white flowers with six petals or more, which is much cultivated in China.

The tea shrub attains the height of five or six feet, and is much branched. The leaves, when full grown, are about an inch and a half long, narrow, tapering, and of a dark glossy green colour, and firm texture. The flowers are not much unlike those of the white wild rose, but smaller; and they are succeeded by a fruit about the size of a sloe, which contains two or three seeds.—Sex. Syst. Polyandria Monogynia.

¹ The plants which produce the various kinds of tea partaken of by Europeans, belonging to the genera *THEA* and *CAMELLIA*, are now arranged by botanists under the genus *CAMELLIA*, of which six species have been described by some authors, including those mentioned above under the genus *THEA*, they are all natives of China except one; namely, the *Camellia bohea*, or *Bohea*: the *Camellia viridis*, or *Green tea camellia*; the *Camellia sasanqua*, or *Lady Banks's camellia*; the *Camellia Japonica*, or *Common camellia*, and well known in this country as an ornamental flowering shrub, consisting of numerous varieties; the *Camellia oleifera*, or *Oil-seed camellia*; and the *Camellia axillaris*, or *Axillary camellia*, a native of the East Indies. The tea

The tea-tree flourishes, with great luxuriance, in valleys, on the sloping sides of mountains, and on the banks of rivers, in a southern exposure, betwixt the twenty-seventh and forty-fifth degrees of north latitude. It is chiefly cultivated near Pekin, and around Canton, but it attains the greatest perfection in the mild and temperate climate of Nankin.

Fig. 61.

*The Green Tea Plant.*

The collecting of the leaves is conducted with great care: they are picked singly, and, for the most part, at three different times of the year: in February, April, and June. The drying and preparation of them for use, are processes too long to admit of minute detail respecting them in this place. It may, however, be observed, that for these purposes buildings are erected, which contain from five to ten, and some of them even twenty, small furnaces, each having, at the top, a large iron pan. There is also a long table covered with mats, on which the leaves are laid, and rolled by persons who sit round it. The iron pan being heated by a fire in the furnace beneath, a few

pounds of the leaves are put upon it, and frequently turned and shifted. They are then thrown upon the mats to be rolled betwixt the palms of the hands: after which they are cooled as speedily as possible. That the moisture of the leaves may be completely dissipated, and their twisted form be better preserved, the above process is repeated several times with the same leaves, but with less heat than at first. The tea, thus manufactured, is afterwards sorted, according to its kind or goodness. Some of the young and tender leaves are never rolled, but are merely immersed in hot water, and dried.

of commerce is almost all obtained from the two first species; but a select kind of tea is said to be sometimes collected from the blossoms and buds of the *Camellia sasanqua*. The seeds of all the species of the *Camellia* afford an useful oil.

How long the use of tea has been known to the Chinese we are entirely ignorant; but we are informed that an infusion of the dried leaves of the tea shrub is now their common drink. They pour boiling water over them, and leave them to infuse, as we do in Europe; but they drink the tea thus made without either milk or sugar. The inhabitants of Japan reduce the leaves to a fine powder, which they dilute with water, until it acquires nearly the consistence of soup. The tea equipage is placed before the company, together with a box in which the powdered tea is contained: the cups are filled with warm water, and then as much of the powder is thrown into each cup as is necessary, and it is stirred about until the liquor begins to form, in which state it is presented to the company.

It was formerly imagined that black and green tea were the production of different species of shrubs; but the Chinese all assert, that both are produced from the same species, and that the sole difference which exists betwixt them arises from the seasons when the leaves are gathered, and the modes of curing them. The teas principally consumed in Europe are four kinds of black, and three of green. It is said, that of the various names given to teas in this country, the Chinese know nothing; but that the compounds and names given to them are made by the Canton merchants. Nor is it now decidedly known whether the *green tea* is obtained exclusively from the *Thea viridis*; the general opinion seems to be that both *green* and *black tea* are obtained from either of the species; but that the *viridis* produces the best.

Black Teas.

(a) *Bohea*, or *Voo-ye*, so called from the country in which it is produced, is sometimes collected at four gatherings.

The best bohea tea is a small blackish leaf, is dusty, smells somewhat like burnt hay, and has a rough and somewhat harsh taste: of this tea, very little is now consumed in this country.

(b) *Congo*, or *Cong-foo*, derived from a word which implies much care or trouble, is a superior kind of bohea,

less dusty, and with larger leaves. These are gathered with peculiar care, and there is some little difference in the preparation of congo and bohea.

(c) *Souchong*, from a Chinese word which signifies small good thing, is made from the leaves of trees three years old ; and where the soil is good, even of the leaves of older trees. Of true souchong very little is produced : what is sold to Europeans for this is only the finest kind of congo, and the congo usually purchased by them is but the best sort of bohea.

(d) *Pekoe* is distinguished by having the small white flowers of the tree intermixed with it. This, which is chiefly consumed in Sweden and Denmark, is usually made from the tenderest leaves of trees three years old, gathered just after they have been in bloom, when the small leaves that grow between the first two that have appeared, and which altogether make a sprig, are white, and resemble young hair or down.

Green Teas.

It has been asserted that green teas are indebted for their qualities and colour to a process of drying them upon plates of copper. This is certainly incorrect. The leaves for green tea are gathered, and immediately roasted, or *tached*, as it is called, upon cast iron plates, and then are very much rubbed betwixt men's hands, to roll them. After this they are picked, cleansed from dust, several times tached or roasted, and finally put hot into the chests in which they are to be packed.

The principal kinds of green tea are *singlo*, *hyson*, and *gunpowder*.

(a) *Singlo*, or *Sing-lo*, is so named from the place where it is chiefly cultivated.

(b) *Hyson*, or *Hee-chun*, has its name from that of an Indian merchant who first sold this tea to the Europeans. It should have a fine appearance, be of a full-sized grain, very dry, and so crisp that, with slight pressure, it will crumble to dust. When infused in water the leaf should appear open, clear, and smooth, and should tinge the water a light

green colour ; the infusion ought to have an aromatic smell, and a strong pungent taste.

(c) *Gunpowder* tea is a superior kind of hyson, gathered and dried with peculiar care. This tea should be chosen in round grains, somewhat resembling small shot, with a beautiful bloom upon it, which will not bear the breath: it should have a greenish hue, and a fragrant pungent taste.

When green tea is purchased by the dealers, devoid of what is technically termed the *face*, or *bloom*, which is a concomitant quality to ensure the sale, they effect the same by placing the tea in a chamois-leather bag, six feet or more in length, and introduce a small quantity of carbonate of magnesia, which, when well shaken from one end of the bag to the other, diffuses its subtle powder over the leaves. There occurs a nasty, yellowish-coloured Hyson in the market, which is much improved in appearance after this process has been duly performed.

Tea, both black and green, is sometimes imported in balls from the weight of two ounces to the size of peas.

Tea, a century and a half ago, was scarcely known as an article of trade. The earliest importation of tea into Europe is said to have been by a Dutch merchant in 1610 ; but the time of its first introduction into England has not been correctly ascertained. So scarce an article was it for many years after the above period, that in 1666, twenty-two pounds and three quarters of tea, estimated at fifty shillings a pound, were presented as a valuable gift to King Charles II. The first importation of tea by the East India Company was in 1669, and this consisted only of two canisters, weighing 143 lbs. 8 oz. So rapidly, however, has the consumption of this article since increased, that it now amounts to more than twenty millions of pounds weight per annum. Such is at present the extent of the tea trade, that it affords constant employment for many thousand tons of shipping, and several thousand seamen ; and its importance to us is the greater, since it has been the means of opening in China a market for the sale of woollen goods, one of the most essential articles of our manufacture, to the amount of more than one million of pounds sterling per annum.

If good tea be taken in moderate quantity, it is con-

sidered by medical men to be beneficial, by exhilarating the spirits and invigorating the system; but when taken too copiously, it is apt to occasion weakness, tremor, and other bad symptoms.

Occasionally, and sometimes too frequently, *teas* have a musty, or other unpleasant smell, when taken from the chest, probably dependent on improper drying and preparing; to remove which is the imperative object of the dealer (provided he wishes to dispose of his article at the usual price). Such teas are usually forwarded to a Mr. Smith, who possesses a secret process for removing the smell, and for which he charges *two-pence* per pound.

The different tasters of teas in the market never swallow the infusions, but after judging of their flavour spit out the liquid into pails. This liquid is purchased principally by a Mr. Lazarus, who asserts that it is used to clean silks.

The tea plant may be propagated in the temperate climates of Europe, as well as in the Indies; under the shelter of a south wall it will even flourish in our own gardens. It is, however, somewhat remarkable that the fresh leaves, if used for tea, produce giddiness and stupefaction; but these noxious properties are capable of being dissipated by the process of drying by heat.

In some of the southern parts of England there are smugglers who prepare the leaves of the ash, the sloc, and some other trees, for the adulteration of tea. The article thus prepared has the name of *smouch*, or *British leaf*, and is sometimes mixed in the proportion of about one-third, with the ordinary teas. The preparation of it, however, if discovered, is subject to very heavy penalties.

The amount of Customs' duty paid on teas in the year 1839, was 3,658,800*l.*

NAT. ORD. 31. ACERACEÆ. *Lindl.*—THE SYCAMORE TRIBE.

565. *The COMMON MAPLE* (*Acer campestre*) is a low kind of tree, common in woods and hedges, with leaves in lobes, blunt and notched, and green flowers in upright clusters.—*Sex. Syst.* Octandria Monogynia.

By the Romans, the maple *wood*, when knotty and veined, was often highly prized for furniture. The poet

Virgil speaks of Evander sitting on a maple throne. The knots of this wood were considered to resemble the figure of birds, beasts, and other animals; and when boards large enough for tables were found of this curious part of it, the extravagance of purchasers is said to have been incredible. Indeed its value, in that madly luxurious age, is stated to have been such, that when at any time the Romans reproached their wives for their extravagance in pearls, jewels, or other rich trifles, the latter were accustomed to retort, and turn the *tables* upon their husbands. Hence our expression of "turning the tables" upon any person is said to have been derived.

With us the maple tree is used by turners, particularly for making cups, which may be rendered so thin as to be almost transparent. This wood, where it is devoid of knots, is remarkably white, and is sometimes used for domestic furniture. On account of its lightness it is frequently employed for musical instruments, and particularly for those of the violin kind.

566. *SUGAR-MAPLE* (*Acer saccharinum*) is a North-American tree, which grows to the height of forty feet, and has somewhat hand-shaped leaves, in five divisions, notched at the edges, and downy underneath.—*Sex. Syst.* Octandria Monogynia.

This large and beautiful tree is much cultivated in North America, on account chiefly of the *juice* which it yields, and which is made into sugar. The process of obtaining the juice is, in the spring of the year, to bore holes about two inches deep into the tree, and to put into each of these holes a projecting spout, by which it may be conveyed into troughs placed to receive it. Each tree will afford from twenty to thirty gallons of juice, from which may be obtained five or six pounds of sugar. The juice is clear, of a pleasant flavour, and, in its simple state, is sometimes drunk as a remedy against the scurvy. The sugar, which is obtained from it by evaporation, is clean to the eye, and very sweet, but it has a peculiar, though not unpleasant taste. It may be clarified and refined in the same manner as the common sugars. The juice of the maple furnishes also a pleasant wine, and a very excellent vinegar.

The *wood* of this tree is valuable as timber, and is also well adapted for turnery and cabinet-ware, more particularly

as it is said not to be liable to suffer by the depredations of insects.

Possessing these properties, and being sufficiently hardy to sustain the rigours even of a cold climate, its culture in our own country would probably be attended with great advantage, and cannot be too strongly recommended.

567. *The SYCAMORE* (*Acer Pseudoplatanus*, Pl. 6. Fig. 70) is a handsome tree of British growth, which has leaves in five unequally serrated lobes; and green flowers in pendent clusters.—*Sex. Syst.* Octandria Monogynia.

It is peculiarly deserving of remark concerning this tree, that it grows better near the sea than in any other situation, and that plantations of sycamores may be so made as even to defend the herbage of the adjacent country from the spray, and consequently from the injurious effects of the sea. Its growth is quick, yet it will increase in size until it is two hundred years old. It best flourishes in a loose black earth. The only inconveniences attending it in plantations is the early shedding of its leaves.

In the spring of the year the inhabitants of some parts of Scotland bore holes through the bark of the sycamore, at the distance of about twelve inches from the root, and suffer the *juice* to drain into vessels, to the amount of eight or nine quarts a day from each tree. This liquor they convert into a kind of wine; and if the watery part were evaporated, a useful sugar might be obtained from it.

The *wood* of the sycamore is soft and white, and was formerly much in request by turners, for making trenchers, dishes, bowls, and other articles; but since the general introduction of earthenware for all these purposes, its value has greatly decreased.

NAT. ORD. 30. RUTACEÆ. *Lindl.*—THE RUE TRIBE.

568. The *RUE* (*Ruta graveolens*) is a native of the South of Europe, and grows freely in our gardens, flowering from June to September. By the ancients it was much

esteemed, and is particularly mentioned by Hippocrates and Pliny in their writings; the latter of whom asserts, that Pythagoras imagined rue to be hurtful to the eyes, but this, according to Pliny, was not correct, inasmuch as engravers and painters partook of it with cresses or bread to benefit the organs of vision. The leaves are mostly used, although the entire plant is acrid; they have a hot, bitter, and acrid taste, with a strong odour; these virtues mostly reside in a *volatile oil*, contained in some quantity in glandular vesicles. Water and alcohol extract their active properties.

In a medical point of view it acts as a stimulant and anti-spasmodic, and has been found particularly serviceable in hysteria, flatulent colic, &c. The *confection* is the preparation ordered by the Pharmacopeia. The dried leaves are sometimes reduced to powder and given in doses of from ten to twenty grains.

NAT. ORD. 29. SIMARUBACEÆ. *Rich.*—THE QUASSIA TRIBE.

569. *QUASSIA* is the root and wood of a tree (*Quassia amara*, Pl. 7. Fig. 78)¹ which grows in the West Indies and South America, but particularly in the colony of Surinam.

The leaves of the quassia tree are winged, with two pair of oval and somewhat pointed leaflets, and an odd one at the end these are smooth, deep green above and pale below, and the common foot-stalk is edged on each side with a leafy membrane. The flowers are bright red, and terminate the branches in long clusters. All the parts of this tree are intensely bitter.—*Sex. Syst.* Decandria Monogynia.

This drug was first brought into use in Surinam, by a negro named Quassia, who employed it with great success in the cure of intermittent and other malignant fevers, which prevail in that country. The offer of a valuable consideration induced him to reveal the secret to Daniel Rolander, a Swede, who carried specimens of the wood, together with a branch of the tree, the flower, and fruit, to Stockholm, in

¹ There is another species called by medical writers *Quassia excelsa*, or Lofty quassia, which attains sometimes the height of one hundred feet.

1756 ; and it was named by Linnæus *Quassia*, in honour of *Quassia the negro*.

Since this period the drug has been generally employed in Europe ; and its efficacy in many diseases has been perfectly ascertained. *Quassia* is said to possess antiseptic properties, and consequently to have considerable influence in retarding a tendency to putrefaction. It is also sometimes used instead of hops in the brewing of malt liquor.

The *root*, *wood*, and *bark* of this tree are all occasionally employed in medicine ; the bark is said to be more intensely bitter than either of the other two.

NAT. ORD. 28. LINACEÆ. *Linl.*—THE FLAX TRIBL.

570. *FLAX* is an annual plant (*Linum usitatissimum*, Pl. 4. Fig. 37), with lanceolate or linear leaves, and blue flowers, cultivated in various parts of Great Britain, and grows wild in corn-fields and sandy pastures in some of the southern counties. The external part of this plant is also called *flax*.

The stems of the plants rise to the height of about two feet. The seed vessels and leaves of the calyx are sharp-pointed, and the flowers have each five scolloped petals.—*Sex. Syst.* Pentandria Pentagynia.

It is supposed that we were originally indebted for this plant to those parts of Egypt which are annually inundated by the Nile ; but the time of its introduction into this country is unknown. Its utility is incalculable. To it we are indebted for the linen we wear, and for numerous other indispensable articles of clothing and domestic economy ; and although cotton might, in some degree, supply its place, those persons who have been accustomed to the comforts of linen would be little desirous of the exchange.

The cultivation of flax is pursued to considerable extent in some parts of the British dominions. The seed imported from Riga and Holland is generally, though perhaps erroneously, esteemed the best. It is sown in March or April ; and the plants, when nearly ripe, are pulled up by the roots. These, if flax and not seed be the object of the crop, are either placed in small parcels upon the surface of the land, for exposure to the sun to dry, or they are imme-

diately conveyed to the place where they are to undergo the process called watering. For this purpose they are loosely tied in small bundles, placed in pools or ponds of soft and stagnant water, and allowed to continue there several days. By the fermentation which takes place, the flax (i. e. the external part, or bark) becomes separated. They are then taken out, and thinly spread upon the grass, in regular rows. Here they are occasionally turned, until they become so brittle that on being rubbed between the hands, the flax readily separates from the stalks. They are then bound in sheaves, to be either sent to a mill, or to be broken and scuttled, as it is called, by a machine contrived for that purpose. But a more recent practice, not yet very general, is to avoid the preceding processes, and bind, dry, and stack flax as corn, and afterwards to separate the seed and the fibre by machinery: thus the fibre is obtained longer, and the refuse is an excellent food for horses and cattle.

The flax obtained by the above process subsequently undergoes various dressings, according to the purposes for which it is to be used.

When the plants are grown for *seed*, they are pulled as before, and laid together by handfuls upon the ground, with the seed ends towards the south, that they may be the better exposed to the sun. To force off the seed vessels, a large cloth is usually spread on some convenient place, and a ripple, a sort of comb consisting of six, eight, or ten, long, triangular, upright teeth, is employed. The seed ends of the flax are pulled repeatedly through the teeth of the comb, and thus the seed pods are removed from the stalks. After this the pods and seeds are spread upon a cloth in the sun to dry, and subsequently threshed and winnowed. The best seed is generally preserved for sowing; the second sort yields considerable profit in the *oil* which is obtained from it by pressure. Its use in painting and varnishing is well known. It is occasionally employed for making *green soap*.

The *linseed oil* usually found in commerce is obtained by heating the ground seeds previously to pressure; but *cold drawn* linseed oil is the best for medicinal use: both kinds have a strong, disagreeable, and peculiar smell. The cold-drawn is of a paler colour than that obtained by heat. An infusion of the seed, in the manner of tea, is recom-

mended in coughs and other complaints; the seed and the oil cake of it are used as poultices for various tumours, &c.

After the oil has been expressed, the remaining farinaceous part of the seeds is called *oil-cake*, and given as food to oxen.

The water in which flax has been macerated is poisonous to cattle; and, on this account, the practice of steeping it in any running stream or common pond was prohibited by an act of parliament passed in the reign of Henry the Eighth.

NAT. ORD. 27. RESEDACEÆ. *Dec.*—THE MIGNONETTE TRIBE.

571. *WELD* (*Reseda Luteola*) is a plant of the mignonette tribe, used in dyeing: it grows wild in barren and uncultivated places, particularly on chalk and coal-pit banks, in several parts of England. The wild plant is often biennial; the cultivated one an annual.

The leaves are lanceolate, and entire, with a tooth-like process on each side of the base. The flowers are yellow, and in long spikes; and the calyx is divided into four segments.—*Sex. Syst.* Dodecandria Trigynia.

In some parts of England, particularly in the clothing counties, weld is cultivated to great extent; and it flourishes in sandy soils that could be turned to little advantage in any other way. When the plants are ripe, they are pulled up by the roots, dried, and tied into bundles for use.

The dyeing quality of weld resides both in the stems and roots. This imparts to wool, cotton, mohair, and silk, a very bright and beautiful yellow colour; and blue cloths, dipped in a decoction of it, become green. The yellow colour of the paint called *Dutch pink* is obtained from this plant.

NAT. ORD. 26. PAPAYACEÆ. *Mart.*—THE PAPAWE TRIBE.

572. The *PAPAW* is a fruit about the size of a small melon, but of very various shape, the production of a species of gourd (*Carica papaya*), which grows in tropical climates, both of the eastern and western parts of the world.

The tree is twenty feet and upwards in height: naked almost to the summit; and marked through its whole length, with the scars

of fallen leaves. Its leaves are on foot-stalks two feet in length, and deeply divided into seven, nine, or eleven large lobes. The flowers are axillary, white, and sweet scented.—*Sex. Syst.* Decandria Monogynia.

In shape the fruit of the papaw-tree is sometimes angular, and flattened at both ends; sometimes oval or round; and sometimes pyramidal. When ripe it is of a yellow colour; and contains a yellow succulent pulp, of a sweetish taste, and aromatic smell, with many black or brown and furrowed seeds. This fruit is seldom eaten raw, but when boiled it is esteemed a wholesome sauce for fresh meat. The inhabitants of the countries where it is found sometimes preserve it in sugar, with oranges, and small citrons. Thus prepared, it may be kept a long time; and, in this state, it is not unfrequently brought into Europe. When about half grown, the papaw is sometimes pickled in vinegar with spices.

The fruit of the trifid-fruited custard apple (*Annona triloba*) is called papaw in some parts of America.

The bark of the papaw-tree is manufactured by the Indians into cordage. The leaves are used in place of soap; and water-pipes are sometimes made of the stem of the tree.

NAT. ORD. 25. CRUCIFERÆ. *Juss.*—THE CRUCIFEROUS TRIBE.

573. SEA-KALE (*Crambe maritima*) is a well-known perennial plant in our kitchen-gardens, the early shoots of which are blanched, and eaten in the same manner as asparagus.—*Sex. Syst.* Tetradynamia Siliquosa.

This plant grows wild on sandy sea-coasts in various parts of England; and has been transplanted thence into our gardens. The mode of management is, to place large inverted garden-pots over the plants, and to cover the whole bed and the pots with dung and litter. The heat of the fermenting dung causes the plants to shoot early in the spring; and the pots protect them and keep them clear of the litter. By this means also, as they have no access to the light, they become blanched, tender, and of an extremely sweet and delicate flavour.

Sea kale is ready for use some time before asparagus appears ; and for the table, it is preferred by most persons to that favourite vegetable. If the leaves of sea-kale be eaten when full grown, they are said to occasion giddiness ; but horses, cows, swine, and other animals, feed upon them without injury.

574. *WOAD* is a dyeing drug, produced by a biennial British plant (*Isatis tinctoria*), with arrow-shaped leaves on the stem, yellow cruciform flowers, and oblong seed-vessels, each containing one seed.—*Sex. Syst.* *Tetradynamia Siliquosa*.

This plant is believed to have been the same that was adopted by the ancient Britons for staining their bodies a blue colour, to render them, in appearance at least, more terrible to their enemies. It grows wild on the borders of corn-fields, in some parts of Surrey, Cambridgeshire, Somersetshire, and Durham : and is cultivated in several of the clothing districts of England.

As soon as the leaves are in a sufficient state of maturity, which they will be in the July following that in which the seed has been sown, they are collected, at one, two, or more gatherings during the season, and submitted to the action of mills, in which they are reduced to a pulp. The woad is then laid in small heaps, which are closely and smoothly pressed down. After continuing about a fortnight in this state, the heaps are broken up, and their substance is formed into balls, which are exposed to the sun to be dried. When the balls are perfectly dry, they are ready for use ; and are employed, not only in dyeing blue, but also as the basis of several other colours.

575. *HORSE-RADISH* (*Cochlearia Armoracia*) is a well-known perennial plant, which grows wild by the sides of ditches and the banks of rivers, in several parts of England. It is, however, largely cultivated for domestic use.—*Sex. Syst.* *Tetradynamia Siliculosa*.

The root of horse-radish is much used for culinary purposes. It is remarkable for great pungency both of smell and taste. When scraped, it is mixed with pickles to heighten their flavour, and is eaten as a condiment with roast beef, fish, and several other kinds of food. Whenever more of the roots are dug out of the earth at once, than are

immediately wanted, they may be preserved for some time in a juicy state, by putting them into dry sand, or burying them in dry earth.

Horse-radish is also in considerable repute as a medicine, and is a powerful stimulant, whether externally or internally applied. Notwithstanding this, we are informed by Dr. Withering, that an infusion of horse-radish in cold milk is one of the best and safest cosmetics that are known.

576. *COMMON BROWN MUSTARD* is made from the seeds of an annual plant (*Sinapis nigra*) reduced to powder, which grows wild in corn-fields and by road-sides, in most parts of England, and is known by its yellow cruciform flowers, with expanding calyx, and its pods being smooth, square, and close to the stem.—*Sex. Syst.* Tetradynamia Siliquosa.

In light and otherwise barren lands mustard is cultivated to great advantage. That which is produced in the county of Durham has much celebrity; though the powdered seeds of charlock (*Sinapis arvensis*) have, in many instances, been substituted for it. Mustard is in daily use at our tables; the seeds, whole or bruised, are employed in pickles, and for numerous other culinary purposes. These seeds contain a considerable quantity of oil, which, when expressed, partakes but little of the acrimony of the plant.

Mustard (brown) is cultivated chiefly in this country in the fens of Lincolnshire; it requires a good strong soil, and cannot therefore be grown in the marshes of Essex, &c. The average price of an acre of land when cultivated, and the season propitious, is from 40*l.* to 50*l.* It is usually sown at the end of March or beginning of April, and is ready to be harvested about the end of July; so difficult is it to eradicate from the soil, that in many parts of the country farmers hold their land under covenant not to sow it with mustard.

Two manufactories have recently been established in Amsterdam and Rotterdam for grinding brown mustard, owing to the low price at which the seed may be purchased in that country compared with the London market, a difference existing of 2*l.* 4*s.* in the same quantity cheaper.

White mustard is obtained from the bruised seeds of *Sinapis alba*. Its properties and characters are very like those of the brown kind, but somewhat milder.

Different preparations of mustard are used in medicine. The seeds, taken internally, are serviceable in asthma, rheumatism, and palsy. Cataplasms of mustard are employed, on account of its stimulating properties, on benumbed or paralytic limbs. An infusion of the powdered seeds, taken in considerable quantity, operates as an emetic, and in smaller quantity is an useful aperient and diuretic.

577. *RAPE and COLE-SEED* (*Brassica Napus*) are different varieties of a biennial plant with yellow cruciform flowers and spindle-shaped root, which grows wild upon ditch banks, and amongst corn. Both are more or less cultivated

This plant is distinguished from others of the same tribe, by its roots being a regular continuation of the stem.—*Sex. Syst.* Tetradynamia Silquosa.

In several parts of England rape and cole-seed are sown intermixed, the plants being distinguishable in their growth by the cole exceeding the rape in height, being more soft and tender, and less branched and bushy. When sown separately the cole is usually, though not always, consumed as food for sheep and cattle; and the rape is allowed to stand for seed. For the cultivation of rape the soil ought to be rich and deep.

The harvest commences about the month of August; and as the seed, when in a state of maturity, is easily shed, it is customary, in some places, to thresh the plants on a large cloth in the field. The threshing is almost always considered a sort of festival, at which a great portion of the neighbours attend, in order to expedite the work. In other places the rape is carried on a cloth, in a low kind of waggon, to be threshed out of the field.

An oil obtained from rape-seed by pressure is used, in large quantities, by clothiers and others. It is also used for making the soap called *green soap*. It is likewise useful for various purposes in domestic life, and particularly for burning in lamps; but it is apt to become rancid, though there are means of purifying it. After the oil has been extracted, the *cake* (see *Linsced*, 570) is employed for the fattening of oxen; and, in Norfolk, it is sometimes broken to pieces, and strewed upon the land as manure. The roots of rape plants may be eaten like turnips, but they have a stronger taste. The stalks, if strong, may be advantage-

ously employed in the formation of the enclosing fences of farm yards. They are, however, generally burnt; from the ashes, good pot-ashes are sometimes obtained.

578. The *TURNIP* (*Brassica Rapa*) is the well-known edible root of a biennial plant, which is cultivated to great extent in almost every part of England.—*Sex. Syst.* *Tetradynamia Siliquosa*.

To the farmer turnips are, in various particulars, a most valuable crop. They afford a profitable intervening crop with corn. Both the *tops* and *roots* are eaten by sheep. Horses and cattle may be advantageously fed upon the roots during winter; but the milk of cows receives an unpleasant flavour from them. This flavour is also communicated to the butter; but it may be taken off by dissolving a little nitre in spring water, and putting a small tea-cupful of it into about eight gallons of milk, when warm from the cow. Turnips also serve as food for mankind. In the years 1629, 1636, and 1693, during the pressure of a severe famine, bread was made of turnips in several parts of England, particularly in the county of Essex, in a similar way to that in which potatoe bread is now made, namely, by mixing boiled turnips with an equal weight of flour; but the economy of such bread is questionable.

These roots have been much recommended as sea store, from the possibility, with care, of preserving them for a great length of time uninjured, and from their furnishing a wholesome food for sailors on long voyages. The young and tender *tops* of turnips, when boiled, are also a wholesome food.

For the cultivation of turnips a light soil, consisting of a mixture of sand and loam, is preferable to rich and heavy land. Turnips are raised from seed, which is usually sown in the month of June. As soon as the young plants have attained a tolerable size, they are hoed, for the purpose of thinning them. In their growth they suffer much by the attacks of slugs, caterpillars, and insects of different kinds, particularly of a small, dark beetle, with two longitudinal yellowish stripes (*Chrysomela nemorum*), which is called by farmers the *turnip fly*. For the destruction of this insect many plans have, at different times, been devised.

Turnips are either eaten on the land by cattle, or are

drawn out and stacked, or preserved under ground for winter use; and, in this state, they may be kept sound till April.

There are several kinds of turnips; but of these the *common white* or *Norfolk turnips*, and the *Ruta-baga*, or *Swedish turnips*, are the principal. The latter, which indeed constitute a distinct species, are generally of a yellowish colour, and are so hardy as to suffer no injury even from the most intense cold; but their substance is so compact as sometimes to break the teeth of sheep which feed upon them.

Turnips should be collected for the table the first year of their growth, for if allowed to remain until the second year the flower-stem shoots up, and the nourishment in the reservoir (the root) is absorbed to perfect the flowers and seed, and little else but the woody fibre (305) remains, which is of a *stringy* nature; hence the explanation of the term *stringy turnips*, &c.

579. The COMMON CABBAGE (*Brassica oleracea*) is a well-known biennial plant, the original stock of which grows on cliffs by the sea-side, in Kent, Cornwall, Yorkshire, and Wales.

Plants of this genus yield the various kinds of borecole, cauliflower, brocoli, &c.—*Sex. Syst.* Tetradynamia Siliquosa.

The effects of cultivation on the cabbage are very remarkable. In the wild plants the leaves are extended: but in the common garden-cabbage they are set so close together as to lie upon each other almost like the scales of a bulb, and increasing in compactness as they increase in size: those in the interior being excluded from the effects of the light, do not assume a green, but are of a yellow or white colour.

Other plants of this species form their stalks into a head, which is the enlarged and succulent flower-stalk, as the *cauliflower* and *brocoli*, and *Brussels sprouts*; others grow, in a natural way, without forming either their leaves or stalks into heads, as the *coleworts*, or *Dorsetshire kale*, the *borecoles*, *turnip-rooted cabbage*, and others.

In some parts of England cabbages of different kinds are much cultivated as food for cattle; they succeed well in rich and finely prepared land. The seed is sown in February or March. In April or May the young plants are taken

out, and set in rows, at a little distance from each other; and in the ensuing autumn and winter, the cabbages afford a valuable stock of food.

All the kinds of cabbage are useful for domestic purposes; and some of them afford a peculiarly sweet and delicate food. An agreeable pickle is made of the *red* kind, and the Germans, and people of other northern countries of the Continent, prepare from them a favourite food called *sour-cROUT*. These plants were known to, and much used by, the ancient Greeks and Romans.

580. The *WATERCRESS* (*Nasturtium officinale*) is a plant too well known to require a minute description, or to enter into detail as to its properties. It is alluded to, with a view of introducing to the notice of the reader, the traffic which is daily going on in the metropolis alone in this simple article; for it has been calculated that there are not less than 700 persons in London and its suburbs venders of this plant, and who derive their subsistence by retailing watercresses. It has been computed that each individual sells about two shillings worth each day, for which in the market he pays six-pence; thus the total sum collected daily for this vegetable will be 1400 shillings or 70*l.* sterling; the latter sum multiplied by the days of the year (365) will amount to 25,550*l.* sterling for this one simple luxury only.

NAT. ORD. 24. AMYRIDACEÆ¹. *Lindl.*—THE BALSAM TREE.

581. *BALSAM of TOLU* is a reddish, yellow, thick, and pellucid substance, of a fragrant odour, obtained from a tree (*Tolulifera Balsamum*², of *Miller*), which grows in South America.

This tree is of considerable height; and has somewhat oval leaves, each on a short footstalk. The flowers are numerous, and in lateral branches; and the fruit is a round berry.—*Sex. Syst.* Decandria Monogynia.

The name of this balsam has been obtained from its being chiefly procured from the province of Tolu, on the north

¹ Also called TEREBINTHACEÆ by *Jussieu*.

² Now called by *Richard*, *Myrospermum toluiferum*. It is only admitted in the Edinburgh Pharmacopœia.

coast of South America, near the isthmus of Panama. Incisions are made in the bark of the trees, at a particular season of the year, and a resinous fluid of a yellowish white colour oozes out. This is collected in small gourd shells. At first it is about the consistence of treacle, but it thickens by being kept; and by age it becomes hard and brittle. Its smell is peculiarly grateful, somewhat resembling that of lemon; and its taste is warm and sweetish. On being chewed, it adheres to the teeth.

This balsam is used in medicine, both in the form of a tincture and a syrup; in its medicinal virtues it agrees with many other balsams. Tolu is also made into lozenges, which are considered serviceable in appeasing the irritation which accompanies severe coughing.

582. *BALSAM, or BALM OF GILEAD, is a resinous exudation from a small tree (Balsamodendron Gileadense), which grows in several parts of Abyssinia and Syria.*

This tree has spreading crooked branches, small bright green leaves, growing in threes, and small white flowers on separate foot-stalks. The petals are four in number, and the fruit is a small egg-shaped berry, containing a smooth nut.—Sex. Syst. Octandria Monogynia.

This balsam, from the authority of the Scriptures, was in great esteem in the highest periods of antiquity. We are informed by Josephus that the balsam of Gilead was one of the trees which was given by the Queen of Saba to King Solomon. Those Ishmaelitish merchants, who were the purchasers of Joseph, are said to have been travelling from Gilead, on the eastern side of Canaan, to Egypt, having their camels laden with "spicery, balm, and myrrh." It was then, and still is, considered there one of the most valuable of medicines; but the virtues ascribed to it exceed all rational bounds of credibility.

The mode in which it is obtained is described by Mr. Bruce. The bark of the tree is cut with an axe, at a time when the juice is in its strongest circulation; this, as it oozes through the wound, is received into a small earthen bottle, and every day's produce is gathered and poured into a larger one, which is closely corked. When the juice first issues from the wound, it is of a light yellow colour, and somewhat turbid appearance; but it afterwards becomes

clear, has the colour of honey, and is fixed, and heavier than at first. Its smell, when fresh, is exquisitely fragrant, and strongly pungent, not much unlike that of volatile salts; but if the bottle be left uncorked, it soon loses this quality. Its taste is acrid, rough, and pungent.

The best and finest kind was formerly called *Opobalsamum*, but real balm of Gilead is rarely, if ever, to be obtained in this country. *Canada balsam*, or some other terebinthine-balsam being substituted for it. Even at Constantinople it cannot, without great difficulty, be procured, although it is said to be in high esteem in Turkey as a medicine, an odoriferous unguent, and a cosmetic. Some modern botanists mention that the *Amyris opobalsamum*, another species of *Amyris*, produces the *Balsam of Mecca*, of which little is known in this country; some, indeed, consider *Balsam of Mecca* and Balm of Gilead as the same. The plant is said to grow near Mecca.

583. ROSE-WOOD (*Amyris Balsamifera*) is an odoriferous tree, with smooth oval leaves, which grows in the island of Jamaica. —*Sex. Syst.* Octandria Monogynia.

The wood of this tree is much used by cabinet-makers in this country for the veneering of tables and other furniture. Its grain is of a dark colour, and very beautiful. This tree yields, it is said, an odoriferous *balsam*, much esteemed both as an external application for the cure of wounds, and an internal medicine in various diseases; but it is hardly known in this country.

Several other kinds of *Rose-wood* are imported, obtained from different plants. Thus the *Jacaranda* is said by Prince Maximilian to be produced by a Brazilian *Mimosa*. The *Rose-wood of Commerce*, not that which occurs in large blocks, and used for ornamental furniture, but the odoriferous kind, in small pieces, is said to be obtained from the *Convolvulus floridus* and *C. scoparius*, natives of the Canary Islands. The ordinary *rose-wood of commerce* is yielded, according to Don, by the *Physocalymnia floribunda*. The price of this wood in bond varies from 120*l.* to 125*l.* per ton.

NAT. ORD. 23. VITACEÆ. *Lindl.*—THE VINE TRIBE.

584. VINES are a very important tribe of shrubs, to the fruit of which we are indebted for all our foreign wines, for raisins of every description, and for the dried currants of the shops.

Several species of vine are cultivated; but by far the most important of the whole is the common vine (*Vitis vinifera* of *Linnaeus*). The varieties of the vine are innumerable.—*Sex. Syst.* Pentandria Monogynia.

The earliest introduction of the vine into the western parts of Europe is stated to have been about the year 280, under the sanction of Probus, the Roman Emperor, who, throughout his whole dominions, was a zealous encourager of agricultural pursuits. Vines were anciently propagated in our own island for the purpose of wine, and there were vineyards of considerable extent in Gloucestershire, Hampshire, and some other counties; but as vines are principally found to flourish in inland countries lying betwixt the thirtieth and fifty-first degrees of latitude, it is evident that there can be no part of Great Britain sufficiently adapted to their successful cultivation.

Any person who has seen a hop garden, may easily form an idea of the appearance of a *vineyard*. Vines are usually propagated by cuttings a foot or more long, with a portion of two years' old wood; sometimes short with only one bud, &c. These, when they have obtained a sufficiency of roots, are transplanted from the nursery-ground, in the wine countries, into the vineyard, the soil of which ought to be light and rich. They are placed in this ground in rows, and at regular intervals, leaving space sufficient for the vine-dressers and the reapers to pass betwixt them. As soon as the rooted-plants are three years old they begin to bear fruit. The season for pruning and dressing them is the early part of the year, before the sap begins to rise; and about the time when the flowers appear, the plants are fastened to poles for the purposes of supporting them, of preventing them from growing entangled with each other, admitting a free circulation of air amongst them, and affording greater convenience for gathering the fruit.

The vintage, a season of mirth and delight, commences in the early part of autumn. The villagers assemble in the

respective vineyards under the direction of overseers. Of the grapes there are in general three distinct gatherings. The first comprehends all the finest and ripest bunches, every grape that appears green or decayed being carefully removed; the second is confined to the large and thick clusters which are not so ripe as the others; those which are nearly green, withered, or decayed, are gathered last.

The grapes are subjected to the operation of large presses, somewhat similar to the cyder-presses of our own country (the separate gatherings being still kept apart), and the juice is received into proper vessels. Afterwards it undergoes the necessary fermentation to become wine. During this process the part which remains insoluble is called the *marc*, and the scum when it sinks to the bottom of the cask, is called *argol*. By the ancients the juice was obtained by treading the grapes. This practice is alluded to in various parts of Scripture, but perhaps in none are the characteristics of the ancient vintage expressed more strongly than in the predictions of Isaiah concerning Moab: "And gladness is taken away, and joy out of the plentiful field; and in the vineyards there shall be no singing, neither shall there be any shouting: the treaders shall tread out no wine in their presses; I have made their vintage-shouting to cease." The treading of grapes is still practised in several parts of the world. The ancients frequently kept their wine in skins or leathern bags, well secured at the seams; hence the passage in the Gospel: "Neither do men put new wine into old bottles; else the bottles break, and the wine runneth out, and the bottles perish: but they put new wine into new bottles, and both are preserved."

The kinds of wine are extremely various. The difference which exists between them is not, however, so much owing to a distinction in the species of grapes, as to the quality of the fruit produced by the varieties of soil, cultivation, and climate to which they are subject. This difference likewise depends, in some instances, on the peculiar mode of fermentation, and the state of the grapes from which the wine is produced.

(a) PORTUGUESE WINES.—Of all the kinds of wine that are consumed in England, none is so much in request as

red port. This has its name from the city of Oporto, in the neighbourhood of which the vines that produce it are chiefly cultivated. A great proportion, however, of the port that is consumed in England, is said to be mixed with a Spanish red wine of inferior quality, or to be otherwise adulterated. Red port is brought over in pipes, which contain 138 gallons each¹, and ought to fill fifty-two dozen bottles of legal measure.

The difference in colour betwixt red wines and white does not so much depend upon the quality of the grape, as upon the mode in which the wines are prepared. The juice of red grapes, if carefully pressed, and fermented separately from the skins, becomes a white wine. If the skins be pressed so as to discharge the colouring matter which they contain, or if they be allowed to remain in the juice during the fermentation, the wine assumes a red tinge. There is usually some uncombined brandy in this wine.

White port, and *Lisbon*, are two kinds of white wine which we receive from Portugal. Of these, the former was much in demand some years ago, but it is now seldom called for; the latter is still in use.

(b) FRENCH WINES.—Many wines are produced in France. That usually considered the best is *Burgundy*, a red (or white) wine of a very delicate flavour, which has its name from the province where it is made. The wines of the neighbourhood of Orleans, however, after having been matured by age, are much like Burgundy. *Claret* is the only French red wine for which there is any great demand in England. It is thin and highly flavoured, and is chiefly supplied from the neighbourhood of *Lafitte*, *Latour*, *Chateau-Margaux*, and *Haut-Brion*. Some of the red wines of Champagne are highly prized for their excellence and delicacy, though they occasionally have a pungent and sourish taste. *Hermitage* is produced from vineyards at a place so called, near the village of Thcin, on the eastern

¹ It should be noted that the measure here alluded to is that which has been long called in this country *wine measure*, a pint of which holds of water sixteen ounces avoirdupois; a gallon of the same measure holding of course eight pounds of water. The new, or, as it is called, *imperial* measure, is much larger.

bank of the Rhone ; and *Côte Rôtie* from vineyards on the opposite side of the river.

No French white wine has so much celebrity as *Champagne*. This is of *four* kinds ; one of which, called *still*, *creaming*, or *slightly sparkling* champagne, has gone through the whole process of fermentation ; another, the *full-frothing* Champagne, is bottled before the fermentation is complete, and it consequently proceeds slowly in the bottle, causing the wine, on the drawing of the cork, to sparkle in the glass. This arises from a large quantity of carbonic acid gas (26), which then escapes from it ; the two remaining varieties are the *white* and the *pink*. *Vin de Grave* is produced in the vicinity of Bordeaux, and the lower parts of Gascoigne : *Pontac* is made in Guienne ; and *Frontignac* and *Muscadel* are white wines, the delicious productions of Languedoc. To these may be added the wine of *Roussillon*, *Sauterne*, and *Barsac*.

(c) SPANISH WINES.—The country about Xeres, in Andalusia, produces an excellent wine called *Sherry*. It is very strong, owing to the quantity of uncombined brandy with which it is mixed. In the province of Valencia, some of the proprietors have wines of different kinds, sixty, eighty, and even a hundred years old, the prices of which differ according to their age. *Rota*, in Seville, produces a rich and sweet white wine ; and the country around *Malaga* (or *Mountain*), near Gibraltar, is celebrated for white wine which is known by that name ; and so assiduously is the cultivation of the vine there pursued, that the export of the produce of the vineyards yields to the inhabitants an annual revenue of more than 200,000*l.* sterling per annum. We import from Spain a harsh and inferior kind of *red wine*, which, duty free, sells for only 10*l.* or 15*l.* per pipe of 126 gallons ; but the territory of *Alicant* produces a very rich and excellent kind of red wine. The sweet red wine which we call *Tent* is a Spanish production ; chiefly imported from Cadiz.

(d) ITALIAN WINES.—Notwithstanding the ancient celebrity of many of the wines of Italy, by far the greater part of what are now manufactured in that country are thin and bad. Such as *Massara*, *Syracuse*, *Lissa*, and *Marsala*.

Certain vineyards on Mount Vesuvius, however, still have great celebrity for a luscious red wine called *Lachryma Christi*.

(e) GERMAN WINES.—Germany produces many wines, of which *Tokay*, *Hock*, *Rhenish*, and *Moselle*, are the most celebrated. *Tokay* has its name from a town in Hungary, near which it is chiefly made. The quantity of this wine is so small, that, even on the spot where it is manufactured, it is sold at a very high price. It is made by mixing with the common grapes a portion of luscious, half-dried, and shrivelled grapes; the latter being absolutely necessary to constitute the peculiar quality of the wine. The two kinds of grapes are pressed separately, and the juices are afterwards mixed and fermented. The best Tokay does not long remain in the place where it is made, a great portion of it being sent into the cellars of the nobility in other parts of Hungary. Tokay is a fine wine, but no way adequate to the price for which it is sold. Several years ago it could not be purchased, even in Hungary, for much less than half a guinea of English money per bottle; and yet there are few Englishmen, who, except on account of its scarceness, would prefer it to good Claret or Burgundy. Of all the German wines, that which is in greatest demand in England is *Hock* (*Hochheimer*). This has its name from the town of Hockstadt in Suabia, celebrated for a great battle which was fought in its neighbourhood by the French and the Allies in 1704. *Rhenish* and *Moselle* are produced chiefly on the banks of the rivers Rhine and Moselle, and have a cool, sharp taste, and considerable strength. Anterior to the late wars in Germany, there were wines in the cellars of many of the noble and wealthy inhabitants of that country which were more than a hundred years old, and of such body as to be uninjured even by so great an age. Professor Schonbein mentions a particular kind of old wine, of which no three men could drink a bottle.

(f) MADEIRA and TENERIFFE WINES.—The Madeira and Canary islands produce some excellent white wines. Of these *Madeira wine* is by far the most valuable, particularly after it has been ripened by conveyance through a hot climate. The number of pipes of Madeira annually

made, is about 30,000. The grapes, when gathered, are put into wooden vessels, and the juice is extracted by persons treading upon them.

The Canary islands gave name to a white wine, which was formerly in great esteem under the name of *Canary-sack*, and is now usually called *Malmsey-Madeira*. The genuine *Malmsey* wine, which is of a sweet and luscious flavour, and a rich golden yellow colour, is the produce of Malvesia, one of the Greek islands, and thence had originally its name, the French merchants denominating it *Vin de Malvesia*: but so little is now made that few persons can possess it. *Teneriffe wine*, when two or three years old, has much the flavour of Madeira, but, after this age, it somewhat resembles Malaga.

(g) CAPE WINES.—There are produced at the Cape of Good Hope, two kinds of peculiarly rich, sweet, and delicate wine, called *red* and *white Constantia*. The farm from which they have their name is situated about eight miles from Cape Town. The grapes of this farm, owing, as it is supposed, to some peculiarity in the soil, are superior to any other in the whole country. The vintage commences about March or April; and great care is taken in the manufacture of the wine, no fruit being used but such as is fully ripe and in the highest perfection. The annual produce is considered to be about sixty pipes of the red, and 100 pipes of the white wine. *Constantia* is in perfection when about two years old; but when kept six or seven years, it sparkles in the glass somewhat like wine which has not undergone a perfect fermentation. *Cape Madeira* is a light kind of white wine, the produce of the Cape of Good Hope. Considerable quantities of this wine are now consumed in England, in consequence of its price, it paying only one-third part of the duty which is imposed on most other wines.

The best *Port Vintages* were in the following years, 1812, 1815, 1820, 1821, 1822, 1827, 1830, 1834.

The best *Claret Vintages* at Bordeaux, were in 1811, 1815, 1820, 1822, 1825, 1831. Of these, that of 1825

was the best, it being the year the sun scorched the grape which yielded the bad Port Vintages.—(*Notes from Dr. R. Dickson's Lectures on Vitifera, May, 1836.*)

The amount of Customs' duty paid on wine in 1839, was 1,849,709*l.* Of *wines*, this general remark may be made, that all *good wines* contain a portion more or less large, of *alcohol*, or *pure spirit*, the product of their fermentation; that bad and poor wines contain little alcohol, and therefore are not much esteemed.

The following table drawn up by Mr. W. T. Brande (*Phil. Trans.* for 1811, p. 337. and for 1813, p. 82) exhibits the proportion of *alcohol* (specific gravity 0,825 at 60° Fahr.) by measure, contained in 100 parts of wines.

(The A. prefixed to the numbers denotes *average.*)

1. Lissa . . . A	25.41	17. Cape Ma-		32. Sauterne . .	14.22
2. Raisin . . . A	25.12	deira . . . }	20.51	33. Burgundy A	14.57
3. Marsala . . A	25.09	18. Cape Mus-		34. Hock A	12.08
4. Port A	22.96	cat }	18.25	35. Nice	14.63
5. Madeira . . A	22.27	19. Grape wine	18.11	36. Barsac	13.86
6. Currant . .	20.55	20. Calcevela . A	18.65	37. Tent	13.30
7. Sherry . . . A	19.17	21. Vidonia . . .	19.25	38. Cham-	
8. Teneriffe . .	19.79	22. Alba Flora .	17.26	pagne . . . A }	12.61
9. Colares . . .	19.75	23. Malaga . . .	17.26	39. Red Her-	
10. Lachryma } 19.70		24. White		mitage . . }	13.32
Christi . }		Hermitage }	17.43	40. Vin de	
11. Constantia } 19.75		25. Roussillon A	18.13	Grave . . }	13.94
white . . }		26. Claret . . . A	15.10	41. Frontignac }	
12. Constantia } 18.92		27. Zante	17.05	(Rivesilte) }	12.79
red . . . }		28. Malmsey }		42. Côte Rôtie .	19.32
13. Lisbon . . .	18.94	Madaira . }	16.40	43. Gooseberry	11.84
14. Malaga . . .	18.94	29. Lunel	15.52	44. Orange . . . A	11.26
15. Bucellas . .	18.49	30. Sheraaz . . .	15.52	45. Tokay	9.88
16. Red Ma-		31. Syracuse . .	15.28	46. Elder	8.79
deira . . . A }	20.35				

The following remarks are abstracted from Dr. A. T. Thomson's *Materia Medica*. Sparkling wines are bottled before fermentation is completed, and the carbonic acid is dissolved as soon as generated. In Champagne sugar-candy is added, as the wine is not sufficiently sweet. New wines are *not* wholesome. When *malic* and *acetic* acids

abound in wine, digestion is retarded, but when *tartaric* it is promoted. The proper period for taking wine is when chymification is not going on, as it necessarily interrupts the natural process; just before meals, is, therefore recommended. *Sweet wines* are all apt to disorder the stomach, owing to their imperfect fermentation, and should, especially if new, be taken in limited quantity, as they are then more likely to become acescent. *Brisk* or *sparkling wines* intoxicate sooner than dry wines, which contain a larger quantity of alcohol. This effect is produced by the spirit rising with the carbonic acid gas, and being applied more directly to the nerves of the stomach; their effect is more transitory and the exhaustion less; they are more wholesome, and inebriation is sooner recovered from. *Light wines* are much less intoxicating. The Rhenish wines are not so liable to become acid in the stomach, as they contain tartaric acid, and the alcohol is more intimately combined with the other principles of the wine. Hock and Claret may, equally with Madeira be taken by persons affected with the gout. *Strong wines* such as Port, Sherry, Madeira, &c. are the least wholesome. Port and Sherry have generally uncombined brandy in them. They contain a large quantity of *tannin* and *gallic acid*, which render them hurtful as daily beverages; they intoxicate sooner, and the *volatile oil* they contain affects the brain similar to narcotics. The light Burgundy and those of Spain and Portugal are free from these properties. They are more pernicious however, than those of France and the Rhine. In cases of severe intoxication empty the stomach as soon as possible by means of the stomach-pump, and to obviate the impression made on the nervous system, give from *two* to *four* drams of the *Acetate of Ammonia*, in a glass of water; repeated once in ten or fifteen minutes, it prevents those uncomfortable feelings which invariably accompany the transition from drunkenness to sobriety.

The young *twigs* of the vine, when dried, cut into small pieces, and moistened with water, afford a wholesome food for cattle and horses. The *leaves* and *tendrils* have an astringent taste, which it is probable they would impart to British made wines, and thus render them somewhat similar to foreign wines. The *wood* of the vine, reduced to charcoal, is used by painters for drawing outlines: and, from

the seeds or *stones*, a kind of oil is sometimes made, which can scarcely be distinguished from olive oil. These stones, when purified, moderately roasted, and ground to a coarse powder, form a tolerable substitute for chocolate.

585. *Brandy* is a spirit obtained by the distillation of wine, and prepared in most of the wine countries of Europe. The principal manufactories of this spirit are in France, particularly in Languedoc, and Anjou, whence comes the well-known *Cognac Brandy*. The distilleries of brandy in Catalonia, in Spain, are so extensive as to yield more than 35,000 pipes per annum. When brandy first issues from the still, it is colourless as water; the colour, which it usually has, is produced partly by the oak casks in which it is kept, but chiefly by the addition of red sanders wood, burnt sugar, or other colouring matter. These however, do not appear to affect the quality of the spirit. According to Mr. Brande the proportion of spirit in *brandy* is 53,39 per cent. ; in *Scotch whisky* 54,32 per cent.

In addition to the preceding uses of the vine, we have to add those of its fruits in a recent state, called *grapes*, as a delicious addition to our desserts; and of this fruit, in a dried state, under the appellation of raisins and currants. It may be added, that grapes when fresh and fully ripe, are cooling and antiseptic; in large quantities diuretic and laxative; and are very useful in febrile diseases.

Raisins are grapes which have been suffered to remain on the trees until they are perfectly ripe, and have been dried. They are occasionally dried in ovens. Sometimes the clusters, being tied several together, are dipped in a ley of ashes, with a certain portion of slaked lime, and then dried by exposure to the sun. The best fruit of this description are the *sun* and *jar raisins*. These are imported from the southern countries of Europe; and also from the Asiatic provinces of Turkey. They are principally used for desserts, whilst *Malaga raisins*, and some other kinds, are employed for culinary purposes and the making of wine.

586. The *CURRANTS* of commerce are a small kind of raisins, produced in the Grecian Archipelago, and particularly in the islands of Zante and Cephalonia.

The chief plantation of these grapes was anciently in the isthmus of Corinth, whence they obtained the name of *Corinths*, since corrupted to currants. Few, however, are now produced there, the vineyards having been neglected in consequence of the jealousy of the Turks not allowing large vessels to enter the gulf for their exportation. These grapes have no stones, are usually either of a red or black colour, and when recently gathered, are an extremely delicious fruit.

The harvest commences in the month of August; as soon as the grapes are plucked from the trees, they are spread to dry, upon a floor prepared for the purpose by stamping the earth quite hard. This floor is formed with a gentle rising in the middle, that the rain, in case any should fall, may run off, and not injure the fruit. When sufficiently dry, the currants are cleaned, and laid up in magazines, being poured into them through a hole, and stowed so closely that it is necessary to dig them out with an iron instrument. They are packed for exportation in large casks, and by persons who have their feet greased in order to tread them close.

The principal consumption of currants is in England: the inhabitants of the islands whence they are brought know little of the use which we make of them. A small but inferior kind of currant is grown in some parts of Spain.

NAT. ORD. 22. ZYGOPHYLLACEÆ, Lindl.—THE BEAN-CAPER TRIBE.

587. *LIGNUM VITÆ* and *GUAIAECUM* are the wood and resin of a large tree (*Guaiacum officinale*, Pl. 7. Fig. 77), which has winged leaves in two sets upon one footstalk, and regular flowers of five petals. It is a native of the West Indies, and the warmer parts of America.

The usual height of this tree is about forty feet. The leaves consist of two, three, and sometimes four pairs of leaflets, which are somewhat oval, and of a shining dark green colour. The flowers spring in clusters from the division of the smaller branches; the petals are of a rich blue colour, and the stamens are crowned with yellowish anthers.—*Sex. Syst.* Decandria Monogynia.

The wood, resin, bark, and even the flowers of this tree,

are all of use, either in the mechanical arts or in medicine. The former, which is yellow towards the outside (*alburnum*), of a deep blackish brown colour in the centre (*duramen*), and so compact and heavy as to sink when immersed in water, is chiefly employed in the West Indies for the wheels and cogs of sugar mills. It is also formed into mortars, bowls, and domestic utensils of various kinds, for which, on account of its hardness, and not being liable to warp, it is peculiarly valuable. *Lignum vitæ* is chiefly imported into this country from Jamaica, in logs or pieces of four or five hundred pounds weight each, and is in great request for skittle balls, school-boys' rulers, and numerous articles of turnery ware. A decoction of the wood, when rasped, is occasionally administered as a medicine in rheumatic and gouty affections.

The *resin* of this tree, called *gum guaiacum*, is sometimes obtained by wounding the bark in different parts. It exudes through the wounds; and when sufficiently hardened by exposure to the sun, is taken off, and packed in small kegs for exportation. Sometimes it is obtained by sawing the wood into billets, each about three feet in length, which are then bored with an auger longitudinally, and laid upon a fire, so that the melted resin which flows through the hole as the wood burns, may be received into a vessel placed for the purpose of containing it. This resin has a fragrant odour; it is of a greenish colour externally, which it acquires by exposure to air, as does also the wood; it has a resinous appearance when broken, and is then of a reddish brown colour. Its taste is pungent and acrid. From the bark of the tree there is frequently a spontaneous exudation: this has the name of *native gum guaiacum*, and is imported in small, irregular, bright pieces, which are much more pure than the gum obtained in any other way. *Guaiacum* is employed as a remedy against rheumatic and other pains, and as an ingredient in many officinal preparations. On its first introduction, which was soon after the discovery of America, it was in such repute as to have been sold for seven crowns a pound.

In the West Indies, the *bark*, *flowers*, and *fruit*, are each employed in medicine; and of these the former is frequently used instead of soap for washing, in which process it gives a good lather.

NAT. ORD. 21. LEGUMINOSÆ, *Juss.*—THE BEAN TRIBE.

588. *TAMARINDS* are the contents of the pods of a large tree with winged leaves (*Tamarindus Indica*, Pl. 5. Fig. 51), which grows in the East and West Indies, America, and several parts of Asia.

This is a large, beautiful, and spreading tree; its leaves consist usually of sixteen or more pairs of leaflets. The flowers are formed in clusters, from the sides of the branches, and have each three yellowish petals, beautifully marked with red veins.

The fruit of the tamarind-tree is a roundish but somewhat compressed pod, four or five inches in length, the external part of which is very brittle. Each pod contains three, four, or more hard seeds, enveloped in tough skins, surrounded by a dark-coloured, acid pulp, and connected together by numerous tough and woody fibres.—*Sex. Syst.* Monadelphia Triandria.

Tamarinds ripen in the West Indies, and are gathered for preservation in June, July, and August; the pulp, with the reeds and fibres, are freed from their shell, and placed in layers in a cask, over which boiling syrup is poured till the cask is full; after which the heads are put in and fastened up for exportation.

The East Indian tamarinds are generally packed without any admixture. They are more esteemed than the others; and when in the pods are easily distinguished from them by being longer, and containing six or seven seeds; the pulp also is drier and of a darker colour.

It is said that we are indebted to the Arabians for a knowledge of the use of tamarinds. In hot climates they are a most refreshing and delicious fruit; and, dissolved in water, are much used as a cooling and agreeable beverage, particularly by persons suffering under fever. They also give great relief in sore throats and other complaints. They are also gently laxative, but are rarely given alone.

589. *LOG-WOOD* is a dark red wood, chiefly used in dyeing; and imported from Honduras, and some of the islands of the West Indies.

The log-wood tree, a native of South America (*Hæmatoxylon Campechianum*. Pl. 4. Fig. 43), is from sixteen to twenty-four feet high, and both in the trunk and branches is extremely crooked. The branches are spinous, and the leaves winged, with, in general, four

or five pairs of leaflets, which are somewhat heart-shaped. The flowers are of a reddish yellow colour, small, and numerous.—Sex. Syst. Decandria Monogynia.

The district of Honduras, in America, has long been celebrated for the production of log-wood, which grows wild chiefly in forests where the soil is moist, or near the banks of rivers and lakes. The cutting of it occupies a great number of hands, and is an unpleasant and very unhealthy pursuit.

In the year 1715 some seeds of the log-wood tree were introduced into the island of Jamaica; and it is now chiefly employed in that island as a fence against cattle. As an article of commercial export it does not appear to answer so fully as could have been wished; yet, in morassy parts of the island, it grows in considerable luxuriance.

Few kinds of wood are of more solid texture than this, hence its weight is so great that it will sink in water. Its predominant colour is red, tinged with orange and black; and its hardness such that it is capable of being polished, and is scarcely susceptible of decay. For exportation to Europe it is cut into billets or logs, each about three feet in length.

The chief use of logwood is for dyeing green, purple, blue, and black colours, according to the different ingredients with which it is employed. It gives a purplish tinge to watery and spirituous infusions; but all the colours which can be prepared from it are fugitive, and cannot by any art be rendered so durable as those prepared from other materials.

Logwood possesses also some utility as a medicine in diarrhoea and dysentery, chiefly under the form of a decoction, or of an extract. It is also employed by a patent process for preventing the deposition of carbonate of lime in the interior of boilers, which it effects by glazing the particles and thus preventing them from adhering to each other.

The price of logwood at Honduras is so low as not usually to exceed 12*l.* or 14*l.* Jamaica currency, per ton.

In 1839 duty (3*s.* if from British possessions, 4*s.* 6*d.* if from other places) was paid on 15,867 tons.

The total amount of customs' duty paid on dye and hardwoods, in 1839, was 68,997*l.*

590. *SENNA* is the dried leaflets of an annual plant (*Cassia* *Senna*, Fig. 62. c.), and other species, which grow in various parts of Africa and Asia.

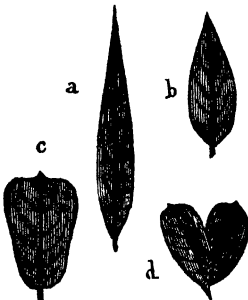
The stems of this plant are woody, and not unlike those of a shrub. The leaves are winged, and the leaflets oval, smooth, and pointed. The flowers, which grow in lengthened clusters, and are of a pale yellow colour, are succeeded by oblong, compressed, and kidney-shaped pods.—*Sex. Syst.* Decandria Monogynia.

The cultivation of senna is carried on to considerable extent in Ethiopia, Arabia, Persia, and Upper Egypt, from several of which countries it has, from time immemorial, been brought to Alexandria, where it is usually shipped for Europe, and was hence denominated *Alexandrian senna*. Eight varieties of senna are enumerated by Mr. Pereira, viz.

1. The *ALEXANDRIAN*, composed of the leaflets of two species, *C. acutifolia* and *C. obovata*. 2. The *TRIPOLI*, produced from *C. Æthiopica*. 3. That of *ALEPPO*, obtained from *C. obovata*. 4. The *SENEGAL*. 5. The *SMYRNA*. 6. The *MECCA*. 7. The *TINNEVELLY*. 8. The *AMERICAN*, which is obtained from the *C. Marilandica*. The process of stripping and drying the leaves is perfectly simple. When dried, they are of a yellowish green colour, have a faint, though not unpleasant smell, and a somewhat acrid, bitterish, and nauseous taste. The best senna grows wild in Nubia, and yields two crops of leaves; the first in September, the second in March.

Senna has long been in use in Eastern countries as a medicine; and its repute as a purge is very considerable in Europe. It is administered in various ways.

Fig. 62.



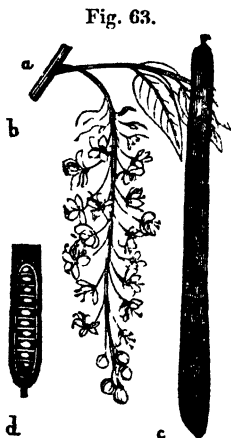
Varieties of Senna Leaflets.

Senna is an article of commerce that is very much adulterated with the leaves of *Argel* (*Cynanchum oleafolium*), the *Colutea arborescens*, and *Coriaria myrtifolia*, which may very readily, with a little practice, be distinguished from the leaves of the several species of *Cassia* constituting the article called senna. The principal of them are *Cassia acutifolia* (a), *C. obovata* (d), *C. elongata*, and *C. lanceolata* (b).

Small portions of twigs, together with the seeds and fruit, and leaves of other plants, are added to this drug by way of adulteration; these are, or should be, removed, when senna is required for medical purposes; for, according to some observers, the griping quality is said to be due to the presence of the coriaceous leaves of the *Argel* in the infusion. A duty of 6*d.* per pound was paid on 174,175 pounds of senna imported from the East Indies and other places. The active principle is named *Cathartin*.

591. *PURGING CASSIA* is a somewhat cylindrical pod, about an inch in diameter, and from one foot to two feet in length; the fruit of a tree (*Cathartocarpus fistula*, Fig. 63), which is a native of Egypt, the East and West Indies, and South America.

This tree is forty or fifty feet high, and much branched. Its leaves are winged, with five pairs of leaflets, somewhat oval, pointed, smooth, and of a pale green colour. The flowers are large, yellow, and grow in oblong clusters. The pods are divided by transverse partitions, into numerous cells, each containing one seed.—Sex. Syst. Decandria Monogynia.



Purging Cassia.

These pods (c) contain a black, sweetish, but somewhat acid pulp, which is used as a mild opening medicine. It is customary in Egypt to pluck the pods before they are quite ripe, and to place them in a house, from which the external air is, as much as possible, excluded. They are then laid in beds about six inches deep, having palm leaves interposed betwixt them. On the two following days the whole are sprinkled with water; and in the course of about six weeks, they are in a fit state to be packed for sale. In the accompanying figure, (a) represents a portion of the stem, with the flowers (b); (c) the long, black seed vessel; and (d) a portion of the rind of the seed vessel removed, to show the arrangement of the partitions (phragmata), and the seeds surrounded by the black pulp.

The East Indian and West Indian seed vessels somewhat differ both in appearance and qualities. Of the former the pods are smoother, smaller, and have a thinner rind; and the pulp is of a deeper shining black colour, sweeter, and more agreeable to the taste. The heaviest pods, in which the seeds do not rattle on being shaken, are considered the best.

592. *GUM ARABIC* is a well-known drug, obtained from a tree (*Acacia vera*) or *Egyptian Thorn*, which grows in various parts of Africa

This tree has leaves doubly winged, with spines at the base, small flowers, of a globular shape, growing four or five together on slender footstalks.—Sex. Syst. Polygamia Monœcia.

The principal supply of gum arabic for this country is obtained from Barbary, Turkey, and the Persian Gulf. It issues from clefts in the bark, in the same manner as the gum of the cherry and plum trees of our orchards and gardens: and by exposure to the air it soon becomes hard and solid. Gum arabic is in small irregular masses, or rough pieces, of a pale yellowish colour, and roundish shape; it is imported in large casks.

Much of the gum which is sold in the shops under this name, is the production of another variety of the *Acacia vera*, and is sometimes called *gum Senegal*. The latter is imported from Senegal, Guinea, and other parts of Africa. It is generally in large rough pieces or drops, of a reddish hue, more or less pure; it possesses similar properties to the other, and is much cheaper.

On account of their mucilaginous qualities, these two kinds of gum are used for several purposes in medicine; and in coughs and hoarsenesses are considered of some service. They are principally in request by the manufacturers of water-colours; by dyers, and artificers of different kinds. In Africa the latter constitutes a principal ingredient in the food of the inhabitants. They sometimes dissolve it in milk: and this solution of it is esteemed a favourite repast by some of the tribes.

The dried juice of the *unripe fruit* of the Egyptian acacia is called *acacia*, and is to this day much used in medicine by the Egyptians. It is sometimes imported into this country in roundish masses, wrapped in thin bladders; and

is externally of a deep brown colour, and of a yellowish or reddish brown within.

“Colonel Sykes possesses a small snake entangled in gum arabic, which he removed from the tree himself; and insects, of course, may be entangled in a similar manner; but it is probable they will rarely, if ever, be found in masses which fall to the earth, since from the soluble nature of gum, they would necessarily be dissipated by successive showers.”—(*Hope in Proceed. Entom. Soc.*, vol. ii. p. 47.)

593. *The COMMON BROOM* (*Spartium scoparium*) is a shrub common on sandy pastures and heaths in nearly all the southern parts of England; and is distinguished by having large, yellow, butterfly-shaped flowers, leaves in threes, and single, and the branches angular.—*Sex. Syst.* Diadelphia Decandria.

Few of our wild plants are applicable to more numerous purposes of domestic utility than this. Its twigs are tied in bundles, and formed into brooms. Some persons roast the seeds, and make them into a kind of coffee. The fibrous and elastic parts of the bark, after having been separated by soaking in water, may be manufactured into cordage, matting, and even into a coarse kind of cloth. The twigs and young branches have been successfully employed as a substitute for oak bark, in the tanning of leather. They may also be rendered serviceable as thatch for houses and corn ricks; some persons mix them with hops in brewing; but it is doubtful whether, in this respect, they are wholesome. The flower buds, when pickled, have occasionally been used as a substitute for capers.

The wood, where the dimensions are sufficient for the purpose, is employed by cabinet-makers for veneering. The green tops are diuretic and cathartic; a decoction of them has been found efficacious in the cure of dropsy.

594. *SPANISH BROOM* (*Spartium junceum*) is a well-known ornamental flowering shrub in our gardens, which has opposite round branches that flower at the top, and spear-shaped leaves. A variety with double flowers.—*Sex. Syst.* Diadelphia Decandria.

In the province of Valencia, and other parts of Spain, great attention is paid to the manufacture of various articles

from the *twigs* and *bark* of this shrub. They are plaited into mats, carpets, covering for plants, baskets, ropes, and even shoes. The Spanish broom is most readily raised from the seed grown in this country.

595. *FURZE, GORZE, or WHIN* (*Ulex Europæus*), is a well-known thorny shrub, which is common on heaths and waste ground in almost every part of England.—*Sex. Syst.* Diadelphia Decandria.

The chief uses to which furze is applied are for fuel and the heating of ovens. Its *ashes* are used for a ley, which is of considerable service in the washing of linen. The most profitable use of it is, however, as green food for cattle.

Furze is sometimes sown on banks round fields, for the purpose of a fence; and it will flourish even close to the sea side, where the spray of the sea destroys almost every other shrub. But it will not bear severe cold, and it is often destroyed by intense frost. It does not often occur in the northern parts of our island.

Horses, sheep, and cattle may be fed on this shrub; and in several places the seeds of it are sown either by themselves, or with barley, oats, or buck-wheat (531). The plants are mown a year afterwards. They will grow for several years, and produce from ten to fifteen tons per acre of food, which is equal in quality and excellence to the same quantity of hay. They are bruised before they are eaten, either in a machine or by heavy mallets on blocks of wood. This operation is requisite in order to break the prickles, and prevent these from being injurious to the mouths of the animals that eat them.

596. *COWHAGE, or COW-ITCH*, is a sharp and barbed kind of fine down or hair, which thickly besets the pods of a bean-like climbing plant *Dolichos pruriens*, Pl. 5. Fig. 53)¹, that grows in the East and West Indies, and other warm climates.

It is an herbaceous plant, which entwines round the adjacent trees or shrubs, and often rises to a considerable height. The

¹ Now called, in the most recent nomenclature, *Stizolobium* another species, the *Stizolobium urens*, yields pods with similar downy hairs; this last is a native of the West Indies: both have the common name of *Cow-itch*.

leaves grow in threes upon long foot-stalks ; and the flowers are large, butterfly-shaped, of a purplish colour, and form long and pendent spikes, which have a very beautiful appearance.—Sex. Syst. Diadelphia Decandria.

Cowhage, when rubbed upon the skin, immediately penetrates it, and causes an intolerable itching. Hence it is sometimes wantonly employed for mischievous purposes ; and hence also it is found very troublesome to cattle and domestic animals, in places where the plants grow. Notwithstanding this, it may be swallowed in safety, and is said to be a useful medicine for the destruction of worms ; it is mixed with syrup or treacle into the form of an electuary.

597. *SOY is a dark-coloured sauce, which is prepared from the seeds of an East Indian plant (Dolchos soja), that has an erect and hairy stem, erect branches of flowers, and pendulous bristly pods, each containing about two seeds.—Sex. Syst. Diadelphia Decandria.*

There is a joke amongst seamen, that soy is made from beetles or cock-roaches. This probably originates from the seeds of the plant having some resemblance in shape and colour to a beetle. These *seeds* are used in China and Japan as food. They are made into a kind of jelly or curd, which is esteemed very nutritious, and which is rendered palatable by seasoning of different kinds.

Soy is thus prepared :—After the seeds have been boiled until they become soft, they are mixed with an equal weight of wheat or barley meal, coarsely ground. This mixture is fermented ; and a certain proportion of salt and water being added, the whole is allowed to stand for two or three months, care being taken to stir it every day, when it is ready for use.

Soy is chiefly prepared in China and Japan ; but that imported from Japan is considered preferable to any other. The quantity annually vended at the East India Company's sales was formerly from eight hundred to two thousand gallons, at an average price of sixteen or eighteen shillings per gallon. It is to be feared that much of the soy sold in this country contains a considerable portion of *ketchup*.

598. *BEANS* (*Vicia faba*) are well known seeds of an annual plant, a native of the East, and particularly of Egypt, of which there are several varieties; some of these are cultivated in fields, and others in gardens. They have been known in this country from time immemorial.—*Sex. Syst.* Diadelphia Decandria.

Field, or *horse-beans*, as they are frequently called, are small and somewhat round. The cultivation of them is pursued to a considerable extent. They are in many respects an advantageous crop to the farmer, and will thrive on any land where the soil is sufficiently stiff. They are usually sown in the month of February. There is much uncertainty in the crop, particularly from the ravages of a small black fly, myriads of which are frequently seen to crowd the tender tops of the plants.

The bean-harvest is seldom completed till nearly the end of September; the produce is from two and a half to five quarters per acre.

There are several varieties of field-beans; but the fine and very small ones usually bear the highest price. Bean flour is not only thought more nutritive, but is found to be more abundant than that of oats. Beans are chiefly applied to the feeding of horses, hogs, and other domestic animals; and it is supposed that mealmen often grind them amongst wheat, the flour of which is to be made into bread. By some persons they are roasted, and adopted as a substitute for coffee. With the Roman ladies bean-flour was in much repute as a cosmetic.

Garden-beans are almost wholly confined to culinary uses. What are called *French-beans*, and *Kidney-beans*, belong to a different genus from the present.

Bean stalks, if subjected to a certain process, are capable of being converted into paper and cordage.

599. *VETCHES* are a small species of beans (*Vicia sativa*) which grow wild in dry meadows, pastures, and corn-fields, and are also cultivated in most parts of England.

The pods are generally in pairs; and the leaves winged, having each about six pairs of leaflets, with a branched tendril at the extremity. At the bases of each of the leaves there is a small stipule, marked with a dark spot.—*Sex. Syst.* Diadelphia Decandria.

The principal use of vetches is as provender for horses

and cattle. They are grown so early as to allow of being fed off, or cut for this purpose, in sufficient time for turnips to be sown the same year. When the land is to be prepared for a wheat crop, it is sometimes customary to plough in the vetches as manure. The *seeds* afford a grateful food for pigeons.

600. *PEAS* (*Pisum sativum*) are the seeds of an annual plant too well known to need any description. The native country of the pea is unknown, but supposed to be the south of Europe.—*Sex. Syst.* Diadelphia Decandria.

There are several kinds of peas, some of which are cultivated in gardens, and others in fields. The former are principally used for culinary purposes. In the early part of the year, gardeners in the neighbourhood of London raise them on hot-beds. The kind they select for this purpose are the dwarf peas. These are sown about the middle of October in warm borders; and afterwards, towards the end of January, they are removed into the hot-beds. The inducement, of course, is the enormous prices that are paid for the earliest peas brought into the market. The podding or picking of green peas for the London market is also a valuable branch of the business of some farms within a few miles of the metropolis. Many attempts have been made to preserve green peas for use in winter; one of these is by bottling them, and another by drying them in an oven, and afterwards keeping them in paper bags; but none of the modes have been attended with complete success.

Field peas are sown about March or April, and succeed best in light, rich soils. They are generally considered an uncertain crop; but this is owing in a great degree to want of due attention to their culture.

In common with most other seeds of this class, peas are a nutritive food to persons of strong stomachs. When boiled in a fresh or green state, they are both wholesome and agreeable; and when ripe and ground into meal, they are peculiarly serviceable for the fattening of swine. The flour of peas is not unfrequently mixed by bakers amongst that of wheat for bread; but bread made of this flour alone is heavy and unwholesome. Three parts of rye-flour and one of ground peas are said to yield a palatable and nourish-

ing bread. Peas that are freed from their husks, and split in mills constructed for the purpose, are used for puddings and soup. The *straw* of field peas, if saved in favourable seasons, is a useful food for horses, cattle, and sheep.

It has been presumed that the *everlasting pea* (*Lathyrus latifolius*), a native of some of our hedges, and commonly grown as an ornamental flower in our gardens, would be an advantageous green food for horses and cattle,

601. *LIQUORICE* is the root of a perennial plant (*Glycyrrhiza glabra*)¹, with winged leaves, and purplish butterfly-shaped flowers, which grows wild in the south of Europe, and is cultivated near Pontefract in Yorkshire, Worksop in Nottinghamshire, and Godalming in Surrey, and in the vicinity of London. It is a native of the south of Europe.

The stalks of the liquorice-plant are usually four or five feet high. The leaves are winged, and the leaflets egg-shaped, with an odd one at the extremity. The flowers grow in long spikes from the junction of the leaves and branches. The roots are long, round, tough, of a brown colour externally, and yellow within.—*Sex. Syst.* Diadelphia Decandria.

The principal use of liquorice is in medicine. It contains much saccharine matter, joined with some portion of mucilage; and is one of the few sweet substances which tend to allay thirst. Liquorice is used in coughs and hoarsenesses. When boiled in water, it gives out nearly all its sweetness; and this, when the moisture is evaporated, produces, by different processes, what are called *Spanish liquorice*, *liquorice cakes*, *liquorice lozenges*, and *Pontefract cakes*. The former of these is used to great extent in the brewing of porter. It is said that more than two hundred tons weight of it are annually manufactured in Spain, a considerable portion of which is reputed to be sold to the London brewers for this purpose; the best is, however, brought from Italy. The liquorice powder found in the shops is too often adulterated.

The soil in which liquorice is cultivated should be deep, light, and sandy; and the roots, which strike deeply into the ground, should be planted in rows, at the distance of a foot and a half or two feet from each other. Three years elapse after the roots are planted, before they are in perfec-

¹ By the most recent nomenclature *Liquoritia officinalis*.

tion. The amount of customs duty paid on liquorice, in 1839, was 25,258*l*.

602. *SAINT-FOIN* (*Hedysarum Onybrichis*) is a British perennial plant with winged leaves, somewhat pyramidal bunches of butterfly-shaped flowers, marked with red, white, and purple: and oblong, hairy pods, each containing a single seed. There are several varieties.—*Sex. Syst.* Diadelphia Decandria.

This plant is cultivated in several of the farming districts of England, as food for horses and cattle; it succeeds best on dry and chalky lands, in high and exposed situations. The seed should be sown in February or March: during the first year, the plants should remain untouched. In the ensuing summer a crop of hay may be obtained from them; after this the saint-foin may be regularly mown twice every year, for eight or ten years. When intended for hay it should not be cut before it is in full bloom, about the beginning of July, as otherwise the quality of the hay would be much injured. In its green state it is useful for all sorts of stock; but it has been thought to affect the flavour of the milk when given to cows. No pasture is considered more excellent for sheep than this. Saint-foin is also sometimes sown with clover, and sometimes with barley.

603. *COMMON RED or BROAD CLOVER* (*Trifolium pratense*) is a well-known perennial field plant, much cultivated in this country.—*Sex. Syst.* Diadelphia Decandria.

Clover is chiefly grown in firm and good soils, either as green food for horses and cattle, or to be cut for hay. On grass farms it is sometimes sown in conjunction with spring corn, and sometimes with ray-grass; and its utility in the fattening of cattle is well known. This species of clover grows wild, in meadows and pastures of most parts of Europe; and in some countries, during a scarcity of provisions, the flowers have been made into a kind of bread. In Sweden the heads are used as a green dye.

604. *LUCERN* (*Medicago sativa*) is a native perennial plant, with small purple butterfly-shaped flowers, twisted pods, the stem erect and smooth, and the leaves in threes.—*Sex. Syst.* Diadelphia Decandria.

Although a wild plant in nearly every country of the

temperate parts of Europe, this useful vegetable has only of late years been introduced into cultivation. It flourishes most luxuriantly in deep, rich, and friable loams, and when cut green is a very useful food for cattle, particularly cows. It may be cut three or four times a year. The value of lucern may be considerably increased by sowing it with oats; and though an expensive crop, it yields great profit.

605. *INDIGO* is a blue dye obtained from several plants of the genus *Indigofera*, which grow in the warm climates of the globe. The plant from which indigo is obtained as an article of commerce are, the *Indigofera tinctoria*, a native of the East Indies; the *Indigofera anil*, and the *Indigofera argentea*, and some others, natives of the West Indies. Most of them are elegant shrubs.—*Sex. Syst.* Diadelphia Decandria.

The culture of indigo is an object of considerable importance in the East and West Indies, and in some parts of America. It is sown about the middle of March, in rows fifteen inches asunder. The plants come into flower about three months afterwards, and are in a state to be cut about the month of August. They are cut with a hook, a few inches above the root, and then laid in strata, in a vat, and covered with water. In this state they are left to ferment, and the fluid or pulp, which is first green, afterwards becomes of a deep blue colour. It is now drawn off into another vat, where it is strongly and incessantly beaten and agitated, until the colouring matter is united into a body. The water is then drawn off; and the indigo, after undergoing some further preparations, is cast, in boxes or moulds, into small pieces, each about an inch square, and packed up for sale. Indigo is used by dyers, calico printers, and paper stainers, to an extent so great that, in the year 1827, above 6,000,000 lbs. of it were imported into this kingdom. The *stone-blue*, and some other blues used by laundresses, are prepared from indigo. Painters use it also as a water colour.

Indigo is of various qualities. The best, called *Flora* or *Guatemala* indigo, floats on water; it is of a rich, dark blue colour, approaching to black, and when cut or scratched with the nail appears of a *copper* colour: indeed the *copper*

hue of all indigo when cut or scratched is usually considered the chief criterion of its quality.

From the leaves of *Polygonum tinctoria*, treated in the same manner as those of indigo, the French chemists have recently obtained a blue colouring matter, which is likely to become an article of some importance.

The amount of customs duty paid on indigo in 1839, was 35,270*l.*

NAT. ORD. 20. BERBERACEÆ, *Lindl.*—THE BARBERRY TRIBE.

606. BARBERRIES are a beautiful red and oblong-shaped fruit, produced, in small bunches, by a shrub (*Berberis vulgaris*), which grows wild in many parts of England. This shrub has somewhat oval serrated, and pointed leaves; thorns growing three together upon the branches; and pendent clusters of yellow flowers. There are two other varieties, with purple and white fruit.—*Sex. Syst.* Hexandria Monogynia.

So great is the acidity of this beautiful fruit, that even birds refuse to eat it. In this respect it nearly approaches the tamarind (588). When boiled with sugar, however, it makes an agreeable preserve, rob, or jelly, according to the different modes of preparing it. Barberries are also used as a dry sweetmeat, and in sugar-plums or comfits; are pickled with vinegar, and are used for the garnishing of dishes. They are likewise well calculated to allay heat and thirst in persons afflicted with fevers. The bark of this shrub was said to be useful in jaundice, &c., but modern medicine does not recognize it. The inner bark, with alum, dyes linen a fine yellow colour. The roots, but particularly their bark, are employed, in Poland, in the dyeing of leather.

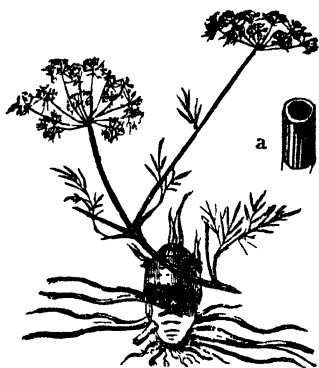
It has been said that corn sown near the barberry shrub, proves abortive, the ears being in general destitute of grain; and that this influence is sometimes extended to a distance of three or four hundred yards across a field. A similar opinion, on this subject, prevails in France, as well as in England, but this is still questionable. See *DAVY'S Agricultural Chemistry*, p. 266.

NAT. ORD. 19. UMBELLIFERÆ, *Juss.*—THE UMBELLIFEROUS TRIBE.

(As a general rule, the plants of this order, growing in dry elevated pastures and situations are aromatic, but if they grow in low marshy situations they must be looked upon as poisonous.)

607. The COW-BANE OR WATER-HEMLOCK (*Cicuta virosa*)

Fig. 64



Cow-bane.

is a very acrid and poisonous British plant, growing in ditches, and about the margins of rivers and lakes. The roots, which are hollow and divided by transverse partitions into large cells, are extremely poisonous to man, as is also the whole plant, although cattle are said to partake of the leaves with impunity. It flowers in July and August, and bears a branched stem of from three to four feet high.

608. PARSLEY (*Petroselinum sativum*. *Hoffm* ¹) is a biennial umbelliferous plant, too common to need any description. Three varieties of parsley are known to gardeners:—The Common plain-leaved; the Curled thick or double-leaved; and the Broad-leaved or large Hamburg rooted.—*Sex. Syst.* Pentandria Digynia.

The uses of parsley as a culinary plant are numerous and well-known. The Hamburg variety is cultivated for its root, which is eaten like parsnips; it is also said to be a good remedy for the gravel. The doubled-leaved parsley is the best as a pot-herb.

Parsley was formerly in the *Materia Medica*, but it is of trifling importance as a medicine. It is eaten with great avidity by sheep.

It is a native of Sardinia, and was introduced into this

Formerly called *Apium Petroselinum*. Linn.

country in 1584; and is now naturalized in several places in Great Britain. Mr. Forster is of opinion that it has a stronger claim to a place in the British Flora, than many plants that are admitted.

609. *The COMMON or SPOTTED HEMLOCK* (*Conium maculatum*) is an herbaceous plant, native of Europe, and is characterized by the presence of a glabrous spotted stem, tripinnate leaves, an involucre consisting of from five to seven leaflets, three of which are placed on one side; the fruit has five ridges, with crenated margins; root fusiform. *The officinal parts of the plant are the leaves and stem.*—*Sex. Syst.* Pentandria Digynia.

Like many others of this tribe, much of its activity depends on the soil and climate in which it is cultivated. Thus, in Russia, and other northern parts of the world, this poisonous vegetable is eaten with impunity; while in the South, a small quantity acts as a poison. In procuring the plant for medicinal purposes, care should be taken to collect the *leaves* at the period when it is about to flower, as the juices are then in their most elaborated state. In drying the leaves of this vegetable, as well as others, it should be observed, that artificial heat carried to too great a degree dissipates in a measure their *volatile* active principles.

Conium in the form of *powder, extract, and tincture*, is much used in medicine on account of its narcotic and anodyne properties, without producing any sedative or stimulant action. In cases of poisoning by this herb, tonic emetics, diffusible stimulants, and nervous excitants are more particularly recommended.

610. *CELERY* (*Apium graveolens*) is a well known indigenous biennial plant. Several varieties are in cultivation; the Turnip-rooted is cultivated for its root.—*Sex. Syst.* Pentandria Digynia.

Celery is found growing wild by the sides of ditches, and on moist places in several parts of England, and is called *smallage*, in which state it has a rank coarse taste that the process of *blanching* by cultivation destroys. The *seeds*, however, of smallage, are useful to flavour soups.

The seeds are sown in the spring, and the plants may be transplanted into trenches, and earthed up for the purpose of blanching, and may be taken out for use in the autumn, or subsequently.

It is eaten raw in salads, boiled in soup, or stewed. The *seeds* are used, particularly at sea, for the flavouring of soup, to which they give the same taste as the plant itself.

611. *ANISE-SEEDS* are the production of an *Umbelliferous annual plant* (*Pimpinella anisum*), which grows wild in *Egypt, Syria, and other Eastern countries*. They are roundish and striated, flattened on one side, and pointed at one end; and of a pale colour, inclining to green.—*Sex. Syst.* Pentandria Digynia.

Although the anise plant is now cultivated in our physic gardens, and ripens its seed in August, and although it is grown in considerable quantities at Mitcham, in Surrey, chiefly for the use of rectifiers of British spirits, yet the seeds found in the shops are imported from Spain, Malta, or Germany; those from *Alicant* are esteemed the best, fetching as much at 9*l.* the cwt; while those from Germany and England much less.

Anise-seeds have an aromatic smell, and a pleasant warm taste, accompanied with some degree of sweetness. They have long been employed in medicine, and have been considered useful in diseases of the lungs and complaints of the stomach. They give out all their virtue to rectified spirit; and a spirituous water prepared from a mixture of equal parts of anise-seed and angelica, is kept in the shops as a cordial. An oil is also obtained from them.

The *oil* is a useful carminative; it has the peculiar property of congealing at the temperature of 50°, and is therefore usually met with in a concrete state; according to Mr. Brande, one cwt. of the fruit yields about two pounds of oil. A few drops of the oil will kill pigeons; Vogel accidentally discovered this fact. The duty of 5*s.* per cwt was paid on 192 cwts. in the year 1839.

612. *FENNEL* (*Fœniculum vulgare* ¹ *Gærtn.*) is a well known

Formerly called *Anethum Fœniculum*. Linn.

plant, which is cultivated in gardens, and grows wild in several parts of England.—Sex. Syst. Pentandria Digynia.

The *leaves* of fennel, both boiled and raw, are used in sauce for several kinds of fish. The tender buds are eaten in salads; and in Italy, the *stalks* are sometimes blanched as winter salad. A *distilled water*, prepared from the seeds, is occasionally administered as a medicine; and there was formerly a notion that the *roots* were peculiarly valuable, as a remedy in several diseases, but they are now almost wholly disregarded. It may be administered in the flatulent colic of children, and with medicines prone to gripe. An *oil* is also obtained from the bruised seeds.

613. CARAWAY is a small well known seed, produced by an Umbelliferous biennial plant (*Carum Carui*), with smooth and double winged leaves, narrow leaflets, and small white or pale flesh-coloured flowers, of which the petals are bent inward, so as to become heart-shaped.—Sex. Syst. Pentandria Digynia.

The *seeds* of caraway have a pleasant spicy smell, and a warm aromatic taste. They are much used by pastry-cooks and confectioners in cakes, and for other purposes. Incrusted with sugar, they are called caraway comfits. They are also distilled with spirituous liquors, to improve their flavour; and are given as a medicine in several disorders. An essential *oil*, *water*, and a *spirit*, are also prepared from them. It is this oil which gives the peculiar smell to *Windsor soap*. The young *leaves* are sometimes used in soups, or boiled with pot-herbs. The *roots* may be converted into an agreeable pickle; and, if simply boiled, they are said to be better than parsnips.

This plant grows wild in several parts of England, but particularly in meadows and pastures near Bury St. Edmunds, in Suffolk. It is much cultivated in Essex and Kent, sometimes alone, and sometimes mixed with teasel (477) and Coriander (615), much of that sold in the shops is mixed with seed imported from Germany. The season for cutting it is in July; and it is threshed in the field on a cloth, in the same manner as rapeseed. Duty of 30s. per cwt. was paid on 515 cwts. in 1839.

614. PARSNIP is the root of an Umbelliferous biennial plant

(*Pastinaca sativa*), with winged and serrated leaves, and small yellow flowers, which is cultivated in kitchen gardens, and which also grows wild in several parts of England.—*Sex. Syst.* Pentandria Digynia.

The wild and cultivated parsnips differ much from each other, but particularly in the roots of the latter being large and succulent, and those of the former being slender and woody.

Parsnips are propagated by seeds sown in February or March, and the roots are in perfection about October. These, besides their use as a vegetable for the table, are of great value for the feeding of cattle, horses, sheep, and hogs. They are much cultivated in Guernsey and Jersey, chiefly for feeding cows, the milk of which, when fed on parsnips, is said to be peculiarly rich; the variety of parsnip there preferred is called *coquaine*. The butter obtained from such milk is also very fine.

If parsnips be washed clean, and sliced among bran, horses will eat them. They fatten sheep and oxen in a short time; for hogs they are equal if not superior to carrots. As food for mankind they are considered extremely nutritive; and may, with great advantage, be kept on board ships that are destined for long voyages. The tops afford green food for cattle and hogs.

In several parts of Ireland parsnips have been used instead of malt in brewing; and, when properly fermented, they afford an agreeable beverage.

615. *CORIANDER* is a small seed, produced by an annual Umbelliferous plant (*Coriandrum sativum*), with pinnate leaves and small whitish flowers; it now grows wild in Suffolk and Essex, and is cultivated in several parts of England.—*Sex. Syst.* Pentandria Digynia.

In Essex and Kent the cultivation of coriander is chiefly pursued for the seed, which is used by distillers, druggists, and confectioners. In some parts of the North of Europe it is ground and mixed with dough, to give an aromatic flavour to bread.

Coriander is usually grown with teasel (477) and caraway (613); but, as these are biennials, the coriander does not interfere with the other crops. The seed may be sown in February; it blossoms in June, and ripens in July or August. To prevent the seeds of the largest and best

plants from being shed and lost, each stem is cut separately. The stems are then carried into some convenient part of the field, and threshed altogether upon a sail cloth.

So luxuriantly, and, at the same time, so abundantly does this plant grow in a wild state, in some of the southern parts of Europe, as almost to choke the growth of wheat and other grain. Every part of it, when green, if bruised, has a fetid and disagreeable smell. The seeds as a medicine are not of much importance; they are used chiefly to cover the unpleasant taste, and to correct the griping qualities of some cathartics.

The tender leaves are used in soups and salads.

616. *ASSAFÆTIDA* is a gummy resinous exudation, procured from the root of a large Umbelliferous perennial plant (*Ferula Assafœtida*) which grows in the mountains of Chorasan and Laar in Persia.

The leaves of this plant are nearly two feet long, doubly winged, and have the leaflets alternate; the stalk is nine feet high. The flowers are small, and the seeds oval, flat, and each marked with three longitudinal lines.—*Sex. Syst.* Pentandria Digynia.

No one who has ever smelt the peculiarly powerful, and garlic-like-odour of assafœtida, can well forget it. If exposed to the air, but particularly when heated, it will pervade every apartment of a house. Notwithstanding this, it constitutes a favourite seasoning, for food, with the inhabitants of many of the eastern countries of the world. The Banian Indians, who never eat animal food, use it in almost all their dishes: and, before their meals they even rub their mouths with it, to stimulate their appetite. It is sometimes used by our own cooks, but in very small quantity, in place of garlic. In many parts of Arabia and Persia, assafœtida is much esteemed as a remedy for internal diseases, and even as an external application to wounds. With us, it is considered a serviceable medicine in several disorders, and is stimulant, expectorant, and antispasmodic: in hooping-cough and worms; in asthma, dyspepsia, hysteria, and in flatulent colics, it has, in many cases, afforded great relief. It is imported in masses of various sizes and form; of a yellow or brown colour on the outside, whitish within; and has been recently found to contain as much as 23 per cent. of sulphur.

When the root of the plant is four years old it is in a condition to yield the assafœtida, which is obtained from it

when the stem and leaves begin to decay; these being separated from the root, it is laid bare by digging around it. Subsequently the top of the root is cut off transversely; after two days the juice which has exuded is scraped off and another transverse section made. This is repeated thrice; the root is then untouched for eight or ten days before another section is made, by which it is exhausted, and perishes. The juice collected from a number of roots is put together, and dried in the sun.

In the year 1784, the assafœtida plant was introduced into the Botanic garden at Edinburgh, from seeds which had been sent by Dr. Guthrie of Petersburg to Dr. Hope. The duty of 6s. per cwt. was paid on 60 cwts. in 1838, and on only 24 in 1839.

The *Ferula* (OR GIANT FENNEL) consists of several known species of plants; the *Ferula communis* is a native of the south of Europe, and is occasionally grown in this country, where its stalks have grown fifteen feet high.

In some parts of the Levant the sailors are said to use the stalks of the *Ferula communis* to transport fire from one island to another. This custom is of great antiquity, and explains a passage of Hesiod, who speaking of the fire stolen from heaven by Prometheus, says that he carried it in a ferula. The foundation of this fable is undoubtedly owing to what Diodorus Siculus informs us of Prometheus, that he was the inventor of the steel with which fire is struck from flint; and in all probability that prince made use of the pith of the ferula instead of tinder, to convey it from one place to another. The Sicilians, it is said, now use the pith of the stalk for tinder.

617. *ROCK SAMPIRE* (*Crithmum maritimum*) is an Umbelliferous plant, with fleshy spear-shaped leaflets, and small but regular-shaped white flowers.—Sex. Syst. Pentandria Digynia.

The cliffs of Dover have long been celebrated for the production of this vegetable, which has received an additional interest from the notice that Shakspeare has taken of the gathering of it:

“ Half way down

Hangs one that gathers samphire; dreadful trade!”

It is also found on cliffs of other parts of the south of

England more especially, as well as in Italy, France, and Spain; and generally in inaccessible situations.

In some parts of England the *leaves* of sampire are pickled in vinegar for the table: they are also used in salads, and for other culinary purposes. But their place is frequently supplied by a much more common plant, which grows in salt marshes, and has the name of *marsh sampire* (*Salicornia*). This, however, is a very inferior substitute, and entirely destitute of the fine aromatic flavour of the former species.

618. *GARDEN CARROT* (*Daucus Carota*) is a plant too well known to need any description.—*Ser. Syst.* Pentandria Digynia.

In few vegetable productions are the effects of cultivation more conspicuous than in the carrot. The wild plants, which are common in most parts of England, have a root so small and woody, that no one could suppose they had any alliance whatever to the large and succulent root of the garden carrot.

The carrot (as an agreeable variety of human food, when sufficiently boiled) is well known. It is also an excellent fodder for cattle and horses, either alone or mixed with hay; and if given to cows, in winter or the early part of spring, it is said to cause a great increase of milk. If carrots be boiled with their wash, hogs will thrive well upon them. In some parts of England this vegetable has been cultivated as a winter food for deer; and the leaves have sometimes been made into hay. Carrots contain a large proportion of saccharine matter, and various but unsuccessful experiments have been made to extract sugar from them. They have, however, been more advantageously employed in distillation. Ten pounds' weight of carrots will yield about half a pint of very strong, ardent spirit: and the carrots (twenty tons in weight) produced by an acre of ground, have been known to produce 240 gallons of spirit. A syrup made of these roots, and clarified with the white of eggs, has been found useful for many purposes. The *seeds* of the *wild carrot* are carminative and diuretic. A marmalade of carrots has been used with success in sea-scurvy, and a poultice prepared from them is sometimes employed in cancerous ulcers. Crickets are so fond of these roots

that they may easily be destroyed by making a paste of flour, powdered arsenic, and scraped carrots, and placing this near their habitations.

In addition to the above named plants of the Natural Order *Umbelliferæ*, there are many others of great importance, which the reader should at least be made acquainted with; such are the gum resin known as *Sagapenum*, said to be the produce of the *Ferula Persica* of Willdenow—its effects are very nearly allied to *Galbanum*: *Ammoniacum*, the produce of *Dorema Ammoniacum* of Don, growing in Persia and some parts of Arabia; its properties are those of a stimulating expectorant, possibly antispasmodic and emmenagogue; the *Galbanum* obtained from the *Galbanum officinale* of Don, is likewise a gum-resin, the tree yielding it grows on the Eastern coast of Africa, although considered a native of Syria; its properties are analogous to the last named. To these may be added those used as articles of diet, not quoted above, such as the *Eryngo*, the produce of the roots of *Eryngium campestre*, which when preserved are eaten as a candy; and lovage (*Levisticum officinale*) the roots, leaves, and seeds of which are aromatic, stomachic, and diaphoretic,—the stems yield *English Opoponax*; in addition to this, the plant is used by the distillers for the preparation of a liquor called *lovage*.

The *Fool's parsley* so commonly found mixed with garden parsley (607), and in waste places, has on many occasions, when the plant has been mistaken for the palatable herb, been the cause of loss of life. It may be readily distinguished by its darker coloured leaflets, and by its possessing only *three* pendent leaves *on one side* beneath the flowers; it contains a peculiar alkaloid principle, known as *Cynapin*. The juice of the *Hemlock water-dropwort* (*Ceanothe crocata*) is of a *yellow* colour, and is very poisonous; it grows in watery places, by ditches, and rivers, frequent in England. The root consists of large fusiform tubers.

NAT. ORD. 18. GROSSULACEÆ. Dec.—THE CURRANT TRIBE.

619. *RED CURRANTS* are the fruit of a well known British shrub (*Ribes rubrum*), which is cultivated in gardens; and which

also grows wild in woods or thickets of some of the northern parts of England. Its branches are smooth and pendant ; and its flowers are flattish.—*Sex. Syst.* Pentandria Monogynia.

The utility of this fruit in domestic economy has long been established. Its acidulous *juice*, boiled with an equal weight of loaf sugar, forms an agreeable substance, called *currant jelly*, which is much employed in saucers and for other culinary purposes ; and also for sore throats and colds ; in febrile complaints, it is useful on account of its readily quenching thirst. The French frequently mix currant jelly with sugar and water, as a beverage ; and by many persons, this mixture is preferred to orgeat or lemonade. This juice, fermented with a proper quantity of sugar, becomes a palatable wine, which is much improved by keeping. Modes of making this, as well as other British wines, are to be found in all the domestic receipt books.

White and *flesh-coloured currants* have nearly the same qualities as the red species.

620. **BLACK CURRANTS** are the fruit of a garden shrub (*Ribes nigrum*), which is distinguished by having its branches hairy and its flowers oblong, and by the emission of a very strong and singular smell from every part of the plant.—*Sex. Syst.* Pentandria Monogynia.

The berries of the black currant shrub are larger than those of the red ; and, in some parts of Siberia, are said to attain the size of a hazel nut. They are occasionally made into wine, jelly, and rob or syrup. The two latter are sometimes employed for sore throats ; and, from the use of black currants in such complaints, they have sometimes been denominated *squinancy* or *quincy berries*.

The *leaves* have been recommended for their medicinal virtues. An infusion of them, in the manner of tea, is, by many persons, preferred to tea. The tender leaves tinge common spirits so as to resemble brandy ; and an infusion of the young *roots* is said to be useful in eruptive fevers.

Black currant trees grow wild in wet hedges, and near the banks of rivers, in several parts of Norfolk. The berries of this shrub are the largest of all the British species of currants. The *dried currants* of the shops do not belong to this family, but are a small kind of grape.

621. *GOOSEBERRIES* are the fruit of a prickly shrub (*Ribes Grossularia*), which grows wild in several parts of England.—*Sex. Syst.* Pentandria Monogynia.

Few of the garden fruits are more esteemed for the table than gooseberries. For culinary purposes, gooseberries are generally employed before they are ripe; but they do not possess the delicate flavour and rich saccharine qualities of the ripe fruit. Wine made of gooseberries has great resemblance to Champagne. In the making of wine, after the juice has been expressed, it is customary to throw away the *skins* of the fruit. These, however, may with advantage be employed in distillation, as they afford a spirit somewhat resembling brandy. Vinegar may be also made from gooseberries. Some of the kinds are bottled while green, and kept for winter use; and others are, for the same purpose, preserved with sugar.

Gooseberries vary much in colour, size, and quality. Some are smooth, and others hairy. Some are red, others green, and others yellow or amber coloured. Wild gooseberries are greatly inferior in size to those which are cultivated in gardens.

NAT. ORD. 17. CUCURBITACEÆ. *Juss.*—THE GOURD TRIBE.

622. *The COMMON CUCUMBER* (*Cucumis sativus*, Pl. 5. Fig. 59) is an oblong, rough fruit, cultivated in our kitchen gardens, and is supposed to have been originally imported into this country from some part of the Levant.—*Sex. Syst.* Monœcia Syngenesia.

Cucumbers are always eaten before they are ripe, usually with vinegar, pepper, and salt, sometimes with the addition of oil. They are sometimes stewed; and when young (under the name of *gherkins*,) are pickled with vinegar and spices, or preserved in syrup as a sweetmeat.

As the cucumber plants are too tender to sustain the coldness of our climate exposed to the open air, it is necessary to sow the seed in hot-beds, or under hand-glasses; though, in the beginning of summer, the glasses may, without danger, be removed. The fruit is much improved by putting a piece of slate or a tile under each, instead of allowing it to lie upon the naked ground. The cucumber is scarcely, in any state, a wholesome food.

623. The **COMMON MELON**, or **MUSK MELON**, is the fruit of a creeping herbaceous plant (*Cucumis Melo*), which has leaves with rounded angles. Its native country unknown.—*Sex. Syst.* Monœcia Syngenesia.

In hot climates this fruit attains great perfection and a peculiarly fine flavour; and even in England, where it is cultivated in hot-beds, and sheltered by glass frames, it is one of the most delicious summer fruits that we possess. Its size and form vary beyond description. Sometimes it is smooth, and only three or four inches in length: sometimes its whole surface is rugged, or netted, and it is many pounds in weight. Melons are grey, yellowish, or green, externally; whilst their flesh is white, yellow, reddish, or green.

They are usually eaten with sugar; sometimes with pepper or ginger, and salt: and sometimes alone. In France, they are often eaten as a sauce to boiled beef. The smaller kinds are pickled; and one particular sort of melons are filled with mustard seeds and shred garlic, and pickled under the name of *mangos*.

The propagation of melons is by seed, sown in February or March; and the cultivation is somewhat similar to that of the cucumber, but is attended with considerably more trouble and expense.

624. The **PUMPKIN**, or **POMPION**, is a species of gourd which grows to an enormous size, contains several cells, and numerous seeds with tumid margins, and is produced by a creeping plant, with lobed leaves (*Cucurbita pepo*). It is a native of the *Levant*.

The shape of the pumpkin is generally globular, or flatted at top and bottom, and ribbed. The rind is glossy, and of a yellow or green colour. The flesh is firm, but melting, and the whole weight is sometimes more than thirty pounds—*Sex. Syst.* Monœcia Syngenesia.

The Germans cultivate this plant in extensive fields, for various economical purposes, but particularly for the feeding of swine, and other animals. They cut it into pieces, and throw it into fish-ponds, as food for carp. Little trouble is required in its culture; and it will flourish on any tolerable soil, in a warm and sheltered situation. The pulp is served at table in various forms, but parti-

cularly in pies, and as an ingredient in puddings and pancakes. The Americans frequently gather pumpkins when half grown, and eat them boiled as a sauce to meat. The *seeds* are edible, and yield a large quantity of oil; when ground with water they afford a cooling and nutritious kind of milk.

625. The *BOTTLE GOURD* is an Indian fruit with a woody rind, and often shaped like a bottle; it is the fruit of a creeping plant (*Cucurbita lagenaria*) with somewhat angular and downy leaves, each having two glands at the base underneath.—*Sex. Syst.* Monœcia Syngenesia.

This fruit is at first green, but when ripe, it assumes a dull yellow colour; and the flesh is spongy and very white. Its size and shape are various; sometimes it has a long slender part next the stalk, like the neck of a bottle; sometimes it is swollen, and sometimes of great length, and of form so curved as to be shaped almost like a bugle horn, or the musical instrument called a serpent.

So hard and strong is the *rind* of the bottle-gourd, that this, when freed from the pulp, is frequently converted by the Americans, as well as the inhabitants of the West Indies, into drinking cups, flagons, bottles, and other domestic utensils; but, on being first used, it communicates a disagreeable taste to the juices contained in it. The *pulp*, boiled with vinegar, is sometimes eaten.

626. The *WATER MELON* (*Cucurbita Citrullus*) is a roundish or oblong species of gourd, with a thin smooth rind, marked with star-like spots, the leaves deeply divided into lobes, and the flowers somewhat resembling those of the cucumber; sometimes this fruit is a foot and half long.—*Sex. Syst.* Monœcia Syngenesia.

Persons who have visited hot climates know well how to appreciate the grateful coolness and delicious flavour of the water melon, the flesh of which is so succulent that it melts in the mouth; and the central pulp of which is fluid, like that of the cocoa-nut, and may be sucked, or poured out through a hole in the rind, and thus made to afford a most refreshing beverage.

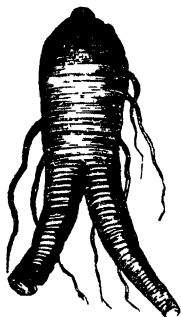
To the inhabitants of Egypt, China, the East Indies, and other countries, where they are cultivated to a great extent, water melons are extremely valuable both as food and

physic. They are allowed to be eaten in fevers and other inflammatory complaints. Their pulp is, in general, of a reddish colour; one kind, however, called by the French *pastèque*, has a whitish green pulp. The latter are frequently pickled in vinegar, like gherkins; and are eaten in fricassees, or baked in sweet wine.

Both these varieties may be grown in our gardens, under hot-bed frames, in the same manner as cucumbers.

627. The *VEGETABLE MARROW* (*Cucurbita ovifera*) and the *MELON PUMPKIN* or *SQUACH* (*Cucurbita Melo-pepo*) are also employed as delicacies for the table.

Fig. 65.



White Bryony Root.

628. The *WHITE BRYONY ROOT* (*Bryonia alba*) is commonly used by the vulgar as a topical remedy for black eyes, and other bruised parts of the body. The plant grows in many parts of England, and is the only individual indigenous to Britain belonging to the gourd-tribe. Its light green, straggling, climbing stems with tendrils must be known to country observers in the summer, and its bright red berries in the autumnal or winter months. The root, of which a representation is given in the margin, is sold by *simplers* or *herbalists* as the

mandrake root. It may be seen outside the doors of these imposing venders variously carved and modelled into a form, bearing the fanciful resemblance to that of the human figure. It is principally resorted to by the poorer classes for the purposes above mentioned. The acrid narcotic poison, the *true Mandrake*, is the produce of *Mandragora officinalis*, a plant belonging to the Nat. Ord. SOLANACEÆ. By Mathiolus it was reported to possess aphrodisiac properties.

NAT. ORD. 16. GUTTIFERÆ¹. *Juss.*—THE MANGOSTEEN TRIBE.

629. *GAMBOGE* is a yellow gum-resinous exudation, obtained

¹ Also called CLUSIACEÆ, *Lindl.*

from a tree of moderate size (*Hebradendron cambogioides* of Graham¹) which grows in Ceylon.

The leaves of this tree are obovate, elliptical, opposite, stalked, and of an obscure green colour. The male flowers are either in distinct clusters or axillary; the petals are four, crenulate, and of a yellowish white colour externally, red on the inside. The fruit is a reddish brown berry, containing several long elliptical, kidney-shaped seeds with a sweet pulp. The tree is of a middling size and moderately branching.—*Sex. Syst.* Monœcia Monadelphia.

The name of Gamboge is said to be derived from the country whence it has been supposed to be brought, namely *Cambogia*; but more accurate information has dissipated the historical anomalies concerning this gum.

In Siam it is obtained in *drops* by breaking the leaves and young shoots; in Ceylon from the bark of the tree wounded with a sharp stone. It is collected first in cocoa-nut shells, then put into earthen jars, where it remains till nearly dried to a cake, when it is formed into rolls and wrapped in leaves; it is then packed in cases. It was first brought to Europe by the Dutch in the middle of the seventeenth century.

Gamboge is a well-known pigment. When good, it is of a fine orange colour; and on being softened with water, is a bright yellow, requiring no preparation previously to being used. It is also a useful purgative; but its operation being very violent (drastic), it should be administered with great caution.

When a small quantity of this pigment is mixed with water and placed beneath the microscope, a number of minute globules will be seen in active motion, very much resembling living atoms; these are the *active molecules* first described by Mr. Robert Brown.

NAT. ORD. 16. RHAMNACEÆ, *Lindl.*—THE BUCKTHORN TRIBE.

630. *The PURGING BUCKTHORN* is obtained from the berries of the *Rhamnus Catharticus*, a shrub, native of Europe, which grows to the height of seven or eight feet, in thickets and

¹ In the former editions of this work gamboge was said to be obtained from the *Garcinia cambogia* and *Stalagmitis cambogioides*.

hedges, and has clusters of small green flowers, and somewhat oval leaves, serrated at the edge. The berries are the only parts used, and are about the size of a pea, round and somewhat flattened at the top, of a shining, black appearance, smooth, containing, in the midst of a green juicy pulp, four seeds.—Sex. Syst. Pentandria Monogynia.

The berries of the buckthorn ripen in October; when perfectly ripe they yield a green tint. Their juice is made into the *sap-green* which is used by painters in water-colours, by evaporating it to the consistence of a gum, and adding lime. From the juice of the unripe berries, mixed with alum, a yellow dye is obtained, which is employed by dyers, and also for staining maps or paper. If the fruit be gathered late in the autumn the juice is purple. The *syrup* of buckthorn berries is sometimes used as a cathartic in dropsies and other complaints, though there are objections to it from its occasioning sickness and griping. The berries have a faint disagreeable smell, and a nauseous bitter taste. It is not unusual to mix with, or substitute for them, the fruit of the berry-bearing alder, and of the dog-berry tree. The fraud is, however, easily detected; for the buckthorn berries have each four seeds, which the others have not.

The *Syrup* of Buckthorn is a well-known purgative for children, and may be given when other more nauseous purgatives are refused by young patients. In its administration, on account of its producing griping, aromatics should be added. It is now principally employed as an adjunct to other purgative medicines. When given to dogs they act powerfully.

NAT. ORD. 15. PAPAVERACEÆ, *Juss.*—THE POPPY TRIBE.

631. *The WHITE POPPY* (*Papaver somniferum*) is a naturalized English plant (Fig. 66), with smooth calyx and seed-vessels, and with leaves embracing the stem, which grows wild in neglected gardens, and some corn-fields, and to which we are indebted for an important medicine, opium.—*Sex. Syst. Polyandria Monogynia.*

Although the white poppy has long been naturalized in this country, it is supposed that we were originally in-

debted for it to some parts of Asia. Throughout nearly the

Fig. 66.



The White Poppy.

whole of that quarter of the world it is cultivated with great attention, on account of the *opium* which is obtained from it. Opium is the dried juice of the seed-vessels, and is thus procured:—After the petals have fallen off, and the seed-vessels or capsules (Fig. 66. a) are about half grown, the latter are wounded on one side, with an instrument having four or five teeth, the gashes being made about an inch in length. A glutinous, milky fluid exudes from the wounds: this is carefully scraped off, on the ensuing day, by a person who, in similar manner, wounds the opposite

side of the head; the juice issuing from which is afterwards similarly collected. The whole is then put into earthen vessels, where it is worked by the hand, in the open sunshine, until it attains sufficient consistence to be formed into balls or cakes; after which it is covered over with poppy or tobacco leaves, and further dried till it is in a proper state for exportation.

Opium is of a reddish brown colour, inclining to black, and has a strong and very peculiar smell. It is adulterated in various ways. The best is brought from Turkey and Egypt, but an inferior kind is imported from the East Indies. But it is probable that with attention as good opium might be obtained from poppies grown in this country as that brought from Turkey. It is true that the seed-vessels of the white poppy do not attain so large a size in this as in warmer climates; but the opium procured from it is said to be of very good quality. It has been calculated that in favourable seasons, the produce of a single acre ought to be near fifty pounds. It is recommended that the seed be sown in autumn rather than in spring. When the seed-vessels have attained a sufficient state of maturity, they may be wounded, and the opium may be

collected by children from eight to twelve years of age. The only proper time for collecting it is in the morning, and seven children and two men have been able to collect one pound and a half in one morning, between five and nine o'clock. The best mode of reducing the opium to a proper consistence appears to be to spread it thinly in shallow dishes, and expose it under glasses to the rays of the sun.

We possess few medicines so valuable as this. It is used chiefly as a remedy for procuring sleep and mitigating pain, which it does in a very remarkable manner. In the latter respects, however, it is too often abused; if taken in large doses, it proves a deadly poison. But so much are the effects of opium diminished by the habit of taking it, that although four grains have, in some instances, proved fatal to grown persons, fifty times that quantity have been taken daily by others. The bad effects of too great a dose are best counteracted by giving the patient a powerful emetic, such as four or five grains of emetic tartar, or four grains of blue vitriol. *After* the poison has been ejected from the stomach, give vinegar, lemon juice, cream of tartar, and strong coffee. The habitual use of opium is attended with the same bad effects as the habit of drinking ardent spirits: it brings on tremors, palsy, stupidity, and general emaciation; and when once acquired it can scarcely ever be relinquished.

Fig. 67.



*Poppy
Capsule.*

It is deserving of remark, that the *seeds* of the poppy have none of the narcotic qualities of the opium. They are mild, sweet, and nutritive; and yield by pressure an oil equal to that of almonds, or of the olive; indeed, it is said that it is often used for adulterating this last oil. Oil of poppy is also employed for delicate painting. So numerous are these seeds that more than 30,000 have been counted from a single seed-vessel, arranged in a curious manner on the sides of small walls or partial projections (parietal-placenta), as seen in the annexed cut.

Laudanum is chiefly a solution of opium in proof spirit of wine, sometimes in wine; and is used for most of the same purposes to which opium is applied. Its effects as a poison may be counteracted in the same manner as those of opium.

No less than eight supposed active principles have been separated from this drug by chemists; the principal of which are Morphia, Codeia, and Narcotine, although the latter is very deficient in medical virtues.

Duty, one shilling per pound, was paid, in 1839, on 40,784 pounds. Previous to the year 1836, the duty was four shillings on every pound.

NAT. ORD. 14. CAPPARIDACEÆ, *Lindl.*—THE CAPER TRIBE.

632. *CAPERS* are the unexpanded flower-buds of a low shrub (*Capparis spinosa*, Pl. 4. Fig. 48), which grows from the crevices of rocks and walls, and among rubbish, in the southern parts of France, in Italy, and the Levant.

The stems of the caper bush are trailing, and two or three feet in length. The leaves are alternate, of a somewhat oval shape, veined, and of a bright green colour; and the flowers are large and beautiful, with four petals, and white with a tinge of red.—*Sex. Syst.* Polyandria Monogynia.

In the south of France the caper bush is as common as the bramble is with us. It grows wild upon the walls of Rome, Sienna, and Florence; when trained against a wall, it flourishes even in the neighbourhood of Paris, notwithstanding which it is almost unknown in English gardens, where it is said it cannot be made to flower without the aid of artificial heat. This shrub is cultivated on a large scale between Marseilles and Toulon, and in many parts of Italy, and in Sicily, whence it is said our chief supply of capers is brought.

In the early part of the summer it begins to flower, and the flowers continue successively to appear till the commencement of winter. The buds are picked every morning before the petals are expanded, and put into vinegar and salt. When a sufficient quantity is collected, they are distributed, according to their size, into different vessels, again put into vinegar, and then packed up for sale and exportation. This pickle is principally used in sauce for boiled mutton.

The flower-buds of the marsh marygold (*Caltha palustris*), and of *Nasturtiums*, are frequently pickled and eaten as a substitute for capers.

NAT. ORD. 13. ANACARDIACEÆ¹, Lindl.—THE CASHEW-NUT
TRIBE.

633. *MYRRH* is a gum resin, the exudation from a tree (*Balsamodendron Myrrha* of Nees.) which grows, according to Ehrenberg, at Gison, on the borders of Arabia Felix. It is rather of a small size, covered with a greyish bark, from which the myrrh exudes.—Sex. Syst. Octandria Monogynia.

This drug is generally imported in a kind of grains, of an irregular form, mixed with large lumps and drops, of a brownish or reddish yellow colour, and somewhat transparent; according to Ehrenberg it exudes from the tree like cherry-tree gum. Its smell is aromatic; and its taste is pungent and bitter. In its medicinal effects myrrh, when taken into the stomach, acts as a stimulant and tonic, and is also reputed to strengthen the other viscera. It is believed to resist putrefaction in all parts of the body; and hence has been recommended as a medicine in malignant, putrid, and pestilential fevers; and in small-pox. It is also employed in tinctures for the teeth and gums, and for tooth-powder.

Two kinds of myrrh are found in the shops: *Turkey* myrrh, which is the best; and an inferior kind called *Indian* myrrh.

634. *MASTIC*, or *GUM MASTIC*, or *LENTISK*, is a concrete resinous exudation obtained from a low tree or shrub (*Pistacia lentiscus*) which grows in the Levant, North of Africa, and the south of Europe.

The mastic-tree has alternate winged leaves, consisting of several pairs of spear-shaped leaflets, and spikes of very small flowers, which issue from the junction of the leaves with the branches.—Sex. Syst. Diœcia Pentandria.

This resin is obtained by making incisions across the tree in different parts, whence the juice exudes in drops, that are suffered to run upon the ground, and there to remain until they are sufficiently hard to be collected for use. The season for this process commences in August, and lasts until the end of September. The best mastic is that

¹ Also called *Terbinthaceæ*. Juss.

imported from the island of Scio. We receive it in semi-transparent grains of a yellowish colour. These emit an agreeable smell when heated; and when chewed they first crumble, and afterwards stick together, and become soft and white like wax.

With the Turkish women it is customary to chew this resin for the purpose of rendering their breath agreeable, and under a notion also that it tends to make their teeth white, and to strengthen the gums. They also mix it in fragrant waters, and burn it with other odoriferous substances, by way of perfume. It was formerly much, and still is occasionally, used in medicine. But it is chiefly employed in the composition of varnish, and by dentists for filling up the cavities of decayed teeth.

The *wood* of the mastic-tree is imported in thick knotty pieces, covered externally with an ash-coloured bark. This wood is accounted a mild, balsamic, astringent; and a preparation of it, under the name of *aurum potable*, is strongly recommended by some of the German writers, in cough, nausea, and weakness of the stomach.

From the *Pistachia officinarum*, or OFFICIAL PISTACHIA TREE, a native of the Levant, are obtained *Pistachia nuts*, so well known in Sicily.

From the *Pistachia terebinthus*, or TURPENTINE TREE, a native also of the Levant, is obtained CHIAN, or CYPRUS TURPENTINE, a delicate turpentine, but rarely to be obtained genuine, as the other kinds obtained from *Coniferous* (459) trees, are sold for it.

635. COPAL is a resinous substance, obtained, it is said, from a tree (*Rhus copallinum*). the produce of America, which has winged and very entire leaves, the foot-stalks membranaceous and jointed. The natural history of copal is not yet satisfactorily ascertained.—*Sex. Syst.* Pentandria Trigynia.

We annually import considerable quantities of copal from Spanish America, in globular pieces of a yellowish white colour; hard, and semitransparent. When copal is dissolved in a proper liquid, and thinly spread upon wood, metal, or any other firm substance, so that the liquid may evaporate, the copal remains perfectly transparent, and forms one of the most beautiful and perfect varnishes

that can be imagined. The varnish thus formed has the name of *copal varnish*. One mode of preparing it is by melting the copal with an equal quantity of linsced oil; another by mixture with oil of turpentine; and a third by mixture with alcohol or spirit of wine. The particular processes are described in various publications; but they are too long and intricate for insertion here.

Copal is the varnish which is chiefly used in the japaning of snuff-boxes, tea-boards, and other similar articles.

According to Piso, *copal* is produced from the *Hymenæa Courbaril* (eight other species are likewise said to yield this gum resin), and is imported *partly* from South America, and partly from India. Mr. Hope questions whether any is found in the East Indies, as he imagines that it has been confounded with *Animè*. This gum resin has been reported to contain insects, but Mr. Hope has never been able to detect them imbedded in its substance as they are in amber.

Since the article *Animè* was printed (224), the following further account has come to hand:—

ANIMÈ is a resinous exudation from *Vateria Indica*, a gigantic tree of Malabar. It is sold in the bazaars of India, according to Dr. Royle, under the name of *Sundroos*. It is also produced in Madagascar, by the *Trachylobium Gærtnerianum* of Heyne. The mountains of Travancore and the forests of Malabar yield the *Animè*, which is mostly for sale in the lower provinces of Hindostan.

The Rev. F. W. Hope has published a paper "On Succinic Insects," in the "Transactions of the Entomological Society of London," vol. ii., in which he states: "The number of genera of insects which have come under my notice, amount to 155; there are also various others in all orders, of very singular and undescribed forms, affording an ample field for the future researches of the entomologist—a field where scarce a track is yet explored. *Animè* also contains, imbedded in its substance, lizards, shells, insects, and vegetables, and sometimes, like amber, it is found with drops of water."

Mr. Strong, of Long Acre, one of the first varnish-makers in London, has "an invaluable collection of resinous insects, the result of forty years' assiduity; which is certainly unrivalled."

636. *MANGOS*, as they are imported into this country, are the unripe fruit of an East Indian tree (*Mangifera Indica*) pickled in vinegar.

The mangos tree grows to a great size, and has spear-shaped leaves, each eight or nine inches long, and two inches wide. The flowers spring, in a loose kind of bunch, from the extremity of the stems.—*Sex. Syst.* Pentandria Monogynia.

The fruit, when ripe, is yellow and reddish, and larger than a goose's egg, and is replete with an odorous and agreeable juice; it is preferred in India to every fruit except the pine apple. Beneath its rough shell there is a kernel, similar to that of the almond, which may be eaten either fresh or preserved. From the expressed juice of this fruit the Indians prepare a kind of wine. When intended for pickling, the fruit is gathered in an unripe state. An imitation of mangos is made in our own country with a particular sort of melon. A small square piece is cut from the side of the melon, through which the seeds are taken out. It is then filled with mustard seeds and shred garlic, and afterwards pickled with vinegar and spices. Large cucumbers are sometimes prepared as mangos. Attempts have been made to raise this fruit in England.

637. The *CASHEW NUT* is a small kidney-formed nut, which grows at the extremity of a somewhat pear-shaped Indian nut.

The tree which produces it (*Anacardium occidentale*, Pl. 5. Fig. 42) resembles a walnut tree in shape, as well as in the smell of its leaves, which are leathery, somewhat oval, and shining. The flowers are red, and sweet-scented.—*Sex. Syst.* Enneandria Monogynia.

The size of this fruit is nearly that of a large pear; the colour of its pulp is sometimes yellow and sometimes red. The singularity of its form, with a nut or stone at the extremity, instead of the centre, generally excites the surprise of persons when they first see it. In a ripe state the fruit is sometimes roasted, cut in slices, and used as an agreeable acid in punch. Its juice, when fermented, is made into wine; and on distillation yields a spirit which some persons prefer even to rum.

The nuts are each inclosed in two shells, connected by a

cellular substance, which contains a thick and very caustic oil. The kernels have a peculiarly sweet and pleasant flavour, and are eaten either raw or roasted, and sometimes even pickled. They are also used as almonds, and when ground with the chocolate nut (641), they greatly improve its flavour. Cashew nuts may be kept, without any great alteration of their quality, for many years. If the shells be broken, and the nuts be laid for a little while on the fire, they open of themselves; and the kernels being taken out, the thin brown skin which covers them must be removed previously to their being eaten. It is necessary to be cautious that the oil do not come in contact with the mouth or lips; as in such case it would inflame and excoriate them.

The *oil* of the cashew nut is sometimes applied by the inhabitants of the West Indies (though much caution is requisite in the use of it) as a means of corroding cancerous ulcers, corns, and ringworms; and some of the West Indian ladies, to improve the colour of their skin, cut off the outer shell of the nut, and rub the oil upon their faces as a cosmetic, by which immediate swelling and blackness of the parts arise; and in five or six days the whole skin peels off, so that the person using it cannot appear abroad in less than a fortnight, when the new skin is sufficiently hardened, and as fair as that of a newly-born infant! This oil tinges linen a permanent rusty iron colour. It has been successfully employed in this country as a counter-irritant in chronic affections of the joints. It raises a blister, having beneath a peculiar *whitish* coloured fluid, somewhat resembling pus.

From the cashew nut tree a milky *juice* is obtained by tapping or incision, which stains of a deep black colour whatever it touches. The fine black varnish so much used in China and Japan is the resinous juice of a tree called *fsi-chu*, which is conjectured to be the cashew nut tree. A fine semi-transparent gum also exudes from this tree, similar to gum arabic, but with more astringent properties.

Under this Order might be mentioned in detail, did space permit, the *Boswellia thurifera* of Colebrooke, known as the Olibanum tree, which produces the gum-resin *Olibanum*,

and the *Rhus Toxicodendron*, or Trailing Poison Oak or Sumach, the leaves of which are recommended in various affections.

The balm of Gilead is also afforded by a tree, the *Balsamadendron Gileadense*, growing in Arabia.

NAT. ORD. 12. TILIACEÆ, *Juss.*—THE LINDEN TRIBE.

638. The LIME or LINDEN-TREE is a British forest tree (*Tilia Europæa*)¹, distinguished by its heart-shaped and serrated leaves, of a bright green colour, and by its berries or seed-vessels, having each four cells and one bud.

The blossoms are whitish, in small clusters, and have a yellowish green floral leaf, nearly as long as the fruit-stalk, and attached to it for about half its length.—*Sex. Syst.* Polyandria Monogynia.

No one can pass a grove of lime-trees, in the month of July, without being charmed with the perfume which, at this season, is emitted by the flowers. They are a great resort of bees, and supply those insects with materials for their best honey. Whether fresh or dried, they easily ferment, and a fine-flavoured spirit may be distilled from them. The wood is close-grained, though soft, light, and smooth. It is much used by carvers and turners; and is in great request for the boards of leather-cutters. When properly burnt it makes an excellent charcoal for gunpowder, and for painters.

Of the fibrous inner part of the bark, softened in water and separated, the Russians manufacture fishing-nets, mats (well known to gardeners under the name of *bast*), shoes, and rustic garments: ropes and other cordage made from it, are stated to be remarkably strong and elastic. In some countries the leaves are dried as a winter food for sheep and goats; from these and the bark, a smooth but coarse brown paper may be manufactured. An inferior kind of

¹ Four species of the lime-tree are now described by botanists as indigenous to this country, namely, the *Tilia Europæa*, or Common; the *Tilia intermedia*, or Intermediate; the *Tilia parvifolia*, or Small-leaved; and the *Tilia platyphylla*, or Broad-leaved lime-tree. The usual height of all these species is about forty feet.

sugar may be made from the *sap* ; and the *seeds*, by pressure, yield a sweet and pleasant oil.

The lime is an eligible tree to form shady walks and clipped hedges ; but its leaves fall very early in the autumn. In rich soils it attains a prodigious size ; and instances have been mentioned of these trees having existed during more than six centuries.

NAT. ORD. 11. MALVACEÆ, *Juss.*—THE MALLOW TRIBE.

639. *COTTON* is a soft vegetable down, which is contained in the seed-vessels, and envelopes the seeds of the cotton-plant (*Gossypium herbaceum*, Pl. 5. Fig. 52)¹, an annual, which is cultivated in the East and West Indies, the south of Europe, the Levant, and other hot climates.

This, though an annual plant, grows to a considerable height. It has leaves of a bright green colour, marked with brownish veins, and each divided into five lobes. The flowers have only one petal, in five segments, with a short tube, and are of a pale yellow colour, with five red spots at the bottom.—Sex. Syst. Monadelphia Polyandria.

The cotton capsules are of a somewhat triangular shape, and have each three cells. These, when ripe, burst, and disclose their snow-white or yellowish contents, in the midst of which are contained small black seeds, in shape somewhat resembling those of grapes.

We are informed by Mr. Edwards, that the plants are raised from seed, the land requiring no other preparation for them than to be cleared of its native incumbrances. The seeds are usually sown in rows six or eight feet asunder, and the holes in which they are put are about four feet apart. At the end of five months the plants begin to flower, and in two months more the capsules are formed.

¹ Although the *Gossypium herbaceum*, or *Common cotton plant*, a native of the East Indies, is the species usually cultivated for the production of cotton in the south of Europe, the Levant, and several other parts of Asia ; yet many other species are also employed for the same purpose in other warm climates. The *Common cotton plant* is occasionally grown in the West Indies, but the *Gossypium Barbadosense*, or *Barbadoes cotton*, is the prevailing species in those islands ; while in the East Indies and China, besides the common cotton, the *G. arboreum*, or *Tree-cotton*, and other species, one in particular, which produces a *Nankin coloured cotton*, are also cultivated.

After the cotton is gathered, it is freed from the seeds to which it is attached, by a very simple machine, consisting of two small rollers that are close and parallel to each other, and move in opposite directions. The cotton is next hand-picked, to free it from decayed leaves, broken seeds, and other impurities; after which it is packed for sale, in bags of about three hundred pounds each.

Though the cotton plant flourishes best in tropical climates, it is capable of cultivation in such as are not so hot; and it is now an object of attention in several of the southern parts of Europe.

We receive great quantities of cotton from America, the East and West Indies, Turkey, &c. The whole quantity imported into this country in the year 1802, exceeded 60,000,000 pounds' weight; whilst the average annual importation, anterior to 1780, did not amount to one-tenth part of this; in the year 1827, it was above 270,000,000 pounds; so rapid has been the increase and prosperity of our cotton manufactures. Calicoes and muslins of all kinds are made of cotton; fustians, corderoys, and innumerable other articles. Nankins, which are manufactured in India, are made of a kind of cotton which is naturally of a reddish buff colour.

After the cotton is imported into England, the first process which it goes through is that of *carding*. Some years ago this was performed by the hand, upon the knee, with a single pair of cards; but it is now performed with cylindrical cards, worked by machinery. The next and most important improvements in the manufacture of cotton, were made at Cromford, in the county of Derby, by the late Sir Richard Arkwright, who, in 1768, first introduced the method of *spinning* cotton by machinery. By this contrivance cotton was *carded*, *roved*, and *spun*, with the utmost expedition, correctness, and equality. Other machines have, at different subsequent periods, been invented by various mechanics and manufacturers, particularly that called a *jenny*, by which one person is able to spin a hundred hanks of cotton yarn a-day, containing in the whole near a million of yards. The concluding operation is that of weaving, which is performed with a machine called a loom, in the same manner as flax and hemp.

Cotton is capable of being manufactured into paper, which is little inferior to that made from linen rags.

It should be stated that the cotton plant, though naturally an annual, may, by repeated cropping of the leaves, be made to bear fruit for three years successively. The seeds of all the species of cotton yield an oil; those of the common cotton are eaten in the Levant, and deemed nutritious.

The amount of customs duty paid, in 1839, on cotton wool, was 416,257*l*.

NAT. ORD. 10. STERCULIACEÆ, Vent.—THE BAOBAB TRIBE.

640. *CHOCOLATE* is a kind of cake, sometimes made of different ingredients, but the basis of which is the cacao or chocolate nut, the produce of a tree, native of South America.

The chocolate-tree (*Theobroma Cacao*. Pl. 5. Fig. 54), both in size and shape, somewhat resembles a young cherry-tree, but it separates near the ground into four or five stems. The leaves are each about four inches in length, smooth but not glossy, and of a dull green colour. The flowers are saffron-coloured, inodorous, but beautiful — *Sex. Syst.* Polyadelphia Decandria.

Fig. 68.



Chocolate Plant.

The fruit of the chocolate-tree somewhat resembles a cucumber in shape, but is furrowed deeper on the sides. Its colour, while growing, is green; but as it ripens, this changes to a fine bluish red, almost purple, with pink veins; or, in some of the varieties, to a delicate yellow or lemon colour. Each of the pods contains from twenty to thirty nuts or kernels, which in shape are not much unlike almonds. These are arranged in rows, as seen in the cut, surrounded by a sweet pulpy substance, and are called *cacao* or *chocolate-nuts*.

Plantations of chocolate trees are numerous on the banks of the river Magdalena, in South America, and in the Ca-

raccas ; there are but comparatively few in our own colonies. It delights in shady places and deep valleys. There are two principal crops of chocolate-nuts in the year : the first in June, and the second in December. As soon as the fruit is ripe, it is gathered, and cut into slices ; and the nuts, which at this time are in a pulpy state, are taken out with the hand ; for the thinness of the husk precludes the possibility of using a machine. They are then laid in skins, or on leaves, to be dried in the sun. They have now a sweetish acid taste, and may be eaten like any other fruit. When perfectly dry they are put into bags, each containing about a hundred weight, and exported to foreign countries.

Previously to the preparation of these nuts into chocolate, they are gently roasted, or parched over the fire, in an iron vessel, after which process their thin external covering is easily separated. The kernel is then pounded in a mortar, and subsequently ground on a smooth warm stone. Sometimes a little annatto (648) is added, and perhaps also some soap ; with water the whole is formed into a paste. This, whilst hot, is put into tin moulds, where in a short time it congeals ; and in this state it is the chocolate of the shops. In South America and Spain, the chocolate is mixed with sugar, long pepper, vanilla, cinnamon, cloves, almonds, and other ingredients, according to the taste of the respective inhabitants.

Chocolate was first introduced into Europe by the Spaniards ; that from the Caraccas is considered the best. It should be used whilst new, as neither the seeds nor the cakes will keep well more than two years. The chocolate used in this country must be manufactured in England, for, by an act of the legislature, the importation of chocolate paste is prohibited, under heavy penalties. The mode in which this substance is immediately prepared for use is well known.

By the natives of South America chocolate *nuts* are used for food, and also as a circulating medium instead of coin : about 1,200 of them being considered equal in value to a dollar.

A white oily matter, about the consistence of suet, is obtained by bruising these nuts, and boiling the pulp. The oil is by this means liquefied, and rises to the surface, where it is left to cool and congeal, that it may the more easily be

separated. This, which is called *butter of cocoa*, is without smell, and when fresh has a very mild taste. Its principal use is as an ingredient in pomatums. From the nuts, when slightly roasted, an oil is sometimes obtained by pressure, which is occasionally used in medicine.

From the shells of the cocoa nut is prepared the substance called *cocoa*.

641. *The SOUR-GOURD, MONKEYS' BREAD, or BOA-BAB, or AFRICAN CALABASH-TREE* (*Adansonia digitata*), is probably the largest of all vegetable productions. The trunk, although not usually more than twelve or fifteen feet high, is frequently from sixty to eighty feet in girth. The lowest branches extend almost horizontally; and as they are sometimes near sixty feet in length, they bend, by their own weight, to the ground; and thus the whole tree forms a hemispherical mass of verdure, which measures from 120 to 130 feet in diameter.

The fruit is oblong, about ten inches in length, pointed at both ends, and covered with a greenish down, under which there is a blackish and woody rind. Its interior consists of a whitish, spongy, and juicy substance, with several brown seeds.

This tree is a native of Senegal and other parts of Africa.

The virtues and uses of the sour-gourd tree and its fruit are numerous and of great importance to the inhabitants of the countries in which it is found. The *bark* and *leaves* are dried, powdered, and preserved in bags, to be employed as a seasoning for food. Two or three pinches of this powder are put by the negroes into their messes, under an impression that it promotes perspiration and moderates the heat of the blood.

The pulp of the *fruit* has an agreeably acid flavour. This is not only eaten when fresh, but is dried and powdered for medicinal uses; a kind of soap is also prepared from it.

In Senegal, when the trees are decayed, the *trunks* are hollowed by the negroes into burying-places for their poets, musicians, and buffoons. These persons are much esteemed whilst they live, although they are supposed to derive their superior talents from sorcery, or an alliance with demons. When dead, however, their bodies are regarded with horror, and are not allowed the usual burial, under a notion that the earth would, in such case, refuse to produce its accustomed fruits. The bodies inclosed in these

trees are said to become perfectly dry without decaying, and thus to form a kind of mummies, without the process of embalming. The wood appears to be of little or no use as timber.

NAT. ORD. 9. CISTACEÆ. *Lindl.*—THE ROCK ROSE TRIBE.

642. *LADANUM*, or *LABDANUM*, is a resinous drug, which exudes, and is collected, from the leaves and branches of several species of *cistus*, chiefly from the *Cistus Creticus*, which grows in Syria and the Grecian islands.

The height of this shrub seldom exceeds three or four feet. Its leaves, which stand in pairs on short foot-stalks, are oblong, wrinkled, rough, and clammy. The flowers appear in June and July, and consist of five large rounded petals of a light purplish colour, each marked with a dark spot at the base.—*Sex. Syst.* Polyandria Monogynia.

The ancient mode of collecting ladanum, if true, is not a little curious: goats, which delight in eating the leaves and young branches of the shrubs that produce it, were turned loose into the plantation, and the resin that adhered to the long hair of their beards and thighs was afterwards detached by combing them.

It is now obtained from the plant by means of a rake, to which leather thongs are appended instead of teeth; from these the resin is scraped off, and subsequently made into cakes of different sizes. These are sometimes much adulterated with sand. Ladanum comes principally from the Levant.

The smell of ladanum is strong, but not disagreeable; its taste is warm, aromatic, and somewhat unpleasant. It was formerly much used as an internal medicine; but it is now only employed as an ingredient in plaisters; and is not of much importance any way.

NAT. ORD. 8. EUPHORBACEÆ. *Juss.*—THE EUPHORBIA TRIBE.

643. The *CASSAVA*, or *CASSADA* (*Jatropha manihot*) is a South American shrub, about three feet in height, with broad, shining, and somewhat hand-shaped leaves, and beautiful white and rose-coloured flowers.—*Sex. Syst.* Monadelphia Decandria.

Although the roots of the cassava, if eaten raw, are a fatal poison both to man and beast, when prepared by heat

they yield a safe and valuable food ; on which, indeed, many both of the Indian and European inhabitants of South America almost wholly subsist. The roots, the only edible parts of the plant, are white, soft, and farinaceous, from one to two feet in length, and five or six inches in circumference ; when dug out of the earth they are washed, stripped of their rind, and ground to a pulp ; the juice, or poisonous part, is pressed out, and carefully thrown away, as cattle, and other animals, which have accidentally drunk of it, have almost instantly died. The flour that remains, after pressure, is formed into thin round cakes and baked. To an European, accustomed to other bread, these, though sweetish, and not unpalatable, have an insipid taste. If placed in close vessels, and preserved from the attacks of insects, cassava bread may be kept for several months without injury.

The natives of South America obtain from the cakes of cassava by rapid fermentation, a very sharp and disagreeable, but intoxicating beverage, which will not keep longer than twenty-four hours without spoiling.

From the pure flour of cassava is formed the substance called *tapioca*, which is frequently imported into this country, and used for jelly, puddings, and other purposes. It is prepared from the fibrous parts of the roots by taking a small quantity of the pulp, after the juice is extracted, and working it in the hand till a thick white cream appears on the surface. This, being separated, and washed in water, gradually subsides to the bottom. After the water is poured off, the remaining moisture is dissipated by a slow fire, the substance being constantly stirred, until at length it is formed into the irregular lumps and grains in which we find it in the shops. These become hard by keeping, and are the purest and most wholesome part of the cassava.

The roots of another species of this shrub, called *sweet cassava*, are usually eaten with butter, and merely after being roasted in hot ashes. They have much the flavour of chestnuts, and are an agreeable and nutritive food.

644. The *TALLOW-TREE* (*Croton sebiferum*) is a native of China, and in habit somewhat resembles a cherry-tree, but has shining, egg-shaped, and pointed leaves, forming tufts at the extremity of the branches.—*Sex. Syst.* Monadelphæa Dodecandria.

The fruit of this tree, from which the Chinese obtain a

kind of tallow for the manufacture of candles, is enclosed in a husk, not much unlike that of the chestnut, and consists of three round white kernels. All the preparation that is requisite is to melt these kernels, adding a little oil, to render them softer and more pliant than they would otherwise be. The candles made from this substance are very white, but are sometimes coloured by adding a little vermilion. They are more firm than those of tallow, but not equal in quality to candles either of wax or spermaceti. The wicks consist of little rods of light, dry wood, with the pith of a rush entwined round them.

645. *The CASTOR-OIL PLANT* (*Ricinus communis*) is a native both of the East and West Indies, and has a stem from five to fifteen or sixteen feet in height, and large bluish green leaves, (Fig. 69.) divided into seven lobes, serrated and pointed, the foot-stalks long, and inserted into the disk.

The flowers are produced in a terminating spike, and the seed-vessels are covered with spines, and contain each three flattish oblong seeds.—*Sex. Syst.* Monœcia Monodelphia.

Fig. 69.



Castor-oil Plant.

It is to the seeds of this annual plant that we are indebted for the drug called *castor-oil*. This is sometimes obtained by pressing the seeds in the same way as is practised with respect to almonds (656). But the mode chiefly adopted in the West Indies, whence we principally import it, is first to strip the seeds of their husks or pods, and then to bruise them in a mortar; afterwards they are tied in linen bags, and boiled in water, when the oil which they contain rises to the surface and is carefully skimmed off. The oil thus obtained is considered more mild than

that obtained by pressure, but it sooner becomes rancid. The mildest and finest of the Jamaica castor oil is limpid and nearly colourless. The best castor oil is now, however, considered that which is *cold drawn*. All the genuine oil has a peculiar smell not easily described.

The uses of castor-oil in medicine are well known.

The plant is sufficiently hardy to grow, if not to ripen its seeds, in the open grounds of gardens in the south of England. It is said to be sometimes a perennial in hot climates.

646. *INDIAN RUBBER, or CAOUTCHOUC, is the dried juice of a large and much branched tree* (*Siphonia elastica*, Pl. 5. Fig. 60), *which grows in Guiana, and other parts of South America.*

This tree has somewhat oval leaves, entire, veined, and smooth, arranged in threes, and on long foot-stalks.

The flowers are small, in bunches, near the ends of the branches, and the fruit is triangular.—Sex. Syst. Monœcia Monadelphica.

It was not until about the year 1736, that this very extraordinary natural production was made known in Europe. It is obtained by making incisions through the bark of the tree, chiefly in wet weather. From the wounds thus formed, the juice (which is of a milky white colour) flows abundantly. Some writers

Fig. 70.



Indian rubber trees.

assert that, on mere exposure to the air, it gradually hardens; and others that, for this purpose, it goes through a certain process, which the Indians keep a profound secret. It is sometimes brought to Europe in thick blocks, more commonly in pear-shaped bottles, which are formed by fixing a ball of clay on the extremity of a stick, and repeatedly dipping it into the fresh juice. Each coating requires a short time to dry and harden by exposure to the sun and air; several coatings produce the required thickness; after

which the stick is withdrawn and the clay washed out, the ornaments on the outside of the bottles having been previously impressed upon them.

Indian rubber is remarkable for the flexibility and elasticity which it acquires on attaining a solid state; and also for the numerous useful purposes to which it is capable of being applied. By the Indians it is sometimes formed into boots, which are impenetrable by water: flambeaux are likewise formed of it, which give a very brilliant light; it is said that a torch of Indian rubber, an inch and half in diameter, and two feet long, will burn twelve hours. The inhabitants of Quito prepare a species of oil-cloth with the hardened juice of this tree.

The principal uses to which Indian rubber is applied by us are, for the effacing of black-lead marks; for flexible syringes, tubes, stoppers for bottles, and other instruments used by surgeons and chemists; and for the formation, by means of naphtha, of a varnish for air-balloons, &c.

Various experiments have been made to dissolve this substance, so that it may assume its naturally elastic state, under any figure that may be required. This has been effected by means of æther; but the process is too expensive for common use. *Naphtha* is the solvent mostly used for this substance. A simple method of forming tubes of it is, to split a piece of cane, and to put between the pieces a slip of whalebone. If the Indian rubber be cut into slips, and twisted closely round the cane, and the heat of boiling water be applied, the whole will become united into one piece or tube, from which the whalebone first, and afterwards the cane, may easily be separated.

It has been proved that cloth of all kinds may be made impenetrable by water, if impregnated with the fresh juice of the Indian rubber tree; and that boots, gloves, and other articles, made of cloth thus prepared, may be joined without sewing, and only by moistening the edges with the juice. These are not only more durable, but retain their shape better than such as are made of the juice without any connecting substance.

Mackintosh's waterproof capes, coats, &c. are made by preparing two surfaces of cloth, &c. with the solution of Indian rubber in naphtha, and when wet, applying them together; by this means a very thin layer of the material is

interposed between the fabrics, quite sufficient to prevent water to pass through.

It is now well ascertained that several trees, natives of the East Indies and other tropical climates, of a class and order totally different from that above described, yield a juice similar to this, and applicable to the same purposes.

647. *The BOX-TREE* (*Buxus sempervirens*) is a shrubby evergreen tree, twelve or fifteen feet high, which has small, oval, and opposite leaves, and grows wild in several parts of Britain. There are three varieties, the common, the narrow-leaved, and the dwarf box.—*Sex. Syst.* Monœcia Tetrandria.

This tree was formerly so common in some parts of England, as to have given name to several places, particularly to Box-hill in Surrey, and Boxley in Kent; and in 1815, there were cut down at Box-hill as many of these trees as were sold for upwards of 10,000*l.*, a circumstance perhaps unparalleled in their history. The box-tree was much admired by the ancient Romans, and also by our own ancestors, on account of its being easily clipped into the form of animals, and other fantastic shapes. In the south of Europe it is cultivated in gardens, and kept in flower-pots, with as much attention as we bestow upon myrtles.

The *wood* is of a yellowish colour, close-grained, very hard and heavy, and admits of a beautiful polish. On these accounts it is much used by turners, by engravers on wood, carvers, and mathematical instrument makers. Flutes and other wind instruments are formed of it; and furniture made of box-wood would be valuable were it not too heavy, as it would not only be very beautiful, but its bitter quality would secure it from the attacks of insects. In France it is much in demand for combs, knife-handles, and button-moulds; and it has been stated that the quantity of box-wood annually sent from Spain to Paris is alone estimated at the value of more than 10,000 livres.

NAT. ORD. 7. BIXACEÆ. *Lindl.*—THE ARNATTO TRIBE

648. *ANNOTTA, or ARNATTO, is a red dyeing drug, ob-*

tained from the pulp of the seed-vessels of a shrub (*Bixa orellana*) which grows spontaneously in the East and West Indies.

This shrub is usually seven or eight feet high, and has heart-shaped and pointed leaves. The flowers, which have each ten large peach-coloured petals, appear in loose clusters at the ends of the branches, and produce oblong and somewhat hairy pods — *Sex. Syst.* Polyandria Monogynia.

The seed-vessels of the annotta shrub are, in appearance, somewhat like those of the chestnut (542). They each contain from thirty to forty seeds, enveloped in a kind of pulp of a red colour and unpleasant smell. In the West Indies the method of extracting the pulp, and preparing it for sale, is to boil it, and the seeds which are mixed with it, in clear water, until the latter are perfectly extricated. They are then taken out, and the pulp is allowed to subside to the bottom of the water; this is drawn off, and the sediment is distributed into shallow vessels, and gradually dried in the shade until it is sufficiently hard to be worked into lumps or masses for sale.

Annotta is now chiefly prepared by the Spaniards in South America, and for the purpose principally of mixing with chocolate, to which, in their opinion, it gives a pleasing colour and great medicinal virtue, as well as an improved flavour. The chief consumption of annotta in England depends upon painters, dyers, and the farmers: it is supposed that *Scott's nankeen dye* is nothing but annotta dissolved in alkaline ley. This drug is sometimes used by the Dutch and English farmers to give a rich colour to butter: our double Gloucester, and several other kinds of cheese, are also coloured with it. Poor people occasionally use it instead of saffron. Three kinds of annotta are found in commerce: *Spanish annotta*, in hard rolls; *Flag annotta*, enveloped in flags, and of the consistence of soft clay; and *Cake annotta*, an article made in England for the dairy farmer. The Spanish annotta is considered the best.

In countries where the annotta shrubs are found, the roots are employed by the inhabitants in broth; and they answer all the purposes of the pulp, though in an inferior degree. The bark is occasionally manufactured into ropes; and pieces of the wood are used by the Indians to procure fire by friction.

NAT. ORD. 6. AMYGDALÆÆ. *Juss.*—THE ALMOND TRIBE.

649. *The CHERRY is a fruit of the plum tribe, the original stock of which is said to be the wild cherry (Prunus Cerasus) of our woods. It was cultivated in England so early as the second century.—Sex. Syst. Icosandria Monogynia.*

The gradual effects of cultivation, as they regard the cherry, have been the production of several kinds, which, both in size and flavour, infinitely exceed the fruit of the parent stock, the wild cherry. The kinds best known are the *May Duke, Early Kentish Cherry, White Heart, Black Heart, and Morello Cherries*. The trees are propagated by grafting or budding them, usually upon the stocks of wild black and red cherry trees, which are reared for that purpose.

This agreeable *fruit* is eaten either fresh or dried. It is sometimes preserved with sugar as a sweetmeat; is made into jam; used in preparations of cherry brandy; and made into wine. From wild black cherries the Swiss distil an ardent spirit, by the sale of which to the French and Germans they derive considerable profit.

The *wood* of the cherry-tree, which is hard and tough, is much used, particularly by turners and cabinet-makers on the Continent, for the manufacture of chairs and other furniture. The *gum* that exudes from the bark is equal to gum arabic and very nutritive. Hasselquist informs us, that during a siege, more than one hundred men were kept alive for nearly two months, without any other sustenance than a little of this gum, which they occasionally took into their mouths and suffered gradually to dissolve.

650. *The APRICOT (Prunus Armeniaca) is a fruit of the plum tribe, but in appearance and taste more approaching the peach. It grows wild in several parts of Armenia, and was first introduced into this country about the middle of the sixteenth century. Of this fruit there are many varieties.—Sex. Syst. Icosandria Monogynia.*

Some persons are inclined to consider the apricot as the most delicate of all our hardy fruits. For pastry certainly none is more excellent. It is used for tarts both green and

when ripe ; it is also preserved with sugar in both these states, and is sometimes dried as a sweetmeat. The *kernels* of apricots have a pleasantly bitter flavour, and answer much better for several purposes in confectionary than bitter almonds, which are usually applied. They likewise contain a sweet oil, which, like that of almonds, was formerly used in emulsions.

The *gum* that issues from the apricot tree is similar to that of the cherry (649). The *wood* is coarse grained and soft, and consequently is seldom used in carpentry.

Apricot trees are chiefly grown against walls, and are propagated by budding upon plum-tree stocks.

651. The COMMON or DOMESTIC PLUM, in all its varieties, has been derived from some of the wild kinds of plums, which grow in England and other parts of Europe. The *Prunus domestica* is usually considered the parent stock. Plums are grafted, sometimes budded, on muscle or damson stocks. Damsons are propagated by suckers.—*Sex. Syst.* Icosandria Monogynia.

The chief kinds of our cultivated plums are the *magnum-bonum*, the *green-gage*, the *Orleans*, the *red magnum-bonum*, and the *damson*. Most of our cultivated plums, when sufficiently ripe, and eaten in moderate quantity, are pleasant and wholesome fruits, but in an immature state they are very unwholesome.

Prunes and *French-plums* are the dried fruit of different kinds of plum-trees. They are usually packed in boxes, and are imported from the Continent, but particularly from the neighbourhood of Marseilles. Brignolles, a town of Provence, about thirty miles from Marseilles, is one of the most famous places in France for dried prunes. *Prunes*, or *St. Catharine's plums*, constitute a lucrative branch of traffic, which is almost exclusively carried on in Tours and Chatelherault. Prunes are sometimes employed in medicine, but French plums are chiefly used at table.

The *wood* of the plum-tree is of little value ; but the *bark* is in occasional request as affording a yellow dye.

652. The BULLACE PLUM is a small violet coloured fruit of a globular shape, produced by a shrub (*Prunus insititia*) which grows wild in our hedges, and is known by its branches being

thorny, and its fruit-stalks in pairs.—*Sex. Syst.* Icosandria Monogynia.

This plum has a rough, but not unpleasant acid taste, especially after it has been mellowed by the frost. A conserve, called *bullace cheese*, is sometimes prepared by mixture of the pulp of the bullace with about thrice its weight of sugar. In several parts of Germany this fruit is preserved in vinegar and spice; and is occasionally used, in the manner of cherries, for the flavouring of brandy. The *wood* is pleasingly veined, and is much valued by turners.

653. *The SLOE is a round and nearly black plum, much smaller than the bullace (Prunus spinosa), of an extremely austere taste, which is common in thickets and hedges throughout nearly every part of England.*

The shrub that produces it has thorny branches, and the fruit-stalks are single.—*Sex. Syst.* Icosandria Monogynia.

The harshness and austerity of the sloe are proverbial. Its *juice*, if mixed with British-made wines, communicates to them a red colour, and an astringent flavour, somewhat resembling that of port wine; a fact too well known to some of the dealers in that favourite liquor. The juice of unripe sloes, dried over a gentle fire, so nearly resembles the Egyptian acacia, that it has in many instances been substituted for that substance; it is, however, harder, heavier, of a darker colour, and somewhat sharper taste than the genuine kind. A conserve of this fruit, made with three times its weight of double-refined sugar, has been occasionally used for sore throats.

If boiled in ley, the bark yields a red dye. The young and tender *leaves* of the sloe afford a substitute for tea, but some persons consider them unwholesome. The juice of the fruit, mixed with green vitriol, becomes an indelible black fluid, either for dyeing linen, or as a writing-ink. The *wood*, being extremely tough, is converted into walking-sticks, and made into the teeth of rakes; it is also sometimes used by turners. Dr. Withering has remarked, that from certain effects which he observed to follow the prick of the *thorns* of the sloe, he was inclined to consider they had some poisonous quality, especially in autumn.

654. The PEACH is a large, downy, and well-known garden-fruit (*Amygdalus Persica*), which is said to have been originally introduced into Europe from Persia (whence its botanical specific name), and was first brought into England about the year 1562.—*Sex. Syst.* Icosandria Monogynia.

This delicious fruit is highly esteemed as an article in our desserts; when ripe and fresh it is grateful and wholesome, seldom disagreeing with the stomach, unless this organ be not in a healthy state, or the fruit be eaten to excess. With sugar it makes a delicious preserve. In some parts of North America a brandy is made from peaches; indeed it is the principal use to which they are there applied. The *flowers*, which are very beautiful, and appear early in the spring, emit an agreeable odour. The *leaves* are occasionally employed in cookery, but they ought not to be used without great caution, on account of their containing prussic acid.

There are many varieties of the peach, some of which are much more esteemed than others. It is usually propagated by budding on damask-plum stocks, apricot stocks, seedling peaches, almonds, or nectarines, by which method any certain kind may be obtained.

655. The NECTARINE is a smooth-skinned variety of the peach, but of a richer and more delicious flavour. The culture and management of the two kinds are exactly the same; and in all the circumstances of their growth, wood, leaves, and flowers, they precisely resemble each other.

656. The COMMON or SWEET ALMOND is a soft and pleasant-flavoured kernel, contained in a nut which is of a flattish shape, and has a tender shell with numerous small holes on the outside.

The almond tree (*Amygdalus communis*, Pl. 4 Fig. 46) is usually twelve or fourteen feet high. Its beautiful pink flowers of five petals grow in pairs, and appear early in the spring. The leaves are somewhat oval, pointed, and delicately serrated at the edges. Of this there are several varieties.

The almond is a native of Syria and Barbary.—*Sex. Syst.* Icosandria Monogynia.

Our shrubberies contain no tree the flowers of which are more beautiful than those of the almond; and these flowers

appear in March and April, a season when few other parts of the vegetable creation have recovered from their wintry state. Though known to the ancients from the most remote periods of antiquity, the almond tree has only been cultivated in England since the year 1562, and this almost wholly on account of the elegant appearance of its flowers ; as this climate is not sufficiently warm to perfect the fruit.

The almonds consumed in this country are imported, sometimes in the shell, but much more commonly without, from France, Spain, Italy, the Levant, and Barbary. The province of Valencia had formerly great celebrity for its almonds ; but the cultivation of the trees in that part of Spain has for several years been much neglected. The best, called *Jordan* almonds, come from Malaga.

The chief uses of sweet almonds are in confectionary and cooking. They are also eaten with raisins in desserts after dinner, but they should be well chewed, as every piece that is swallowed entire is indigestible. By pressure, they yield a considerable quantity of *oil*. Some preparations of almonds are occasionally used in medicine, particularly the *milk of almonds*, which is formed of pounded almonds, loaf sugar, and water. In some parts of the East Indies, it is said that almonds supply the place of small money.

The duty on *Jordan* almonds is 40s. per cwt. ; in 1839, 1596 cwts. were imported. The duty on those *not Jordan* is 20s. per cwt. ; in 1839, 3576 cwts. paid duty.

657 *BITTER ALMONDS* are the produce of a variety of the *Amygdalus communis*, and brought chiefly from Mogadore. They are broader and flatter than, but not so long as, the *Jordan* almond ; they do not much differ in appearance from *Valentia* almonds.—*Sex. Syst.* Pentandria Monogynia.

Like sweet almonds, they yield a large portion of *oil*. This has no bitterness ; but the cake which remains after the pressure is intensely bitter. If bitter almonds be eaten freely, they occasion sickness and vomiting ; to many quadrupeds and birds they are a fatal poison. They contain *hydrocyanic* or *prussic* acid ; a distilled water from them is extremely pernicious. They are frequently used, instead of apricot kernels, in ratafia, and sometimes are employed in making a counterfeit cherry-brandy ; a powder

and paste for washing the hands are made both from them and from sweet almonds. By confectioners they are much in request for flavouring biscuits and other articles.

Although the *oil of almonds* sold in the shops is called *oil of sweet almonds*, it is obtained from the bitter almonds, chiefly on account of their cheapness compared with sweet almonds.

The duty, 4s. per cwt., was paid in 1839, on 2145 cwts. of *bitter almonds*.

NAT. ORD. 5. ROSACEÆ. *Juss.*—THE ROSE TRIBE.

658. *The HUNDRED LEAVED or COMMON GARDEN ROSE* (*Rosa centifolia*) is a shrub too well known to need any description. *The Damask rose is sometimes included under this species.*—*Sex. Syst.* Icosandria Polygynia.

This, the queen of flowers, is one of the most elegant and fragrant of the vegetable productions. Its *petals* yield, on distillation, a small portion of aromatic *oil*, together with a *water* which possesses both the odour and taste of the flowers. This oil congeals in the common temperature of our atmosphere, and in that state is of a white colour; but, when liquefied by heat, it appears yellow. As *attar*, or *essence of roses*, it is much in request as a perfume, and though chiefly manufactured in the East Indies, is seldom imported from thence for sale, but considerable quantities of it are brought from Turkey, at the price of from three to four pounds per ounce, exclusive of the duty. That from the East Indies, when genuine, has been sold at a much more exorbitant rate than this, but it is not unfrequently adulterated with oil of sandal-wood (539). The fraud, however, is easily detected by those who are accustomed to the smell of the latter, and also by the fluidity of the compound. The true attar of roses is undoubtedly the most delightful perfume that is known.

From the petals of this rose is also prepared a *syrup*, which is used in medicine as a purgative. *Rose-water* has little to recommend it beyond its fragrance: it is occasionally used to impart an agreeable flavour to culinary preparations, and also to some kinds of cordials. It should

be remarked, that although roses are much used for nose-gays, their odour has sometimes produced very peculiar symptoms in persons sitting, or sleeping with such nose-gays in confined apartments.

659. The *RED* or *OFFICINAL ROSE* (*Rosa Gallica*) differs from the hundred-leaved rose in having the leaf-stalks more rough and prickly. The petals are of a crimson colour, large, spreading, and not numerous — *Sex. Syst.* Icosandria Polygynia.

This rose flowers rather later than the common garden rose; it is a native of the South of Europe, but has been long cultivated in this country, chiefly for the unexpanded buds of the flowers, with which the *Conserve of Roses* is made. The leaves of the buds are also dried and employed in medicine for making an *Infusion*, a *Honey*, and a *Syrup*, which all have *astringent* properties.

660. The *WILD* or *DOG-ROSE* (*Rosa canina*) is a common wild flower in hedges, and is distinguished by having a somewhat egg-shaped fruit, smooth flower-stalks, the prickles of the stem hooked, and the leaves oval, pointed, smooth, and shining — *Sex. Syst.* Icosandria Polygynia.

We possess perhaps no wild shrub more ornamental to the country than this; and its delicate scent, though less powerful, is perhaps as grateful as that of any rose that is known. The *flowers*, when distilled, afford a pleasant perfumed water. The *fruit*, called hips, contain an acid, yet sweetish, pulp, of which, when carefully separated from a rough prickly matter enclosing the seeds, and mixed with sugar, is prepared the *conserve of hips* of the shop, which, though of little medicinal virtue itself, is used to give form to more active medicines. In the north of Europe, the fruit of this rose, with the addition of sugar, is sometimes employed in the preparation of domestic wines; and the pulp, in a dried state, affords a grateful ingredient in sauces. The *leaves* of this, and indeed of every kind of rose, have been recommended as a substitute for tea. On the Continent they are employed in currying the finer kinds of leather.

On the branches of this tree a singular moss-like and prickly excrescence is frequently found. This, which is

caused by an insect (*Cynips rosæ*), and forms the habitation of its offspring, was formerly in great medicinal repute; but is now seldom used.

661 *The RASPBERRY* (*Rubus Idæus*) is a well-known cultivated fruit, but it grows wild in woods and thickets of several parts of England—*Sex. Syst.* Icosandria Polygynia.

The flavour of the raspberry is peculiarly grateful; and its perfume very delightful. Raspberries are much used in cookery and confectionary, as well as to eat in desserts. With sugar they are made into jam and jelly, and also into cakes. The juice, mixed with a certain portion of sugar and of brandy, constitutes the liqueur called *raspberry-brandy*. This juice is much in request for ice-creams, and is sometimes manufactured into wine. The *leaves* are said to be a grateful food to kids.

White raspberries are sweeter than the red ones.

662. Our wild fruit, called **BLACKBERRIES** (*Rubus fruticosus*), belong to the same tribe as the raspberry. These are much eaten by children, and sometimes, when taken in too great quantities, produce very unpleasant effects. In Provence blackberries are employed for the colouring of wine. A syrup and jelly, and sometimes also wine, are prepared from them. The *twigs* are sometimes used in dyeing a black colour. The *bark of the twigs* is used for binding the straw together in bee hives and mats. Silkworms are occasionally fed upon the *leaves* of the blackberry.

663. *The STRAWBERRY* (*Fragaria vesca*) is a wild British fruit which has been long cultivated in gardens.—*Sex. Syst.* Icosandria Polygynia.

By cultivation the strawberry has been greatly increased in size, and improved in flavour. Its varieties are now very numerous, and constantly increasing.

None of our fruits are more wholesome than these, and even when eaten in large quantities, they seldom disagree with the stomach. They abound in juice, have a grateful, cooling, somewhat acid taste, and a peculiarly fragrant smell; and are either eaten alone, or with sugar, milk, or

wine. A palatable jam, wine, and vinegar, are prepared from strawberries. This fruit is sometimes preserved whole in syrup, and sometimes in wine.

NAT. ORD. 4. MAGNOLIACEÆ. *Dec.*—THE MAGNOLIA TRIBE.

664. The TULIP-TREE (*Liriodendron Tulipifera*) is a North-American production, which yields a very beautiful, and, for some purposes, a valuable wood.

It sometimes grows to the height of sixty feet; and has lobed leaves, and tulip-shaped flowers.—Sex. Syst. Polyandria Polygynia.

While young, the wood of the tulip-tree is white; but at an advanced age it assumes a fine yellow colour, or a streaked appearance of different shades of red. In consequence of its being subject to great contraction and expansion, it is not fit for boards or planks. It is, however, occasionally employed in the construction of light vessels; and the trunks of tulip-trees are frequently hollowed by the Indians into canoes, one of which will contain several people. It is esteemed a fancy wood by the turner.

On account of its quick growth and easy culture, this noble tree well deserves the attention of planters in our own country.

NAT. ORD. 3. MYRTACEÆ. *R. Brown.*—THE MYRTLE TRIBE.

665. The GUAVA, or BAY PLUM, is a West Indian fruit, of which there are several kinds; one white and round, and another red and pear-shaped, are the most important. The former is produced by a tree (*Psidium pomiferum*) which has sharp-pointed and highly ribbed leaves, and flowers three on each stalk; and the latter by a tree (*Psidium pyriterum*) with oval leaves and single-stalked flowers.—*Sex. Syst. Polyandria Monogynia.*

These fruits are in high estimation in the countries where they are found. The rind is lined with an apple-like substance, which is used for tarts and other sweet preparations. It is also stewed and eaten with milk; and, in this

form, is generally thought better than any other stewed fruit ; from the same part a marmalade is made. This rind encloses an agreeable pulp, mixed with innumerable small seeds. The whole fruit is eaten raw, or prepared as a sweetmeat in various ways ; the most common form in which we see it is that of a jelly.

The wood is used for fuel, and also makes excellent charcoal.

666. CLOVES are the unexpanded flower-buds of an East Indian tree (*Caryophyllus aromaticus*, Pl. 5. Fig. 50), somewhat resembling the laurel in its height, and in the shape of its leaves.

The leaves are in pairs, oblong, large, spear-shaped, and of a bright green colour. The flowers grow in clusters, which terminate the branches, and have the calyx divided into four small and pointed segments. The petals are small, rounded, and of a bluish colour ; the seed is an oval berry.—Sex. Syst. Icosandria Monogynia.

In the Molucca islands, where the preparation of different spices was formerly carried on by the Dutch colonists to a great extent, the culture of the clove-tree was a very important pursuit. It has even been asserted that, in order to secure a lucrative branch of commerce in this article to themselves, they destroyed all the trees growing in other islands, and confined the propagation of them to that of Ternate only. But it appears that, in 1770 and 1772, both clove and nutmeg trees were transplanted from the Moluccas into the islands of France and Bourbon ; and, subsequently, into some of the colonies of South America, where they have since been cultivated with great success.

At a certain season of the year the clove-tree produces a vast profusion of flowers. When these have attained the length of about half an inch, the four points of the calyx being prominent, and having in the middle of them the leaves of the petals folded over each other, and forming a small head about the size of a pea, they are in a fit state to be gathered. This operation is performed between the month of October and February, partly by the hand, partly by hooks, and partly by beating the trees with bamboos. They are subsequently immersed in boiling water, then dried by exposure for a while to the smoke of wood fires,

and afterwards to the rays of the sun. When first gathered they are of a reddish colour, but by drying, they assume a deep brown cast.

This spice yields a very fragrant odour, and a bitterish, pungent, and warm taste. It is sometimes employed as a hot and stimulating medicine, but is more frequently used in culinary preparations. When fresh gathered, cloves will yield on pressure a fragrant, thick, and reddish oil; and, by distillation, a limpid essential oil. The latter is imported into Europe, but is frequently adulterated, and sometimes even to the amount of nearly half its weight. Oil of cloves is used for curing the tooth-ache. When the tooth is carious, and will admit of it, a bruised clove is perhaps to be preferred.

667. *The POMEGRANATE is an apple-shaped fruit, with a thick rind, and crowned with the leaves or teeth of the calyx. It is the produce of a shrub (Punica granatum, Pl. 4. Fig. 47) which grows wild in the southern parts of Europe.*

This shrub is usually from fifteen to twenty feet high. The branches are armed with spines; and the leaves are oblong, pointed, and dark green. The flowers, which are of a rich scarlet colour, have five rounded petals.—Sex Syst. Icosandria Monogynia.

By the Greeks and Romans almost every part of the pomegranate tree (the root, leaves, flowers, and fruit) was considered to possess extraordinary medical properties; and the country then chiefly celebrated for it was that adjacent to the city of Carthage. It is now, however, in little esteem, except on account of its fruit, which is pleasant, and, in common with other summer fruits, allays heat and mitigates thirst. *Pomegranate peel*, which is bitter and astringent, was employed by the ancients in the dressing of leather; and it is still used in some parts of Germany, together with the *bark* of the tree, in the preparation and dyeing of red leather, in imitation of what is called Morocco leather. It is also still occasionally used as a medicine in diarrhœa, dysentery, &c.

Pomegranates were first cultivated in England about the year 1596; but the fruit grown in this country seldom attains a delicacy of flavour equal to that which is imported from Spain, Italy, and other warm climates.

668. *The COMMON MYRTLE (Myrtus communis) is a*

well-known ornamental evergreen shrub, which is cultivated chiefly in greenhouses in this country, but grows wild in the countries of the south of Europe. It consists of many varieties.—Sex. Syst. Icosandria Monogynia.

Although this shrub is cultivated with us chiefly for ornament, it is of considerable utility to the inhabitants of the south of Europe. Its *young shoots* are used for tanning leather; and both its *leaves* and *berries* are employed in medicine. From the former a distilled water is obtained, which is sometimes used in gargles. The berries are likewise distilled; and an oil prepared from them has considerable repute as a means of thickening the hair.

669. *ALLSPICE, PIMENTO, or JAMAICA PEPPER, is the dried berry of the Myrtus pimenta (Pl. 4. Fig. 45)¹, a native of the West Indies*

The tree grows to the height of about thirty feet, and has elliptical and jointed leaves of different sizes, the largest five inches long and two broad, and of a deep green colour. The flowers are numerous, the petals of which are pale green, the anthers pale yellow — Sex. Syst. Icosandria Monogynia.

Notwithstanding the flowers of the pimento are without show, there is scarcely, perhaps, any tree more beautiful and more fragrant in the month of July than a young pimento. It grows spontaneously in many parts of Jamaica; but it is said, nevertheless, that it cannot be propagated without difficulty.

About the month of September, and not long after the blossoms have fallen, the berries are in a fit state to be gathered; at this time, though not quite ripe, they are full grown, and rather larger than common pepper-corns. When gathered they are carefully dried on mats or terraced floors in the shade. In ten or twelve days they become dry, lose their green colour, and become dark brown. They are then packed in bags or hogsheads for the market.

When the berries are quite ripe, they are of a dark purple colour, and filled with a sweet pulp.

Pimento is thought to resemble in flavour a mixture of cinnamon, nutmegs, and cloves, whence it has obtained

¹ This tree is now arranged by LINDLEY as a separate genus, and called *Pimenta vulgaris*.

the name of "all-spice." It is much employed in cookery ; and is chiefly used in whole grains. It is also employed in medicine, as an agreeable aromatic ; and forms the basis of a distilled water and a spirit ; and an essential oil is also obtained from it, which is similar in properties to, and sometimes sold for, *oil of cloves*. The *leaves* of the pimento tree yield also, it is said, in distillation a similar oil.

670. *CAJUPUTI* is a greenish coloured oil produced from the fruit of a tree (*Melaleuca Cajuputi*) which grows in the East Indies.

This tree has a long flexible trunk ; with linear, spear-shaped, alternate leaves, which are smooth, ash-coloured, and each with five nerves The flowers are white, and in long, terminal spikes.—Sex. Syst. Polyadelphia Icosandria.

The *leaves* of the cajuputi tree have an aromatic odour, somewhat resembling that of cardamon seed ; and they yield, by distillation, an essential oil, which manifests this aromatic principle still more strongly.

Among the Malays cajuputi oil is a medicine in great repute. It is considered by the common people as a specific in many diseases, and is kept in the shops of the metropolis. In acute rheumatism and gout, however, it has been known to afford immediate relief by being rubbed on the part affected ; but it ought not to be applied without great care, as it is very powerful in its effects. Cajuputi oil is a valuable remedy for the tooth-ache. It is best applied by being dropped on lint, and placed in the cavity of the tooth, or round the gum. Hence it deserves a place in the medicine chest of every private family.

If taken internally, in a dose of five or six drops, it heats and stimulates the whole system ; and it is said to have had a beneficial effect in dropsies and intermittent fevers. In India it is used, both internally and externally, in palsies, deafness, gout, rheumatism, and several other complaints.

Its odour is remarkably destructive to insects. A few drops of it, in a cabinet or drawer in which animal or vegetable specimens of natural history are kept, in a dried state, have, on this account, been found useful.

Cajuputi oil is chiefly prepared in the island of Bourou,

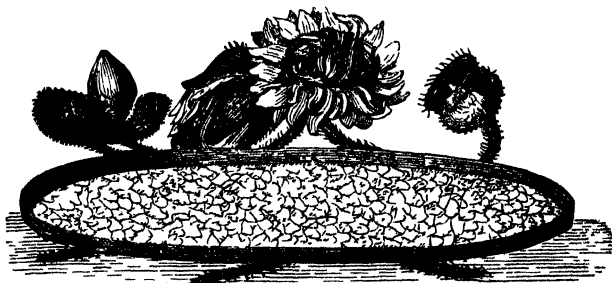
one of the Moluccas; and it is imported into Europe from the East Indies. But from its high price, it is so frequently adulterated, that it is seldom to be had genuine in Europe.

NAT. ORD. 2. NYMPHÆACEÆ. Dec.—THE WATER-LILY TRIBE.

671. *The GREAT FLOWER of BRITISH GUIANA, the Victoria Regina. (Fig. 71), is one of the largest and most beautiful flowers met with of late years. It is very nearly allied to the water lily, and has margined, orbicular, entire leaves, coloured beneath, reticulated above, and glabrous on both sides, the nerves and veins on the lower side prominent and prickled. The stigma many-rayed. Petioles round and bristly. It grows in the river Berbice, British Guiana, and was discovered by Mr. R. H. Schomburgh.*

The following communication, accompanied with drawings, was read at the Botanical Society of London, from Mr. R. H. Schomburgh, dated New Amsterdam, River Berbice, May 11th, 1838, on what he considered to be a new species of *Nymphaea*, but which the President had compared with the specimens of *Nymphæaceæ* in the Herbarium of the British Museum, and was satisfied that it would form a new group intermediate between *Nymphaea* and *Furyale*; and therefore proposed that Mr. Schomburgh's intention of naming it after her present Majesty VICTORIA, should be carried into execution, her Majesty

Fig. 71.



THE VICTORIA REGINA, or, Great Flower of British Guiana.
 Discovered by R. H. Schomburgh, Esq., on the river Berbice, January, 1838.
 (Length of leaf 6 ft; the flower 21 inches across.)

having previously granted her permission. It was therefore named VICTORIA REGINA, and the Society has adopted this plant as its emblem¹.

Mr. S. remarks: "The character of grandeur so peculiar to the productions of a tropical sun and a humid climate is highly developed in the object of the above description. The Holy Cyamus or Pythagorean Bean, is said to have been derived from a plant closely related to the Nymphæaceæ (*Nelumbium speciosum*), and not only that it is highly valued in India and China, and cultivated in large ornamental pots in the gardens and houses of the Mandarins, but it has been held in such high estimation that at last it was considered sacred. The description and illustrations which have been transmitted to us of this noble plant, have raised a desire in many a botanist to see it in its native country. In my rambles through the West Indian Archipelago, I had frequently met the white Water Lily; but the remark of an eminent botanist, that these floating plants were entirely unknown on the continent of South America, did not make me expect to find a representative of that tribe, which, for the superior grandeur of its leaves, the beauty of its flowers, and its fragrance, may be classed amongst the grandest productions of the vegetable world. It was on the 1st of January this year, while contending with the difficulties nature opposed in different forms to our progress up the river Berbice (in British Guiana), that we arrived at a point where the river expanded and formed a currentless basin. Some object on the southern extremity of this basin attracted my attention. It was impossible to form any idea what it could be, and animating the crew to increase the rate of their paddling, shortly afterwards we were opposite the object which had raised my curiosity. A vegetable wonder! all calamities were forgotten, I felt as a botanist, and felt myself rewarded. A gigantic leaf, from five to six feet in diameter; salver-shaped, with a broad rim of light green above, and a vivid crimson below, resting upon the water. Quite in character with the wonderful leaf was the luxuriant flower, consisting of many hundred petals, passing in alternate tints from pure white

¹ From the "Proceedings of the Botanical Society of London," vol. i. part i. 1839.

to rose and pink. The smooth water was covered with them, and I rowed from one to the other, and observed always something new to admire. The leaf on its surface is of a bright green, in form almost orbiculate, with this exception, opposite its axis, where it is slightly bent in. Its diameter measured from five to six feet; around the whole margin extended a rim about three to five inches high, on the inside light green, like the surface of the leaf, on the outside, like the leaf's lower part, of a bright crimson. The ribs are very prominent, almost an inch high, and radiate from a common centre, and consist of eight principal ones, with a great many others branching off from them. These are crossed again by a raised membrane, or bands at right angles, which gives the whole the appearance of a spider's web, and are beset with prickles; the veins contain air cells like the petiole and flower stem. The divisions of the ribs and bands are visible on the upper surface of the leaf, by which it appears areolated. The young leaf is convolute, and expands but slowly; the prickly stem ascends with the young leaf till it has reached the surface; by the time it is developed, its own weight depresses the stem, and it floats now on the water. The stem of the flower is an inch thick near the calyx, and is studded with sharp elastic prickles, about three quarters of an inch in length. The calyx is four-leaved, each upwards of seven inches in length, and three inches in breadth; at the base they are thick, white inside, reddish brown and prickly outside. The diameter of the calyx is twelve to thirteen inches, on it rests the magnificent flower, which, when fully developed, covers completely the calyx with its hundred petals. When it first opens, it is white, with pink in the middle, which spreads over the whole flower, the more it advances in age, and is generally found the next day of a pink colour. As if to enhance its beauty, it is sweet-scented. Like others of its tribe it possesses a fleshy disk, and the petals and stamens pass gradually into each other, and many petaloid leaves may be observed which have vestiges of an anther. The petals next to the leaves of the calyx are fleshy, and possess air-cells, which certainly must contribute to the buoyancy of the flower. The seeds of the many-celled fruit are numerous, and imbedded in a spongy substance. We met them hereafter frequently,

and the higher we advanced the more gigantic they became. We measured a leaf, which was six feet five inches in diameter, its rim five and a half inches high, and the flower across fifteen inches. The flower is much injured by a beetle (*Trichius*, 'Spec. ¹?'), which destroys completely the inner part of the disk; we have counted sometimes from twenty to thirty in one flower."

NAT. ORD. I. POMEÆ. *Lindl.*—THE APPLE TRIBE.

672. The *MEDLAR* (*Mespilus germanica*) is a native of the south of Europe, and some parts of this country. It is distinguished by being depressed and concave at the top, the leaves of the calyx continuing upon it; and by its containing several hard, compressed, and angular nuts.—*Sex. Syst.* Icosandria Pentagynia.

It is the property of the medlar, which is cultivated in most large gardens, to be hard, and remarkably austere and disagreeable to the taste, until it has in part undergone the putrefactive fermentation, when it becomes a soft, mellow, and to many palates a pleasant fruit. Medlars are usually gathered from the trees about the end of October, or beginning of November. To facilitate their becoming fit for the table, they may be placed in moist bran; but such as require to be kept for subsequent use should be deposited on dry straw. In a fortnight or three weeks those in the bran will be eatable, and the others will more gradually ripen. After they are perfectly ripe, they, however, soon become mouldy and decay.

The *wood* of the medlar-tree somewhat resembles that of the pear-tree, but is of no great value.

673. The *PEAR* is a well-known garden-fruit, derived from an English stock, the wild pear-tree (*Pyrus communis*), which grows in hedges and thickets in Somersetshire, Sussex, &c. It is propagated by grafting.—*Sex. Syst.* Icosandria Pentagynia.

It would be an endless task to describe the different va-

¹ The beetle, of which specimens are deposited in the Cabinets of the British Museum, is the *Rutelula trilineata* of Guerin (*R. Schomburgki* of Hope, *R. Cæta* of Weber).

rieties of the cultivated pear. Some of these are very large, and others extremely small; some have a rich and luscious flavour, and others, as the *iron* pear, are so hard and disagreeable to the taste as to be absolutely unfit to eat. Pears are chiefly used in desserts; and one or two of the kinds are stewed with sugar, baked, or preserved in syrup.

The fermented *juice* of pears is called *perry*, and is prepared nearly in the same manner as that of apples (674) is for cider. The greatest quantities of perry are made in Worcestershire and Herefordshire. The *Squash*, the *Old-field*, and the *Barland perry*, are esteemed the best. Many of the dealers in Champagne wine are said to use perry in the adulteration of it; and by some, really good perry is considered little inferior either in flavour or quality to Champagne.

Of the *wood* of the pear-tree, which is light, smooth, compact, and of a yellowish colour, the handles of carpenters' and joiners' tools are sometimes made, as well as the common kinds of flat rulers, and measuring scales. It is also used for picture frames that are to be stained black. The *leaves* impart a yellow dye, and are sometimes employed to communicate a green colour to blue cloth.

Although in some degree irrelevant to the present subject, it may be mentioned, that Dr. Royle has found in the Himalayas, pear-trees at the height of 14,000 English feet; poplars and a fine vegetation at 13,500 feet; and apricots at more than 10,000 feet. These observations are very curious, when we call to mind that in America, the Chimborazo offers but herbs at 13,325 feet of elevation, and that oaks do not pass beyond 10,000 feet on the Popocayas.—(*Bull. Soc. Geol. Fr.* vol. v. p. 152.)

674. The APPLE, in all its numerous varieties, has been derived from the crab-tree (*Pyrus Malus*), which grows wild in almost every thicket, and in hedges of all parts of the kingdom.—*Sex. Syst.* Icosandria Pentagynia.

The uses of apples are very extensive, and even the *crab tree* is not without its use. The *fruit* is indeed small, and bad to the taste; but its acid juice, called *verjuice*, is sometimes employed in cookery, occasionally in medicine, and

frequently by wax-chandlers, for the purifying of wax. Dr. Withering conceives that, with the addition of sugar, a grateful liquor might be made from the juice of crabs, little inferior to hock. The *wood* is tolerably hard, and when made into the cogs of wheels, acquires a polish, and is very durable.

Cultivated apple-trees are usually produced by *grafting*. This is performed by inserting young shoots of such trees as bear valuable fruit, on stocks that have been raised from the seeds of crabs, or other apples. Thus the shoot of an apple-tree inserted into a crab stock, occasions the crab-tree from that time to produce apples of the same kind and quality with those of the tree from which the shoot was taken. Other seedling apple stocks are also used, but those of the crab are perhaps the best. The same process is adopted in the propagation of nearly every kind of fruit-tree; and sometimes *new* and valuable *varieties* are thus obtained without the trouble of grafting. Some apples may, however, be propagated by *slips* and *cuttings*.

There are several varieties of apples, which are every day increasing, through the attention that is paid to the culture of this valuable fruit. Those best known as eating apples are the American apple called *Newtown pippin*, the *non-pareil*, *golden pippin*, *Ribstone pippin*, *golden rennet*, *lemon pippin*, and the *stubbord*; for the kitchen, the *codlin* and *russet*; and for cider, the *golden pippin*, *cockagee*, and *red streak*. the *non-pareil* and *golden pippin* are, it is said, beginning to fail; but this requires confirmation.

Apples are employed in culinary preparations of several kinds; they are a constant article in desserts: and are dried, baked, and made into jelly and marmalade. But by far the most important application of them is for the making of *cider*. The mode in which this is done is very simple. After the apples have been gathered, they are suffered to remain in a heap for some days, so that all may become perfectly ripe. They are then ground in a mill, and pressed either in hair cloths, bags, or by means of straw, beneath a powerful press. The liquor is then placed in casks or vats to undergo a spontaneous fermentation, by which it becomes a pleasant and intoxicating beverage. It is sometimes racked off into other vessels, leaving the lees

behind. As soon as the fermentation has ceased, the casks are filled up with other cider, and the bung-holes are closed.

Cider is a more acid liquor than perry, and, generally speaking, is a wholesome and pleasant drink during the heat of summer; but the *harsher* kinds, or those which are prepared in leaden vessels, if freely drunk, are the cause of colics and other painful complaints. An ardent spirit may be obtained from cider by distillation. By boiling the fresh juice of apples, and afterwards fermenting it, a *wine* may be made, which, when three or four years old, is said to acquire both the colour and flavour of Rhenish wine.

675. *The QUINCE is a pear-shaped fruit, which is supposed to have been originally a native of Cydon, in the island of Crete.*

The quince-tree (Cydonia vulgaris) is low and bushy. Its leaves are oval, entire, and whitish beneath. The flowers are large, of a pale red or white colour, and do not grow in bunches, but each on a separate stalk.—Sex. Syst. Icosandria Polygynia.

Though ripe quinces have a powerful and somewhat fragrant smell, they have an austere taste; but they lose a considerable portion of their harshness if prepared in any manner by heat; when mixed with other fruit in cookery, they communicate a very pleasant flavour. Hence it is that they are often mixed with apples in pies. Quinces are also boiled and eaten with sugar; made into marmalade; and preserved in syrup either whole or in halves. A proportion of one quart of the juice, mixed with a pound of sugar, and fermented, yields a delicious wine. On the continent, a celebrated liqueur is prepared from this juice, in combination with sugar and brandy. A mucilage of the *seeds* is still used in medicine, and is strongly recommended for besmearing the skins of persons of delicate skins, before they proceed on a journey, in the colder months of the year.

Quince trees grow wild on the banks of the Danube, but with much less luxuriance than in a state of cultivation. This tree is propagated by layers.

A *very general*, but comprehensive view, has in the foregoing pages been taken of the various plants used in domestic economy, the arts, &c., as much as our limits guarantee us in detailing. As the *Exogenous* class is now completed, the repetition of the following characters, afforded by the *stems* and *leaves*, cannot be considered out of place.



*Concentric layers of
woody Growth.*



*Reticulated
veins.*

END OF VEGETABLES.

(The Plates are inserted at the end of vol. i., and the Index at the end of this volume.)

ANIMALS.



Cachalot, or, Spermaceti Whale

(*PHYSETER CATODON*)

PART III.

ANIMAL KINGDOM.

ON THE
HABITS, INSTINCT, AND USES OF THE
MOST IMPORTANT
ANIMALS.

INTRODUCTION.

676. ANIMALS are natural bodies which possess organization, life, sensation, and voluntary motion. ZOOLOGY is that branch of natural history which treats of their systematic arrangement; their structure¹ and functions; their habits of life, instincts, and uses to mankind.

677. The substances which enter into the composition of animals contain a great deal of azote, while in plants there exists very little, if any.

678. In order to give an idea of the utility of classifications, an example may be given. If without them we wished to define the word *rabbit*, it would be necessary to give a lengthened enumeration of its characters; and to apply this definition, it would be necessary to compare the description thus traced, with that of more than a hundred thousand different animals; but by saying that the rabbit is a *verte-*

¹ The present state of knowledge respecting the formation of the various apparently elementary organs of animals, is of too deep and speculative a character, to warrant its insertion in a popular work like the present. Those desirous of information on this subject are referred to the modern works on "Comparative and General Physiology," of which several have been recently published.

brated animal, of the class *mammalia*, of the order of the *gnawers*, and of the genus *lepus*, we by the *first* of these words, the definition of which is settled, say that it is neither an insect nor any other animal without an interior skeleton ; by the second we exclude from the comparison all the birds, reptiles, and fishes ; by the third we exclude it from comparison with nine orders of the *mammalia*, and thus bring it down for comparison with one or two individuals, such as the *hare*, connected with it in many particulars, and yet differing in some slight marks of form or habit.

679. In the previous editions of this work, the arrangement adopted was that of LINNÆUS ; the one here employed (p. 230) is slightly altered from that given by the Baron CUVIER in his Animal Kingdom.

LINNÆAN ARRANGEMENT.

By the distinguished Swede (Linnæus) animals were divided into six classes.

1. MAMMALIA, chiefly composed of *Quadrupeds*.
2. AVES, or *Birds*.
3. AMPHIBIA, or *Reptiles*.
4. PISCIS, or *Fishes*.
5. INSECTA, *Insects, Crabs, Spiders, &c.*
6. VERMES, *Worms*, and animals of various kinds not referrible to the five other groups.

Each of these classes is again divided into *orders*.

680. In the MAMMALIA Linnæus established seven orders, the characters of which were derived principally from the teeth, as may be seen in the following table.

ORDERS OF MAMMALIA.

- I. PRIMATES Have the upper *front teeth* generally four in number, wedge-shaped and parallel, or a single canine tooth on each side in both jaws ; and two *teats* situated on the breast, as *man, apes, and monkeys*.
- II. BRUTA .. Have no *front teeth* in either jaw ; and the *feet* armed with strong hoof-like nails, as the *elephant, dugong, and anti-eater*.

- III. FERÆ... Have in general six *front teeth* in each jaw ; a single *canine tooth* on each side in both jaws ; and the grinders with conic projections, as the *dogs, cats, bears, seals, and weasels.*
- IV. GLIRES.. Have in each jaw two long projecting *front teeth*, which stand close together ; and no *canine teeth* in either jaw, as the *rats and mice.*
- V. PECORA . Have no *front teeth* in the upper jaw ; six or eight in the lower jaw, situated at a considerable distance from the grinders ; and the *feet* with hoofs, as the *cattle and sheep.*
- VI. BELLUÆ . Have blunt wedge-shaped *front teeth* in both jaws ; and the feet with hoofs, as the *horses, swine.*
- VII. CETÆ ... Have *spiracles*, or breathing holes in the head ; *fins* instead of fore feet ; and a *tail* flattened horizontally, instead of hind feet. This order consists of the *narwals, whales, cachalots, and dolphins.*

681. The second class, or BIRDS, comprises all such animals as have their bodies clad with *feathers*. Their *jaws* are elongated, and covered externally with a horny substance called a bill or beak, which is divided into two parts called mandibles. Most birds have the power of raising themselves in the air by means of their wings. A few, however, as the *ostrich* and the *emou*, have no such power, their wings being but slightly developed. Birds *respire* by air-vessels which are extended through their body, and which, in the abdominal cavity, adhere to the under surface of the bones. Their organs of motion are two *wings* and two *legs* ; they are destitute of external ears, lips, and many other parts which are important to quadrupeds. Their young are produced from eggs after being sat upon by the parent bird for a period more or less long.

682. Linnæus has divided this class into six ORDERS.

ORDERS OF BIRDS.

1. *Land Birds.*

- I. RAPACIOUS BIRDS (*Accipitres*) Have the upper mandible hooked, and an angular projection on each side near the point, as the *eagles, hawks, and owls.*
- II. PIES (*Picæ*) Have their bills sharp at the edge, somewhat compressed at the sides, and convex on the top, as the *crows.*

III. PASSERINE BIRDS (*Passeres*) Have the bill conical and pointed, and the nostrils oval, open, and naked, as the *sparrow* and *linnet*.

IV. GALLINACEOUS BIRDS (*Gallinæ*) Have the upper mandible arched, and covering the lower one at the edge, and the nostrils arched over with a cartilaginous membrane, as the *common poultry*.

2. Water Birds.

V. WADERS (*Grallæ*) Have a roundish bill, a fleshy tongue, and the legs naked above the knees, as the *herons*, *plovers*, and *snipes*.

VI. SWIMMERS (*Anseres*) Have their bills broad at the top, and covered with a soft skin; and the feet webbed, as the *ducks* and *geese*.

683. Under the third class, or AMPHIBIA, are arranged such animals as have a cold, and, generally, naked body, a lurid colour, and nauseous smell. They respire chiefly by lungs, but they have the power of suspending respiration for a long time. They are extremely tenacious of life, and can repair certain parts of their bodies which have been lost. They are also able to endure hunger, sometimes even for months, without injury.

The bodies of some of them, as the turtles and tortoises, are protected by a hard and horny shield or covering; those of others are clad with scales, as the serpents, and some of the lizards; whilst others, as the frogs, toads, and most of the water-lizards, are entirely naked, or have their skin covered with warts. Many of the species shed their skins at certain times of the year. Several of them are furnished with a poison, which they eject into wounds that are made by their teeth.

They chiefly live in retired, watery, and marshy places, and, for the most part, feed on other animals; though some of them eat water plants, and many feed on garbage and filth. None of these species chew their food; they swallow it whole, and digest it very slowly.

The offspring of all the tribes are produced from *eggs*, which, after they have been deposited by the parent animals in a proper place, are hatched by the heat of the sun. The eggs of some of the species are covered with a shell: those of others have a soft and tough skin or covering, not much

unlike wet parchment: and the eggs of several are perfectly gelatinous. In those few that produce their offspring alive, as the vipers, and some other serpents, the eggs are regularly formed, but are hatched within the bodies of the females.

684. This class Linnæus divided into two ORDERS.

ORDERS OF AMPHIBIA.

- I. REPTILES. Have four legs, and walk with a crawling pace, as the *tortoises, frogs, and lizards*.
 II. SERPENTS. Have no legs, but crawl on their belly, as the *viper, snake, boa*.

685. FISHES constitute the fifth class of animals. They are all inhabitants of the water, in which they move by certain organs called *fins*. These when situated on the back are called *dorsal fins*; when on the sides behind the gills, they have the name of *pectoral fins*; when on the belly near the head, they are *ventral*; when behind the vent, they are *anal*; and that at the posterior extremity of the body is called the *caudal fin*. Fishes breathe by *gills*, which, in most of the species, are situated at the sides of the head. In some of the flat-fish, however, as the skate and thornback, they are on the under part of the body. Fish rise and sink in the water, generally, by a kind of bladder in the interior of their body, called an *air-bladder*. Some of them, as the skate and other flat-fish, do not possess this organ, and consequently are seldom found but at the bottom of the water. The bodies of these animals are usually covered with *scales*, which keep them from injury by the pressure of the water. Several of them are enveloped with a fat and oily substance to preserve their bodies from putrefaction, and also to guard them from extreme cold. The young is produced from eggs or spawn.

686. The fishes were divided by Linnæus into six ORDERS.

ORDERS OF FISHES.

- I. APODAL.....Have bony gills; and no ventral fins, as the *eel*.
 II. JUGULAR.....Have bony gills; and the ventral fins situated *in front* of the pectoral fins, as the *cod, haddock, and whiting*.

- III. THORACIC Have bony gills ; and the ventral fins situated directly *under* the pectoral fins, as the *perch* and *mackarel*.
- IV. ABDOMINAL Have bony gills ; and the ventral fins on the belly *behind* the pectoral fins, as the *salmon*, *herring*, and *carp*.
- V. BRANCHIOSTEGOUS Have their gills destitute of bony rays, as the *moon* and *file-fishes*.
- VI. CHONDROPTERYGEOUS Have cartilaginous fins, as the *sturgeons*, *shark*, and *skate*.

687. The fifth class of animals comprises the INSECTS. These are so denominated from the greater number of them having a separation in the middle of their bodies, by which they are, as it were, *cut into two parts*. The science which treats of them is called ENTOMOLOGY.

Insects have, in general, six or more *legs*, which are, for the most part, nearly of equal length and thickness. Sometimes, however (as in the mole-cricket), the fore-legs are very thick and strong, for burrowing into the ground ; sometimes the hind thighs are long and thick, for leaping ; or flattened, fringed with hairs, and situated nearly in a horizontal position, to serve as oars for swimming.

Most of the insect tribes are furnished with *wings*. Some, as the beetles, have two membranous wings, covered and protected by hard and crustaceous cases, called elytra ; some, as the wasps and bees, have four wings without elytra ; others, as the common house-flies, have two wings ; and others, as the spiders, are entirely destitute of these members.

They are furnished with *antennæ*, which are usually jointed and moveable organs, formed of a horny substance, and situated on the front and upper part of the head. The researches of Mr. Newport go far to prove that they serve as organs for hearing. The *eyes* of insects are formed of a transparent substance, so hard as to require no coverings to protect them. Their *mouth* is generally situated somewhat beneath the front part of the head, and in a few of the tribes is below the breast ; and the jaws are transverse, and move in a lateral direction. These are furnished with feelers, and other organs, of various arrangement and structure, which constitute the foundation of arrangement in some of the systems of entomology. All insects breathe, not through their mouth, but through pores or holes along

the sides of their bodies ; or, as in the crabs and lobsters, by means of gills. The skin of insects is, in general, of a hard or bony consistence, divided into plates or joints which admit of some degree of motion, and is generally clad with very short hairs.

Nearly all insects go through certain great *changes* at different periods of their existence. From the *egg* is hatched the *larva*, grub, or caterpillar, which is destitute of wings ; this afterwards changes to a *pupa*, or *chrysalis*, wholly covered with a hard shell, or strong skin, from which the *perfect* or *winged insect* bursts forth. Spiders, and some other wingless insects, issue from the *egg* nearly in a perfect state.

688. Linnæus has divided the animals of this class into seven ORDERS.

ORDERS OF INSECTS.

- I. COLEOPTEROUS .. Have elytra or crustaceous cases covering the wings ; and which, when closed, form a longitudinal division along the middle of the back, as the *chafer*, *stagbeetle*.
- II. HEMIPTEROUS . . . Have four wings, the upper ones partly crustaceous, and partly membranous ; not divided straight down the middle of the back, but crossed, or incumbent on each other, as the *cock-roach*, *mantis*, *bug*.
- III. LEPIDOPTEROUS . . . Have four wings covered with fine scales, almost like powder, as the *butterflies* and *moths*.
- IV. NEUROPTEROUS . . . Have four membranous and semi-transparent wings, veined like net-work ; and the tail without a sting, as the *dragon-fly* and *ephemera*.
- V. HYMENOPTEROUS Have four membranous and semi-transparent wings, veined like net-work ; and the tail armed with a sting, as the *wasp* and *bee*.
- VI. DIPTEROUS Have only two wings, as the *common house-flies*.
- VII. APTEROUS Have no wings, as the *spiders* and *crabs*.

689. The sixth and last class of animals consists of *worms*, or *vermes*. These are slow of motion, and have soft and fleshy bodies. Some of them have hard internal parts, and others have crustaceous coverings. In some of the species

eyes and ears are very perceptible, whilst others appear to enjoy only the senses of taste and touch. Many have no distinct head, and most of them are destitute of feet. They are, in general, so tenacious of life, that parts which have been destroyed will be re-produced. These animals are principally distinguished from those of the other classes by having tentacula, or feelers.

690. Linnæus divided the vermes into five ORDERS.

ORDERS OF VERMES, OR WORMS.

- I. **INTESTINAL**... Are simple and naked, without limbs; some of them live within other animals, as the *ascarides* and *tape-worms*; others in water, as the *leeches*; and a few in the earth, as the *earth-worm*.
- II. **MOLLUSCOUS**.. Are simple animals, without shell, and furnished with limbs, as the *cuttle-fish*, *medusa*, *star-fish*, and *sea-urchins*.
- III. **TESTACEOUS** .. Are animals similar to the last, but covered with shells, as *oysters*, *cockles*, *snails*, and *limpets*.
- IV. **ZOOPHYTES** ... Are composite animals, and appear to hold a rank between animals and vegetables; though they are in fact true animals, and possess sensation and voluntary motion. In many instances a great number of them inhabit the same stone, but some are soft, naked, and separate. The *coral*, *sponge*, and *polypes* are instances of this order.
- V. **ANIMALCULES**. Are destitute of tentacula or feelers, and are generally so minute as to be invisible to the naked eye. They are chiefly found in different infusions of animal and vegetable substances.

CUVIERIAN ARRANGEMENT.

691. **ANIMALS**, by the Baron Cuvier have been divided into four great divisions:

1. **VERTEBRATED** animals.
2. **MOLLUSCOUS** animals.
3. **ARTICULATED** animals.
4. **RADIATED** animals.

692. In the **VERTEBRATA**, the division which contains man, the brain and the principal trunk of the nervous system are

enclosed in a bony envelope, which comprises the skull and the vertebræ: to this middle column are attached the ribs and bones of the limbs. The animals contained in it have all red blood, a muscular heart, a mouth with two jaws, acting perpendicularly, distinct organs for sight, hearing, smell, and taste, placed in the cavities of the face.

There are never more than four limbs, and the sexes are always separated.

693. In the **MOLLUSCA** there is no skeleton, the muscles being simply attached to the skin, which forms a soft envelope, in which in many species stony plates called shells are produced. The organs of taste and sight are generally only to be remarked, the latter is in some cases wanting; one family alone shews the organs of hearing. There is always a complete circulatory system, and particular organs for respiration; of these shell-fish may be taken as well known examples.

694. The **ARTICULATED** animals, so called from the joints of which their bodies seem to be composed, have for their nervous system two long threads, running the whole length of the body, and swollen here and there into knots or ganglions. The covering of their trunk is divided by transverse folds into a certain number of rings, of which the teguments are sometimes hard, sometimes soft, but which have the muscles always attached to the inside. Insects and shrimps may be taken as examples of this order.

695. The **RADIATED** animals have the organs of movement and of sense arranged around a centre like rays, whence the name is derived; of this kind are the star-fish, sea-urchin, polyps, &c.

696. The vertebrated animals are again divided into four classes.

MAMMALIA, or *Mammiferous animals.*

AVES, or *Birds.*

REPTILIA, or *Reptiles.*

PISCES, or *Fishes.*

The following TABLE, given by M. Edwards, will convey at one view an idea of the characters peculiar to these four divisions.

<i>Mammalia.</i>	<i>Birds.</i>	<i>Reptiles.</i>	<i>Fishes.</i>
Viviparous.	Oviparous.		
Furnished with teats.	Without teats.		
Blood with round globules.	Blood with oval globules.		
Blood-warm.		Blood-cold.	
Lungs.		Gills.	
Respiration simple.	Respiration double.	Respiration simple.	
Circulation double, complete.		Circulation double, incomplete.	Circulation double, complete.
Heart of four compartments.		Heart generally of three compartments.	Heart of two compartments.
Skin covered with hairs.	Skin covered with feathers.	Skin naked, or covered with scales.	
Limbs organized in most cases for walking.	Anterior limbs (wings) organized for flight.	Limbs organized in most cases for walking.	Limbs organized for swimming.

697. The MOLLUSCA are divided into six ORDERS, the *Barnacles*, or *Cirrhipedes*, having been lately shewn to be related to the *articulated animals*. The accompanying TABLE will give an idea of the characters.

ORDERS OF THE MOLLUSCA.

With a distinct head, and having the body	{ in the form of a sack open in front, from which proceeds a head surrounded by feelers or tentacula. }	<i>Cephalopoda</i> (<i>Cuttle fish.</i>)				
	{ not formed like a sack, head not surrounded with tentacula. Having for the principal organs of motion <table border="0" style="display: inline-table; vertical-align: middle;"> <tr> <td> { membranaceous fins in the form of wings on the sides of the neck. </td> <td> } <i>Pteropoda.</i> </td> </tr> <tr> <td> { A fleshy foot, occupying the ventral part of the body either in the form of a disk or sometimes of fins. </td> <td> } <i>Gasteropoda.</i> </td> </tr> </table>	{ membranaceous fins in the form of wings on the sides of the neck.	} <i>Pteropoda.</i>	{ A fleshy foot, occupying the ventral part of the body either in the form of a disk or sometimes of fins.	} <i>Gasteropoda.</i>	
{ membranaceous fins in the form of wings on the sides of the neck.	} <i>Pteropoda.</i>					
{ A fleshy foot, occupying the ventral part of the body either in the form of a disk or sometimes of fins.	} <i>Gasteropoda.</i>					
Without an apparent head.	{ Having four branchiæ distinct from the mantle, and almost always a fleshy foot. }	<i>Acephala.</i>				
	{ Without a fleshy foot but in most cases furnished with branchiæ distinct from the mantle. <table border="0" style="display: inline-table; vertical-align: middle;"> <tr> <td> { Furnished with two ciliated arms. </td> <td> } <i>Branchiopoda.</i> </td> </tr> <tr> <td> { Without arms or particular organs for motion. </td> <td> } <i>Tunicata.</i> </td> </tr> </table>	{ Furnished with two ciliated arms.	} <i>Branchiopoda.</i>	{ Without arms or particular organs for motion.	} <i>Tunicata.</i>	
	{ Furnished with two ciliated arms.	} <i>Branchiopoda.</i>				
{ Without arms or particular organs for motion.	} <i>Tunicata.</i>					

698. The ARTICULATED animals are divided into five ORDERS, which may be shortly characterized as follows :

ORDERS OF ARTICULATED ANIMALS.

Furnished with jointed limbs with white blood and	lungs or tracheæ for breathing in the air ; the head is	distinct from the thorax, is generally furnished with wings, and three pairs of legs.	}	<i>Insecta.</i>
				confounded with the thorax, wingless, four pairs of legs.
gills or branchiæ for breathing in the water ;	in general furnished with five or seven pairs of legs.	}	<i>Crustacea.</i>	
			without organs of locomotion : live fixed.	}
without jointed limbs, having red blood, and generally gills.	without jointed limbs, having red blood, and generally gills.	}	<i>Annelida.</i>	

TABLE OF THE CLASSES OF RADIATA AND ZOOPHYTES.

<p><i>Radiated Zoophytes.</i> Animals having the head scarcely ever vermiform or symmetrical, but having a greater or less tendency to become radiated. In general, they have a digestive cavity with one opening, or with two orifices, the one placed near the other.</p>	}	<i>Echinodermata</i> (<i>Sea-urchins</i>)	}	Animals rather complicated in structure, adapted for crawling, and to effect this furnished with a number of tentacula, which serve as suckers. Skin thick, and in general very hard.	
		<i>Acalepha</i>		}	Gelatinous animals, adapted for swimming only, and having a very simple structure. They have no suckers to serve as feet, and they want retractile tentacula.
		<i>Polypi</i>			Animals almost always living fixed under water, and united together in considerable numbers. Mouth surrounded with a crown of retractile tentacula. They increase by buds as well as by oviducles.

Amongst the Zoophytes are most generally placed the

sponges, which are masses without determined form, pierced with canals, without motion, and insensible.

Wormshaped-Zoophytes
 Have no tendency to assume a radiated form. Body almost always worm-shaped and symmetrical, in general they have a digestive canal with two distinct openings situated at the two extremities of the body.

Infusoria
 (*Rotatoria*)

Intestinal canal short, ending in two distinct openings, mouth in general armed with jaws, and furnished with rotary ciliæ—have the power of swimming—deposit eggs.

Entozoa

Intestinal canal sometimes straight, and with two orifices, sometimes branched and with one opening, mouth without jaws or rotary ciliæ, live in general as parasites in other animals, and spring from ovules (as the tapeworm).

Infusoria
 (*Polygastrica*)

Intestinal canal in general wanting, and seemingly replaced by a certain number of small internal cavities. Have the power of swimming. They multiply by the spontaneous division of their body.

DIVISION I.
VERTEBRATED ANIMALS.



Class II.
MAMMIFEROUS ANIMALS.

ORDER I.—BIMANA.

699. *Although the human body is not, in general, considered so useful as the bodies of many other animals, yet, as affording the best means of informing us concerning the nature of our actual structure, and the functions and uses of the different parts, and thus enabling us to cure, more effectually, the diseases and accidents to*

which we are continually exposed, therefore the study of anatomy, by an inspection of the dead body, is surely of the utmost importance, and should be encouraged by every one desirous of promoting the happiness and well-being of our species.

This sentiment ought, in all our processes of education, to be strongly impressed upon the young mind: for who would choose to trust a surgeon in the amputation of a limb, the opening of a vein, or even the extraction of a tooth, if he thought him ignorant of anatomy?

The only production of the human body which appears to be useful in a commercial view, is the hair.

This order is at once distinguished from all others by the existence of hands to the thoracic limbs only, and by many other anatomical characters. There is but one genus and but one species, man, of which, however, there are three marked varieties or races. The Caucasian, Mongolian, and Ethiopian, of which the European, Chinese, and Negro may be taken as prominent examples. The copper coloured Indians of America partake of the characteristics of the two first mentioned.

According to the most recent statistical calculation, the number of people found on the globe at the present time may be reckoned at seven hundred and thirty-seven millions, distributed somewhat as follows:—

Europe	227,700,000
Asia	390,000,000
Africa	60,000,000
America	39,000,000
Oceanic Islands, &c.	20,000,000

The more or less numerous population of a country depends less on its climate, than on the civilization and wealth of its inhabitants.

In Britain there are about 257 inhabitants for every square mile; in France 208; in Prussia 155; in Russia 35; in Siberia scarcely more than eight inhabitants to every ten square miles; and in the east part of New Holland about four to a hundred square miles, that is to say, in a space which in Britain would be peopled by nearly 26,000.

Human hair, for wigs and ornamental head-dresses, is

imported into this country from the Continent, and chiefly from Germany. We also import hair from China, but the latter is generally of a very dark colour. On the Continent this article is almost wholly collected by pedlars, who travel through the different countries, and carry trinkets and other articles for sale, and to exchange for it.

When, some years ago, long hair was much more fashionable than it is at present, great numbers of young women in Germany suffered their hair to grow, and had it cut, from time to time, as a source of emolument. The notion that long hair is frequently cut from the heads of persons after they are dead is totally unfounded, since the uncertainty of such supply would alone render it impracticable. The hair that is used for men's wigs is almost wholly children's hair, no other being in general considered sufficiently fine for this purpose.

The value of hair is from five to twelve shillings per ounce, according to the quality, length, or colour. Before it can be used it is well rubbed with dry sand, and afterwards boiled, to clean it. Such as is intended for wigs, if it do not curl naturally, is twisted round small earthenware cylinders, put into a vessel with sand or bran, and baked in an oven, until it acquire this property. The most scarce and valuable kind of hair is that of a flaxen colour.

In lawyers' and judges' wigs horse-hair and goats'-hair are frequently used, to give stiffness and form to the different parts.

ORDER II.—QUADRUMANA.

700. *This order is principally characterized by having hands to the abdominal limbs as well as to the thoracic. The formation of the posterior limbs is eminently adapted for the prehension of objects; the flexibility, however, of the parts renders them less fit for supporting the body in a vertical position; nearly all the animals are strictly climbers, and pass their lives in trees, in which they skip about with the greatest activity, while on the ground many of them seem to walk with difficulty.*

This order contains three families or tribes, which may be distinguished as follows:

- SIMIADÆ, *monkeys of the old world.* { Incisor teeth, four in each jaw, placed vertically; nails flat and all of the same form; apertures of the nostrils separated by a slight partition.
- CEBIDÆ, *monkeys of the new world.* { Incisor teeth, four in each jaw, placed obliquely, especially in the upper jaw; nails compressed and bent; thumbs of the forehands scarcely opposable; nostrils separated by a wide space.
- LEMURIDÆ, *the lemur tribe.* { Incisors more in number than in the monkeys; nails flat, except to the first or two first toes of the hind feet, which are pointed and bent. Fur woolly.

These are all animals of hot climates, the Barbary ape alone being found wild in Europe, and even there it is confined to the rock of Gibraltar. Linnæus divided the monkey tribe into three sections, the apes being characterized by the entire want of tails, the baboons by the presence of short tails, and the monkeys by having long ones. The tails of some of the monkeys, particularly those of South America, are so formed, that the animals are able to coil them round any object so firmly as to afford them a support in, apparently, the most perilous situations. Darwin, in his Journal and Remarks made on the Surveying Voyage of Her Majesty's ship the Beagle, informs us that the extremity of the prehensile tail of the bearded monkey, a species not uncommon in Brazil, can support the whole weight of the body, even after death; one, which was shot in his presence, thus remained fast to a branch, and it was necessary to cut down a large tree to procure it. Several of the monkeys have pouches within their cheeks, in which they collect their food previously to its being swallowed.

The chief use to which these animals are applied (except as objects of curiosity), is as food. The *pigmy apes* are caught by the Arabs, and fattened for this purpose, as we would fatten sheep. Whilst Dampier was on the coast of America he frequently partook of this kind of food; and states that he never ate any thing more delicious. The native American tribes eat the flesh of almost all kinds of monkeys, preferring that, however, of the *four-fingered species* (Ateles) to any other. Oexmelin informs us that, while in New Spain, the hunters regularly brought home, in the evening, such monkeys as they had killed in the course of the day; that their flesh somewhat resembled that of a hare, and was of a peculiarly sweet flavour; and that

he and his companions lived on these animals all the time they remained there.

Desmarchias, in his account of Cayenne, says that the flesh of the *howling monkeys* (*Mycetes*) is a white and very palatable food, not indeed so fat, but in general as good as mutton. Both the negroes and the colonists of Surinam occasionally subsist on monkeys. Yet, however delicate this kind of food may be, it is extremely repugnant to the feeling of an European to partake of what, when skinned, has so much the form and general appearance of a human being as these animals.

Colobus Guereza is a beautiful species found in Abyssinia. Dr. Ruppell states, that the skin is used by the warriors of that country to cover their shields, to which it serves as an elegant ornament, being black in the middle and white on the sides.

The woods of nearly all hot climates abound in monkeys. They feed almost wholly on fruit, grain, roots, and other vegetable productions. It would be inconsistent with the plan of the present work to enter into any detail relative to their habits of life. We can only say, generally, that few animals are known to be more active, mischievous, and enterprising than these. They usually live in immense troops, and commit great depredations in cultivated grounds near the forests where they reside; some of them continuing on watch, to give alarm in case of danger, whilst others are engaged in pilfering and carrying off the plunder to their habitations.

Humboldt assures us, that the melancholy note of one of the howling monkeys found in New Andalusia "is heard nearly two miles off, especially when the weather is open." Their dreadful yells, according to Swainson, generally begin about two hours before sunset, and invariably cease soon after twilight.

Fig. 72.

*The Great Bat or Noctule (Vespertilio noctula).*ORDER III. CHEIROPTERA, *Bats.*

701. In this very distinct order the fingers of the fore-extremities are much elongated, having the skin stretched over them; this thin membrane connects the fore and hind legs together, and serving all the purposes of the wing in birds, enables them to flit along in the air in pursuit of their food; for this purpose great strength and solidity are thrown into the clavicles and shoulder-blades, the forearm exists in a rudimentary state, as its rotatory motion, had it been fully developed, would have lessened the power of flying, by weakening the force of the impulse of the membranous wing. The teats are placed on the breast. Bats are supposed to possess a peculiar power of perceiving external objects without coming into contact with them, avoiding, according to Spallanzani, any obstacles with equal certainty, when the ear, eye, and nose are closed. The whole surface of the wing is endowed on both sides with extraordinary sensibility, so that, as Cuvier observes, it may be considered as one continuously expanded organ of touch.

Bats conceal themselves during the day in old buildings, caves, hollow trees, and other retired spots, flitting about after their insect food about twilight. White, in his Natural History of Selborne, speaks of a tame bat, when

taking flies out of a person's hand, as bringing its wings before its mouth, hovering and hiding its head in the manner of a bird of a prey; it rejected the wings of flies, did not refuse raw meat, could rise from the floor, and take wing with ease, it drinks on the wing like swallows, by sipping the surface, as it flits over pools and streams. When at rest they generally hang by their posterior extremities, as represented in the accompanying wood cut.

Fig. 73.



Smaller Horse-shoe Bat
(*Rhinolophus Hipposideros.*)

There are some interesting observations on the habits of two British species, (the Noctule and Pipistrelle) by Mr. Daniel in the Proceedings of the Zoological Society for Nov. 1834. Seventeen species are found in this country. Some of the American bats of the genus *Vampirus*, are accused of having caused men and beasts to perish by sucking them, but Cuvier says, they content themselves with making very small wounds, which may sometimes become envenomed by the climate.

The larger kinds, such as the *Fox bats* (*Pteropus*), are found in the islands of the eastern seas, often in companies of several hundreds, and are not unfrequently used as food.

At a particular season of the year they become fat; and though, whilst alive, their smell is excessively rank and unpleasant, they are then said to be delicious eating, and in flavour somewhat to resemble rabbits. Dr. Horsfield tells us that flights of the *Kalong* (*Pteropus Javanicus*), soon after sunset, direct their course to the forests, villages, and plantations in the lower parts of Java, attacking and devouring indiscriminately every kind of fruit, from the abundant and useful cocoa nut, which surrounds the dwelling of the meanest peasantry, to the rare and most delicate productions, which are cultivated with care by princes and chiefs of distinction, and thus they occasion incalculable mischief. Most, if not all, the European species feed on insects; catching, while on the wing, myriads of night-flying moths, the caterpillars of which are extremely injurious to vegeta-

tion; bats are therefore very useful animals. The inhabitants of New Caledonia weave their *hair* into various ornamental articles, and plait it with the stalks and leaves of a kind of grass into tassels for their clubs.

ORDER IV. INSECTIVORA.

702. The animals of this order, which contains the *Shrews*, *Hedgehogs*, and *Moles*, have, as in the preceding division, their molar teeth serrated with conical points, and most generally lead a nocturnal or subterraneous life. They feed principally on insects, and in cold climates most of them pass the winter in a state of lethargy (hybernation). They want the lateral membranes of the bats, but have clavicles. Their legs are short; the entire sole of the foot is applied to the ground in walking; the teats are ventral; the relative position and number of their incisor and canine teeth vary in the many different genera into which the order is divided.

703. The *HEDGE-HOG* or *URCHIN* (*Erinaceus Europæus*) is a small British quadruped, the upper parts of which are covered with spines, each an inch long, and the under parts covered with hair.

These animals are of considerable utility in several points of view. If kept and allowed to run about in rooms that are infested with beetles, cock-roaches, or crickets, they will destroy the whole of them. Some persons imagine that they will devour mice, but this wants authentication. A hedge-hog which was kept at the Angel Inn at Felton, Northumberland, was tamed, and employed as a turnspit. The *flesh* of the hedge-hog is occasionally used as food, and is said to be very delicate eating. The *skin*, which was frequently employed by the ancients as a clothes' brush, is now used by farmers, in some parts of the Continent, to put on the muzzles of calves which they are about to wean, that the cow may not permit them to suck. Several of the old writers have related accounts of very extraordinary, and at the same time very absurd, medicinal effects from different parts of this animal.

Hedge-hogs sleep in the day-time, and are awake during the night, when they run abroad in search of worms, snails,

insects and other food. Few creatures can be more inoffensive. When attacked they defend themselves by rolling into a globular form, and opposing on all sides a spinous surface. "Such is the strength and elasticity of its covering," says Professor Bell, in his history of the British Quadrupeds, "that I have repeatedly seen a domesticated hedgehog, in my own possession, run towards the precipitous wall of an area, and without hesitation throw itself off, and contracting at the same instant into a ball, in which condition it reached the ground from a height of twelve or fourteen feet, after a few moments it would unfold itself, and run off unhurt." There is a notion, but it is entirely an unfounded one, that hedge-hogs suck the milk of cows whilst lying in the fields asleep; and that they stick fruit upon their prickles, and thus carry it off to their habitations.

704. *The COMMON MOLE* (*Talpa Europæa*) is a small and well-known British quadruped, of a black colour, with broad fore feet, a large head terminating in a slender snout, extremely small eyes, no external ears, and a short tail.

In former times the *skins* of moles were in great esteem for many purposes both useful and ornamental. They were employed for the linings of winter garments, and for trimmings in several kinds of dress, and were even made into coverlets for beds. At present, although, by a late invention, the down or fur, which is as soft as the finest velvet, has been used in the manufacture of hats, they are so little esteemed in this country, that the mole catchers in general can find no sale for them. The *flesh* of the mole is eaten in some countries.

Moles live only in burrows or galleries, which they dig under the surface of the earth with their strong fore-feet; they are chiefly caught to prevent the injury which they are imagined to do to the farmer, by throwing up the mould in little hillocks, in different parts of his grounds. They are caught by traps placed in their galleries, by persons employed for that purpose, and who are paid for their trouble at a stipulated rate per dozen.

Moles feed on roots, worms, and the grubs or caterpillars of insects. They are generally considered to be both blind and deaf, but they possess every requisite organ both for sight and hearing: indeed, their quickness of hearing is

such that they take alarm, and seek for safety in flight, at even the most distant approach of danger; Shakspeare has not forgotten this, "Pray you tread softly, that the blind mole may not hear a foot fall."

Moles are believed by some persons to be useful, and not injurious to the farmer. In cold clayey land their operations are supposed to have a tendency to drain the soil, and to be beneficial in communicating air to the roots of plants; they are also thought to be serviceable by raising fresh mould upon grass-land, and by feeding on the grubs of several kinds of insects which subsist on the roots of the grass.

ORDER V.—CARNIVORA.

705. In this order the thirst for blood is at its highest degree of development, and the animals comprised in it possess the power necessary to procure it. They have all four large, long, and distant canine teeth, separated by six canines in each jaw, the root of the second lower of which is more deeply planted in its socket than the others. The molars are either entirely with cutting edges, or mixed with blunt tubercles, and not furnished with conical points.

These animals are more exclusively carnivorous in proportion as their teeth have more or less cutting molars, and the degree of it may almost be calculated according to the extent of the tubercular surface of their teeth compared with the cutting part. The bears, which can subsist exclusively on vegetables, have nearly all their teeth tubercular. According to Cuvier, the best characters for distinguishing the genera are derived from the three first molars.

These animals may be grouped into two sections by paying attention to the structure of the hind foot.

Fig. 74.



1. The *Plantigrade Carnivora* (Fig. 74. B) apply the whole sole of the foot to the ground when they walk, and this part,

when examined, is found to be devoid of hairs. They are more sluggish than the animals in the other section, and most of those found in cold countries pass the winter in a lethargic state.

2. The *Digitrade Carnivora* (Fig. 74. A) walk on the tips of their toes when they raise their foot. They are more active than the *Plantigrade* section, with which they agree in having only a bony rudiment, suspended in the flesh, as a clavicle.

706. The COMMON or BROWN BEAR (*Ursus arctos*) is a heavy-looking quadruped of a large size, which has a prominent snout, a short tail, and is covered with shaggy blackish hair.

It is found in the marshy woods of the northern parts of Europe and Asia, and is said likewise to be found in Egypt, Barbary, and India, and at one time was common in the British Islands.

The hunting of bears is an extremely important pursuit to the inhabitants of nearly all the countries in which they are found; in many parts of the world it constitutes their principal and most profitable employ. The *skins* are made into beds, covertures, caps, and gloves. Of all coarse furs these are the most valuable; and, when good, a light and black bear's skin is one of the most comfortable, and at the same time one of the most costly articles of the winter wardrobe of a man of fashion at Petersburg or Moscow. In England bears' skins are used for the hammer-cloths of carriages, for pistol-holsters, and other purposes. The leather prepared from bears' skins is made into harness for carriages, and is used for all the purposes of strong leather.

Nearly every part of the bear is of use. Its *flesh* is a savoury and excellent food, somewhat resembling pork: that of the paws is considered a delicacy in Russia, even at the imperial table. The *hams* are salted, dried, and exported to other parts of Europe. The flesh of young bears is as much in request in some parts of Russia as that of lamb is with us.

Bears' *fat* is considered a remedy for tumours, rheumatism, and other complaints. An *oil* prepared from it is adopted as a means of making the hair grow. This fat is likewise used by the Russians and Kamtschatdales with their food, and is esteemed as good as the best olive-oil. The *intestines*, when cleansed and properly scraped, are

worn by the females of Kamtschatka as masks to preserve their faces from the effects of the sun, the rays of which being reflected from the snow, are found to blacken the skin; but by these means they are enabled to preserve a fair complexion. These intestines are also used instead of glass for windows. In Kamtschatka the *shoulder-blade bones* of bears are converted into sickles for the cutting of grass.

The modes in which bears are caught or killed are too numerous to be described in this place. These animals chiefly frequent the most retired parts of forests; and their habitations or dens are formed beneath the surface of the ground, in which they pass the winter in a state of repose and abstinence. In some countries, where they are suffered to live without much molestation, they are quiet and inoffensive animals; but in others they are extremely surly and ferocious.

707. *The WHITE or POLAR BEAR (Ursus maritimus) is a quadruped of a large size, sometimes measuring nearly nine feet in length, and covered with long, coarse, and shaggy white hair; the head and neck are much longer in proportion than those of the common bear, and the tail is short. The sole of the foot is almost entirely covered with hair, a beautiful provision of nature, as the animal has thus a firm footing on the ice.*

The sea-shores of Greenland, and other countries within the Arctic Circle, as well as the immense islands of ice which abound in the Frozen Ocean, are frequented by great numbers of these animals.

The uses of the white bear are chiefly confined to the skin, the flesh, and the fat. Of these the *skin*, which is perhaps the most valuable part, is employed for beds, shoes, boots, and in various ways, as leather. The *flesh* is eaten by the Greenlanders, and the inhabitants of other northern countries, and is described to be as excellent as mutton, though this must be very doubtful when we consider the food on which these animals subsist. The *fat* is melted and employed instead of oil; that of the paws is used in medicine, for anointing rheumatic and paralytic limbs, and was formerly esteemed a sovereign remedy in these diseases. Of the *tendons*, when split into slender filaments, the Greenlanders make thread to sew with.

White bears are killed with spears; and are sometimes

hunted with dogs, or killed with guns. They are savage, ferocious, and powerful animals; and so great is their activity in the water, that they are frequently known to swim over tracts of sea six or seven leagues, from one island or shore to another.

Peter Collinson, in one of his letters to Linnæus, published by Sir James Edward Smith, says that he has often eaten of one of the North American species, and regards it as "the most agreeable taste of all flesh. My friend, a merchant, had young bears brought over every year, and fattened them with *dumplings* and sugar. It is really fine eating, and the fat is whiter and finer than the fat of lambs."—*Letter, Oct. 26. 1747.*

708. The *SLOTH BEAR* (*Prochilus labiatus*) has very extensile lips, it is trained by the Indian jugglers to dance, is said to be very fond of white ants, and by their destruction proves very useful.

709. The *RACCOON* (*Procyon lotor*) is a slender and somewhat fox-shaped quadruped. It is peculiarly distinguished by having a dusky stripe along the nose, and the tail marked with black rings.

This animal is chiefly found in the woods of North and South America.

Raccoons feed both on animal and vegetable food, which, when at liberty, they dip in water before they eat it, and hence the specific name, *lotor* (washer), applied to them. They are easily tamed, and are then good tempered.

The *fur* of the raccoon is so soft and useful as to be sometimes employed instead of beaver in the making of hats. It is also used for the linings of garments; the *skins*, when properly dressed, make good gloves and upper leathers for shoes. The *flesh* is eatable.

710. The *COMMON BADGER* (*Meles taxus*) is a small animal which has coarse hair, of a grey colour on the upper parts, and black beneath; and a long, black, pyramidal stripe on each side of the head; its body and legs are thick, and the teeth and claws peculiarly strong.

This animal is found in several of the woody districts of England, as well as in nearly all the temperate parts of Europe: it is about the size of a small pig.

In various particulars the badger is a useful animal to

mankind. Its *flesh*, which is somewhat similar in taste to that of the wild dog, is much esteemed in Italy, France, Germany, and China, and may be made into hams and bacon. The *skin*, when dressed with the hair on, makes excellent knapsacks, and covers for pistol furniture, and travelling trunks. For all these purposes it is frequently used, as it is impervious to rain, and needs no additional preparation to render it water-proof. In the paralytic complaints of old persons, it is asserted that the hairy skin of the badger, worn next to the body, has been of great service by stimulating the nerves into action. The *hairs* or bristles are made into brushes for painters; the *fat* is applied to many useful purposes, both externally and internally, in medicine.

Badgers are generally caught in sacks fastened at night, when the animals are abroad in search of food, into the mouths of their burrows in the ground. When these are fixed, the animals are hunted home from the adjacent fields with dogs, and on entering their usual places of retreat to escape from their foes, they are immediately seized and tied up in the sacks by men who are stationed at hand for that purpose. Badgers are also sometimes caught by steel traps placed in their haunts.

These animals subsist principally upon roots and other vegetable food, which they scratch up and root out of the ground during the night. Their dens or burrows are generally formed in woody places, or the clefts of rocks. Though in almost every respect innoxious, they are endowed with such strength as successfully to oppose the attacks of animals apparently much more powerful than themselves.

711. *The GLUTTON (Gulo arcticus) is a small animal, which has the back, muzzle, and feet of a dark brown colour; the sides dusky, and the tail of the same colour as the body.*

It is about three feet in length, exclusive of the tail; and is a native of mountains and forests in the northern parts of Europe, Asia, and America.

In such esteem are the *skins* of these animals in Kamtschatka, that only the most wealthy of the inhabitants can afford to wear them; the females, when full dressed, ornament their hair with the paws. They indeed value this

kind of fur so highly, as to assert that the heavenly beings wear garments made of it; and no Kamtschatdale can present to his wife or mistress a more acceptable gift than one of these skins. In Lapland they are sold at very high prices; and are used for muffs and the linings of coats. From the skin of the legs the Lapland women cut out gloves, which they work with a kind of tinsel wire, drawn through a machine made of the skull of the rein-deer. The fur is of a glossy black colour, and shines with peculiar lustre, reflecting different shades of light, according to the different positions in which it is held. The *flesh* of these animals is sometimes eaten in Greenland.

It is said to be the habit of the gluttons to climb into trees, and to drop from the branches upon the backs of deer and other animals which happen to pass beneath, and on which they can prey. They also feed on hares, mice, birds, and even on putrid flesh; and are said to be voracious in an extreme degree; they do not hibernate.

712. *The MARTIN (Mustela martes) is a quadruped belonging to the weasel tribe, with a greatly lengthened body and short legs, and the body of a blackish tawny colour above, brown on the belly, and white on the throat and breast.*

This animal is about eighteen inches in length, exclusive of the tail, and is not uncommon in woods near farm-yards, in the southern districts of Great Britain and Ireland. It is also found in several parts both of the Old and New Continent. It is destructive to game of every kind and to all sorts of poultry, and has been known to feed on mussels.

In some countries the martin is an object of eager pursuit, on account of its *skin*, which makes a valuable fur. This is in great request in Europe for lining and trimming the robes of magistrates, and for several other purposes. In Turkey, where furs of all kinds are in much esteem, those of the martin are particularly admired; and they are exported thither chiefly from France and Sicily. They form a considerable article of commerce betwixt this country and the northern parts of America; more than 12,000 skins being annually imported from Hudson's Bay, and more than 30,000 from Canada. The most valuable part of the skin is that which extends along the middle of the back. In England these skins are sold for about seven shillings

each ; the best and darkest of them are sometimes imposed upon the purchaser for sables' skins. In some countries the flesh of the martin is eaten ; but from its musky flavour it is not very palatable even to persons who are accustomed to partake of it.

713. *The SABLE (Mustela zibellina) is an animal of the weasel tribe, which in its general shape and size has a great resemblance to the martin (712), and is of a deep glossy brown colour.*

It is a native of some of the northern parts of America and Europe, as well as of Siberia and Kamtschatka, and is usually about eighteen inches in length.

The fur of the sable is peculiarly valuable. Some of the darkest and best skins, though not more than four inches in breadth, have been sold at sums equal to twelve or fifteen pounds sterling each. Sables' skins are chiefly imported from Russia, and the greatest number of them was formerly obtained in Siberia by persons banished thither from Russia, or sent for the purpose of collecting them. These were compelled by the government to furnish annually a certain number of skins by way of tax ; the eastern parts of Siberia, Cuvier tells us, were discovered by the sable-skin hunters.

Sables are chased only during the winter, betwixt the months of November and January ; for at that time the skins are in the highest perfection. Such animals as are caught at any other season have their skins full of short hairs, which render them less valuable. The sable hunters frequently assemble in companies of thirty or forty, and proceed along the great rivers in boats, taking with them provisions for three or four months. They have a chief, who, when they arrive at the place of their rendezvous, assigns to each division of his men the quarter to which they are to go. In the places which are frequented by these animals the hunters remove the snow on particular spots, and place snares there, each hunter being able to place about twenty snares in a day. They also pitch upon small places near trees ; these they surround with pointed stakes of a certain height, covering them with boards to prevent the snow from falling in, and leaving a narrow entrance, above which is placed a beam supported only by a

small and light piece of wood. As soon as a sable touches this to seize the piece of meat or fish which is placed for a bait, the beam falls and kills it.

Sables are also caught by a kind of snares that are usually laid for grouse and hares, being peculiarly partial to the seeds that are employed as bait for these animals. Nets are also sometimes used, sometimes fire-arms, and sometimes cross-bows.

The hardships, fatigue, and perils with which these expeditions are attended, may well be conceived when we consider the nature of the country, the season of the year, and the intense cold which the hunters have to endure.

The fur of the sable is short, and generally of a glossy and beautiful blackish brown colour: some animals, however, are of a lighter colour; some have yellowish spots on the neck, and others have been found entirely white; but the skins of these are of little further value than as curiosities.

There is a mode of dyeing the light-coloured furs darker, and also of dyeing other furs to imitate sables; but these are easily discovered by their having neither the smoothness nor the gloss of furs in a natural state.

Sables are very sprightly and active little animals. They form holes or burrows under ground in forests, and the banks of rivers, and subsist on small quadrupeds, birds, eggs, and other animal substances of different kinds.

714. *The FERRET (Mustela furo) is a species of weasel, which, in shape, somewhat resembles the martin (712); but it has a strong and more shaggy fur, of a dingy yellowish colour, and red eyes.*

It is found wild in the northern parts of Africa.

The principal use to which this quadruped is applied is in rabbit warrens, for driving those animals out of their burrows into the nets or traps of the warreners. Though naturally of a savage disposition, ferrets are easily tamed, and rendered sufficiently docile for all the services that are required of them. It is, however, a treacherous animal, and its apparent innocence and good temper should not be carelessly confided in, as instances have been known of its attacking young children asleep, and lacerating them se-

verely. They should be kept in tubs or chests, and well supplied with clean straw, as otherwise they will become excessively fetid and offensive.

When about to be used, they should be kept for a little while without food, and have their mouths securely muzzled. The former, lest they should become indolent and not hunt : and the latter, lest they should satiate themselves on the rabbits, and consequently be disinclined to return from the burrows. Some warreners are so cruel as to sew up the mouths of ferrets instead of muzzling them.

When put into a burrow it is customary to tie a bell round the neck of the ferret, and purse-nets are fastened over all the holes that are supposed to communicate with that in which he is placed. The use of the bell is to ascertain the situation of the ferret, and prevent his being lost. The best time for setting the nets is at day-break, and they are generally suffered to remain till half an hour before sunrise : and they are set again from half an hour before sunset until it is dark. If it be required to take half-grown rabbits from holes that are known to have few angles, and not to extend far below the surface of the ground, it is sometimes customary to use the ferret unmuzzled, and with a line round him ; and as soon as he is supposed to have seized the rabbit, he is drawn gently back with the animal in his mouth.

Ferrets are frequently kept by farmers and other persons for killing rats ; and so eager and active are they in this pursuit that few are able to escape them. Even a young ferret, after he has seized a rat, will so perseveringly retain his hold, as to suffer himself to be dragged to a considerable distance before he can kill it, but he seldom fails in doing this at last.

As the unmixed breed of ferrets is supposed to degenerate, and lose, in some degree, their native ferocity, it is usual with some warreners to cross the breed with our native wild animal the polecat or founmart, of which it was at one time regarded as a variety.

715. The *ERMINE* (*Mustela erminea*) is a species of weasel, of a white colour, except the tip of the tail, which is black. This is, however, only the winter colour of the animal in the northern parts

of Europe; in the summer it becomes brown instead of white, and in this state has the name of stoat.

This animal, which in its brown state is well known in all parts of England, is usually about ten inches in length, exclusive of the tail.

The skins of ermines are a valuable article of commerce in several parts of the Continent, and particularly betwixt the Russians and Chinese. In 1833, 105,139 skins of this species were imported as articles in the fur trade from Siberia and the North of Europe. In some countries, as in Norway, Lapland, and Finland, the animals are found in prodigious numbers. They are generally caught in traps, but are sometimes shot with blunt arrows. Their skins are employed for ornamenting robes of state, and in various parts of female dress; and for these purposes they have been used during many centuries past, as is evident from ancient paintings, sculpture, and other authorities. The black tips of the tails are considered peculiarly valuable.

In Russia ermines' skins of good quality are sold at the rate of about a shilling each. They are usually sewed in lengths of three Russian ells, and these parcels are estimated, according to their quality, at from two to five guineas each. Many deceptions, however, have been practised respecting ermines' skins, which have tended to depreciate their value; the principal of these is to conceal and sew small bits of lead in the feet, to increase their weight.

Ermines, like all other animals of the same tribe, are carnivorous, and very destructive to such quadrupeds as they are able either openly to attack, or to seize by stratagem. They are chiefly found amongst woods, in hedge-banks, hollow trees, heaps of stones, and the banks of rivers.

It is a remarkable circumstance, and one that affords a very pleasing proof of the wisdom of Providence, that at the commencement of winter, these and other defenceless animals change their brown summer coat to one similar in colour to the snows of that inclement season. By such means they are able to elude the sight of many of their enemies, to the attacks of which they would otherwise be peculiarly exposed. Professor Bell is inclined to believe that this change is effected, not by the loss of the summer coat, and the substitution of a new one for the winter, as

some have supposed, but by the actual change of colour in the existing fur.

716. The *STRIATED WEASEL*, or *SKUNK* (*Mephitis putorius*) has the upper parts of its body striped with black and white, the neck and legs very short, and the tail is clad towards its extremity with long whitish hair.

This animal is about eighteen inches in length, exclusive of the tail, which measures about fourteen inches. It is an inhabitant of several parts of America.

The mode in which the skunk is protected from the attack of enemies more powerful than itself, is by emitting an odour so fetid and abominable that few creatures are able long to continue within its influence.

Cattle are said to be so much alarmed by it as to utter the most dreadful bellowings. Clothes that are infected with this smell retain it for many weeks; no washing can render them sweet, and they must be for some time buried in the fresh soil before they are thoroughly cleansed. Notwithstanding this, the American Indians frequently eat the flesh of the skunk; but great care is requisite in killing it, to prevent any ill effect which would arise from its noxious vapour. As soon as the animals are dead, the glands from which this vapour issues, are cut away, and the flesh, then untainted, is said nearly to resemble that of a young pig. The skins of these quadrupeds, which are sweet, and well clad with hair, are much in request by furriers. The inhabitants of Chili are very partial to those of an allied species as coverlids for their beds, and for other useful purposes. The Indians also make purses of them, which they hold in great esteem.

717. The *COMMON OTTER* (*Lutra vulgaris*) is of a dark brown colour, with short and thick legs, the hind feet naked, and the tail more than half the length of the body. The toes are connected by a broad strong web.

This animal is about two feet in length, exclusive of the tail. It has a short head and broad muzzle; the eyes are situated towards the front of the face; the ears are rounded and short; and the tail is very thick, particularly towards its origin.

The otter inhabits the banks of fresh-water rivers and streams, in many of the British counties; in other parts of Europe, in North America, and Asia, as far as Persia.

The depredations committed in rivers and fish ponds by

this voracious animal are not compensated by the value of its *skin*, which however affords a fine fur of a deep brown colour, particularly if the animal be killed in the winter; for then its shade is darker than at any other season of the year. Otters are generally either caught in traps, or chased by dogs, and men armed with long spears.

Their *flesh* is allowed by the canons of the Romish church to be eaten on maigre days, from its supposed resemblance to fish, on which otters almost wholly subsist. In the kitchen of the Carthusian convent near Dijon, Mr. Pennant saw the servants preparing an otter for the dinner of the religious of that rigid order, who, by their rules, are prohibited, during their whole lives, the eating of flesh.

It is possible so far to tame and educate these animals as to render them serviceable in catching fish. Many instances of this have been mentioned. An inhabitant of Christianstadt in Sweden had an otter which daily procured for him as much fish as served for the use of his family. Dr. Goldsmith speaks of having himself seen an otter plunge into a gentleman's pond at the word of command, drive the fish into a corner, and seizing one of the largest, bring it off to his master. In Bewick's History of Quadrupeds two instances of this proficiency are noted. In one of these it is stated that the otter would sometimes catch for his master as many as eight or ten salmon in a day. As soon as one was brought to the shore and taken from its mouth, it dived in pursuit of another; and when tired would refuse to fish any longer, after which it was rewarded with as much as it could devour.

The otter always hunts for his prey against the stream; and usually destroys several fish at a time, seldom devouring more than the upper part of their bodies. These animals fish in the sea as well as in fresh water; their habitation is a den or burrow, which they form or find near the banks of rivers or other waters, from which they can take food.

718. *The SEA-OTTER (Enhydra lutris) is chiefly distinguishable from the common species by its hind feet being hairy, and the tail being only one-fourth part as long as the body.*

Its length, exclusive of the tail, is about three feet; and its fur

extremely soft, and of a deep glossy black or dark brown colour. The hind legs somewhat resemble those of a seal.

These animals are found on the sea-coast of Kamtschatka and the adjacent islands, as well as on most parts of the opposite coast of America.

A considerable trade in sea-otters' skins is carried on betwixt Russia and other nations. The Kamtschatdales, on whose coasts the animals are chiefly killed, barter them with the Cossacks, and they with the Russian merchants. So little do the Kamtschatdales value these skins, that they exchange them freely for an equal number of foxes' or sables' skins, which are indeed much inferior to them in value. The Chinese are the principal purchasers of them from the Russians; they pay for them at the rate of from seventy to a hundred roubles each. This great price, and the distance from which they are brought, are the principal causes of their being seldom seen in Europe.

The best skins are those of such animals as are killed between the months of March and May. The fur of the sea-otter is, in some respects, inconvenient as clothing, on account of its being very thick and heavy, otherwise (independently of its greater size) it would be superior in value to the fur of the sable. Its colour is generally black, but sometimes brown, like the fur of the common otter. The skins of the females are easily distinguished from those of the males, by being smaller, more black, and having the hair longest under the belly. It was the trade for these and other furs, at Nootka Sound, on the north-western coast of America, which, in 1788, had nearly occasioned a rupture between this country and Spain.

The *flesh* of the young sea-otters is said to be an extremely delicate food, and scarcely to be distinguishable from that of lamb.

719. *The DOG (Canis familiaris) is an animal characterized by Linnæus as having the tail recurved, and bent towards the left side of the body. The pupil of the eye is round. Numerous varieties.*

As an attached and faithful servant of man, the dog is equalled by no animal. Though, in common with other brutes, he is incapable of speech, he evinces, on innumer-

able occasions, his feeling and his intelligence. He is all zeal, warmth, and obedience; and forgetful of injuries, he seeks only how he may gain the favour and affection of his master. During the night he guards the house, and, by the noise he makes, he gives notice of the approach of depredators. He also protects the property committed to his care, and secures it from being plundered. He directs the steps of the blind, and, in some instances, has even been instructed to pick up money, and put it into his master's hat. Being endowed with great strength, and fleetness of foot, some kinds of dogs are trained to the chase, and taught not only to pursue and to destroy noxious and savage beasts, but also to hunt for and secure animals as food for their master. Cuvier has well said, that his "swiftness, strength, and highly developed power of smelling, have made him a powerful ally of man against the other animals, and were perhaps necessary to the establishment of society. It is the only animal that has followed man all over the earth."

Dog skins are converted by the inhabitants of Greenland into garments, and particularly into stockings. They are also used for the coverlets of beds. In our own country they are tanned, and applied to several useful purposes, as leather, and particularly for gloves and shoes. The *hair* of some kinds of dogs is so thick and matted that, like wool, it is capable of being converted into cloth. A small kind of King Charles's dog is mentioned by Dr. Anderson to have had long and soft hair, covering a finer sort, which might, with advantage, have been woven into shawls. He speaks of another kind which had a very thick fleece, much resembling that of some of the Lincolnshire sheep; and of a third kind with close frizzed wool, which was shorn annually and made into stockings. He, however, remarks, that the finest hair he ever saw upon a dog, and which indeed for softness and gloss more resembled silk than hair, grew upon a very small kind of Maltese dog. This, if manufactured, might have been converted into shawls of uncommon softness and beauty. The fleece of a water dog, belonging to a farrier in the horse artillery, was manufactured into hats, and answered this purpose sufficiently well. Each fleece was sufficient for two hats, and was considered to be worth about twelve shillings.

Disgusting as it may appear to us, the *flesh* of the dog is a favourite food in many countries. The Greenlanders eat it with avidity. In the markets of Canton, dogs are exposed for sale in the same manner as other animal food. The negroes of Africa prefer their flesh to that of any other quadrupeds; for dogs are sold in some of their markets at as dear a rate as mutton or venison. With the North American Indians they are considered a great delicacy; and we are informed by Pliny, that the Romans were so partial to this kind of food, that a fricassee of sucking puppies was considered a favourite dish with even the most notorious Roman epicures.

There are nearly thirty distinct and well ascertained varieties of the dog; of which fourteen are considered to be natives of our own island.

720. *The SIBERIAN DOG is distinguished by having its ears erect, and the hair of its body and tail very long.*

By the inhabitants of many northern countries of the world, these dogs are employed in drawing sledges over the frozen snow, five of them being yoked to each sledge, two and two, with the fifth in front as a leader. These sledges generally carry only one person each, who sits side-ways, and guides the animals by reins fastened to their collars; but more particularly by his voice, and a crooked stick, which he carries in his hand. So much, however, depends upon the excellence of the *leader*, that a steady and docile dog for this purpose is not unfrequently sold for as much as ten pounds sterling.

The fleetness of the Siberian dogs is so great that they have been known to perform a journey of 270 miles in three days and a half; with a sledge containing three persons and their luggage, they will travel sixty miles in a day. During the most severe storms, when their master cannot see his path, nor can even keep his eyes open, they seldom miss their way. And it is said that, in the midst of a long journey, when it is found absolutely impossible to proceed any further, the dogs, lying round their master, will keep him warm, and prevent him from perishing by the cold.

The natives of Kamtschatka wear the *skins* of these

animals as clothing, and consider the long hair as an ornament.

721. *The NEWFOUNDLAND DOG*, for united size, strength, and docility, exceeds all the kinds of dog with which we are acquainted. As its name imports, it is a native of the Island of Newfoundland; and also of the adjacent parts of America, where it is employed in drawing wood on sledges, from the interior of the country to the sea-coast. Four of these dogs are harnessed to each sledge, and are able with ease to draw three hundred weight of wood for several miles. And it is peculiarly deserving of remark, that they often perform this service without any driver. Before the introduction of horses into general use in Canada, most of the land carriage was performed by dogs.

The ease with which the Newfoundland dog swims, and the strong attachment which he forms towards mankind, have rendered him of great service in cases of danger from the oversetting of boats, and other accidents by water.

722. *The SHEPHERD'S DOG is an animal of a rude and inelegant appearance, has its ears erect or half erect, and the tail covered beneath with long hair.*

In wide and extensive tracts of down or mountain that are appropriated to the feeding of sheep, the assistance of this faithful and docile ally is of very great importance. At a word from his master, the shepherd, he drives the sheep to and from their pasture, and will suffer no stranger from another flock to intrude upon his. If he observe any of the sheep attempting to stray, he springs forward in an instant to stop their course, however great the distance. These dogs drive the sheep entirely by their voice; never lacerating them, nor indeed ever employing force but for the preservation of peace and good order. When awake they are, at all times, alive to their master's directions; and, in repose, they lie down by his wallet, and defend it from plunder.

723. *The WATER DOG is principally distinguished by having its hair long and curled, like the fleece of a sheep, its muzzle some-*

what short, and the feet more webbed than those of most other dogs.

There are two kinds of water-dogs, which differ only in size, the one being nearly as large again as the other.

It is to sportsmen principally that these dogs are of use. Being fond of swimming, they are chiefly employed for fetching out of the water game that has been shot and fallen into it.

Their *fleece* has so near a resemblance to wool, that it is capable of being manufactured into a coarse kind of cloth, or of being made into hats.

724. *The SPANIEL is a dog with pendulous and woolly ears, the hair long on all parts of the body, but particularly on the breast, beneath the body, and at the back of the legs.*

Like the water dog, the spaniel is chiefly useful to sportsmen in the shooting of water fowl. And when hawking was a fashionable recreation in England, this was the kind of dog which was always taken out to spring the game.

In all ages the spaniel has been noted for fidelity and attachment to mankind: the instances that have been recorded of these are innumerable. The chief order of Denmark (now improperly denominated the order of the elephant) was instituted in memory of a spaniel, which had shown a peculiar attachment to the monarch, his master, when deserted by his subjects.

725. *The SETTER is a dog nearly allied to the spaniel, and is to this day frequently distinguished by the name of the English spaniel.*

In some parts of England these dogs are used in the field to discover and point out game to the sportsman. They are very tractable, and easily trained to their duty. And such are their muscular powers, that an instance has been related of a setter having hunted all the fields adjoining to the road along which his master was riding, through a distance of nearly sixty miles.

726. *The POINTER is a dog with smooth hair, stout limbs, blunt muzzle, and tail appearing as if in part cut off.*

These dogs are in common use with sportsmen, for discovering game, which they are taught to do with wonderful steadiness and attention. Aided by the acuteness of their smell, they gently approach the spot where the game lies, and at length stop; having their eyes steadily fixed upon it, one foot generally somewhat raised from the ground, and the tail extended in a straight line. If the birds run, the dog steals cautiously after them, keeping still the same attitude; and when they stop he is again steady. It is by the assistance of pointers that game is chiefly killed in this country.

727. *HOUNDS* are distinguished into three kinds, called the harrier, fox hound, and stag-hound; all of which are characterized by having their ears smooth and pendulous, and having on each hind foot a spurious claw, called a dew claw.

Of these animals the first, which is the smallest, has its name from being employed in hunting the hare; the second is larger and more stout, and is used for hunting the fox; and the third, which is the largest, stoutest, and fleetest of the whole, is used for hunting the stag.

They are always taken to the field in packs, consisting of about twenty-five couple; and when in scent of their game, they unite in a loud yelling noise, which they continue so long as they are in pursuit.

728. *The BLOOD-HOUND* is larger than the common hound, and is generally of a deep tan or reddish colour, with a black spot over each eye.

In the early periods of our history, blood-hounds were in much greater request than at present. They are indebted for their name to the faculty with which they are endowed, of being able to trace wounded animals by their blood. Their principal employment was to recover such game as, after having been wounded, had escaped from the hunters. In most of the royal forests blood-hounds are at this day kept, for tracing wounded deer; which they are able to do, however distant the flight, or however thick the parts of the forest through which they may have passed. Deer-stealers are also frequently discovered by means of these animals.

Blood-hounds were formerly used in certain districts on the confines of England and Scotland, to overawe or pursue the depredators of flocks and herds. Of late years they have been employed in the island of Jamaica to discover the ambuscades of the Maroons, in their projected descent upon the whites; and in the Spanish West Indian islands, to traverse the country, in pursuit of persons guilty of murder and other crimes. The dogs are taught to act more by exciting terror than by attack; criminals are in general taken by them, and brought to justice, without the slightest personal injury.

729. *The GREY-HOUND is distinguished by his slender and curved body, his narrow muzzle, and his tail being curved upward at the extremity.*

Our ancestors so highly esteemed the grey-hound, that, by the laws of Canute, it was enacted that no person, under the degree of a gentleman, should presume to keep a grey-hound. The pursuit of animals by these dogs is particularly denominated *coursing*. Those that were anciently coursed by them were the deer, the fox, and the hare; but they are now only used for coursing the hare. They hunt by sight, and not by scent; their fleetness of foot is such that, in a hilly or uneven country, there are few horses which can keep pace with them.

730. *The MASTIFF is a dog of a large size and robust body; and has the lips hanging down at the sides.*

By the ancient Britons it was customary to train these dogs to be of use in war. With us they are chiefly employed as watch dogs; and they discharge this duty in many instances with great fidelity. Some of them will suffer a stranger to come into the enclosure they are appointed to guard, and will accompany him peaceably through every part, so long as he continues to touch nothing; but the moment he attempts to lay hold of any of the goods, or endeavours to leave the place, the animal informs him, first by growling, or, if that be ineffectual, by harsher means, that he must neither do mischief nor go away. He seldom uses violence unless resisted; and in this case will some-

times seize the person, throw him down, and without biting him, will hold him there for hours, or until relieved.

When roused to fury the mastiff is one of the most tremendous animals with which we are acquainted, and consequently one of the most difficult to be overcome in combat. He is, however, capable of a steady attachment towards his master, and will protect him from injury at the risk of his own life.

731. The *THIBET DOGS*, Mr. Broderip tells us, are the watch dogs of the table land of the Himalaya mountains about Thibet. Their masters, the Bhotcas, to whom they are most strongly attached, are a singular race of a ruddy copper colour, indicating the bracing air which they breathe. They are rather short, but of an excellent disposition. Their clothing is adapted to the cold climate they inhabit, and consists of fur and woollen cloth. The men till the ground and keep sheep, and at certain seasons come down to trade, bringing borax, tincal, and musk for sale. They sometimes penetrate as far as Calcutta. On these occasions the women remain at home with the dogs, and the encampment is watched by the latter, which have an almost irreconcilable aversion to Europeans, and in general fly ferociously at a white face. A warmer climate relaxes all their energies, and they dwindle in even the valley of Nepaul.

732. *The BULL-DOG is smaller than the mastiff, but in general form is nearly allied to it: the body is robust, the snout somewhat flatter than that of the mastiff; and the lips are pendulous at the sides*

For courage and ferocity, the bull-dog is exceeded by no British animal of its size. Since the horrid practice of bull-baiting has been discontinued in this kingdom, the race of these dogs has much declined; and the few that are now seen are employed by butchers and other persons as watch-dogs.

733. *The TERRIER is a small and hardy kind of dog, the name of which is derived from its usually subterranean employment.*

Some terriers are rough, and others smooth haired. They are generally of a reddish brown, or black colour, short-legged, and strongly bristled about the muzzle.

These dogs, the determined enemies of almost every species of vermin, are of great use to farmers and others, in the extermination of rats, polecats, and similar depredators. They are also employed in driving foxes from their dens, and on this account are generally attendants upon every pack of fox hounds. Formerly they were used in rabbit warrens, to expel those animals from their burrows. In character they are fierce, keen, and hardy; and being remarkable for vigilance, they are admirable house dogs.

734. *The LURCHER is a dog apparently partaking of the nature both of the terrier and the grey-hound; there are two varieties, one covered with short and thick set hair, and the other with long and harsh hair.*

As this dog hunts both by sight and smell, and takes his prey without noise, he is frequently employed by poachers in their nocturnal excursions in pursuit of game. When in the midst of game the lurcher does not, like most other dogs, either bark or suddenly run upon it; but by a seeming neglect, he deceives the object till it comes within reach, and then suddenly springs upon and secures it.

735. *The TURNSPIT is a small dog, with short and generally crooked legs, and the tail curled upwards.*

These dogs were formerly much employed to assist in the roasting of meat. For this purpose they were placed in a broad wheel connected with the spit, which they turned round by running in it as a squirrel does in his cage. They are still used in this capacity in most of the countries of the Continent; but being now in little request in England, the breed is nearly extinct with us.

To the preceding description of dogs it may be added, that they are very liable to a disease which, although not very accurately defined, yet their *bite* when labouring under it communicates to the human subject the complaint called *Hydrophobia*, so named from one of its symptoms being a dread of water; and as no remedy has hitherto been found for this deplorable malady, except the *Mikania Guaco* (486), the patients generally dying a few days after the disease is apparent, we therefore emphatically advise every one to

avoid, valuable and faithful as the dog in general is, the fondling and caressing of this animal ; as it is impossible to say how soon or when any individual may be contaminated by its bite.

736 The *WOLF* (*Canis lupus*) is a ferocious animal of the dog tribe, of a brownish colour, in northern countries in the winter white, with a pointed nose, erect and sharp ears, and bushy tail bent inward.

This animal is found wild in most of the countries of the Continent, and was formerly common in Great Britain and Ireland.

The wolf affords to us nothing valuable but his *skin*, which makes a warm and durable fur.

In North Carolina there is a kind of wolf, the *skin* of which, when properly dressed, makes good parchment ; and when tanned, is convertible into excellent summer shoes. The Indians frequently use these skins for beds, under an impression that they drive away bugs and fleas ; and they imagine that nearly all parts of this animal are useful as remedies for different bodily disorders.

In the ancient periods of our history wolves were so numerous and so destructive in England, that we are informed of places having been built in different parts of the island to defend passengers from their attacks. In the reign of Edward the First a royal mandate was issued to a person whose name was Corbet, to superintend and assist in the destruction of wolves, in the several counties of Gloucester, Worcester, Hereford, Salop, and Stafford ; and numerous individuals held lands of the crown, by the duty of hunting and destroying wolves. The latest account that has occurred respecting the existence of wolves in England is under the date of 1281. The last wolf known to have been killed in Scotland was in the year 1680 ; and the date of the complete extinction of these animals in Ireland is 1710.

The *FOXES*, of which there are several species, are distinguished from the other dogs by the pupil of the eye being linear, the bushy tail, and their nocturnal habits ; the skins of most of the species are used as furs, those of the Silver Fox (*Canis argentatus*) of North America, being the most valuable.

737. *The COMMON FOX (Canis vulpes) is an animal of the dog tribe, of a brown colour, with sharp muzzle, erect and pointed ears, and straight and bushy tail, tipped with white.*

This animal is found in almost every country of the world. It lives in furze or in young woods, and when pursued betakes itself to a hole in the earth; in the absence of nobler game, it now ranks as the most important beast of the chase.

Although foxes occasionally commit great depredation in poultry-yards, and among game, they are serviceable to mankind by destroying many kinds of noxious animals. Their *skin* also constitutes a soft and warm fur, which in many parts of Europe is used for muffs and tippets, for the linings of winter garments, and for robes of state. So great is the demand for these skins, that at Lausanne there are furriers, who in a single winter have received betwixt two and three thousand of them from different parts of the adjacent country. The *flesh* of the fox is eaten by the inhabitants of some countries of the Continent. According to Blumenbach, the vast numbers of this or a closely allied species found in the Eastern Aleutian islands have given them the name of Fox islands.

738. *The ARCTIC FOX (Canis lagopus) is an animal of the dog tribe, smaller than the common fox, of a white or bluish grey colour; the hair very thick, long, and soft, the tail straight and bushy, and the feet very hairy.*

The extreme parts of North America, and the country around the Frozen Sea, are those which the Arctic Fox principally inhabits.

These animals are principally killed on account of their *skins*, their fur being light and warm, though not durable. In winter this changes to a *white* colour, and becomes much thicker. The inhabitants of Greenland split the *tendons*, and use them as thread; they also sometimes eat the *flesh* of these animals, which when young is said by many of the recent arctic voyagers to be very good.

The modes in which they are caught are various; by stone traps; in holes in the snow, the openings to which are surrounded by snares; in pitfalls, the surfaces of which are so covered that the animals are unable to discover them; and with arrows and guns.

739. *CIVETS (Viverra civetta and zibetha) are animals distinguished by having coarse hair of a yellowish ash-colour,*

marked with large blackish or dusky spots and stripes; a sort of upright mane on the neck and back (in the *V. zibetha* this is wanting) and the tail spotted above, and brown towards the tip.

They are both natives of several parts of Africa and India, the *V. civetta* being peculiar to Africa, and the other to Asia.

The drug or perfume called civet is the production of this animal. It is formed in a large bag or receptacle situated at a little distance beneath the tail, and the creature often spontaneously presses it out through an external orifice. This fatty substance is about the consistence of soft pomatum, of a lively white colour when fresh, but darker when it has been some time kept. Its perfume is so strong, that it pervades every part of the animal's body. The skin and hair are so entirely impregnated with it, that they retain their original smell long after they have been taken from the body; and if a person be shut up in the same apartment with one of these quadrupeds, the odour is almost insupportable.

Civet was formerly much employed in medicine; but it is now seldom used, except as a perfume. It communicates some smell both to watery and spirituous liquors; hence a small portion of it is often added to odoriferous waters and spirits. The Italians make it an ingredient in perfumed oils, and in this manner obtain the whole of its scent: for oils dissolve the entire substance of the civet. When genuine, its value is from thirty to fifty shillings per ounce.

Although the animals which produce this drug are inhabitants of hot climates, they are kept in great numbers, and with a commercial view, at Amsterdam. They are fed with boiled meat, eggs, birds, small quadrupeds, and fish; and as soon as the receptacle of any of them is supposed to be nearly full, the animal is put into a long cage, so narrow that it is unable to turn round. This cage has a door behind, through which a small spoon or spatula is introduced into the pouch. This is carefully scraped, and its contents are deposited in a proper vessel. This operation is usually performed twice or thrice a week.

In many parts of the Levant and the East Indies civets are reared and fed, as domestic animals are with us: but as, in the Levant particularly, they are few in number, and

brought from a great distance, the perfume is increased by introducing into the bag a small quantity of butter or other fat. The people then shake the animal violently, and by beating irritate and enrage it as much as possible. This accelerates the secretion; and the fat, after having imbibed a great portion of the perfume, is used in place of the genuine drug. Civet is adulterated by mixing it with storax and other balsamic and odoriferous substances. That which is procured from Amsterdam is said to be less adulterated, and consequently is held in higher estimation than the civet which is imported from the Levant and the East Indies: but notwithstanding the apparent care to sell it genuine, as would appear by the sealed bottles in which it is purchased, there is reason to suppose that very little indeed of it is free from adulteration.

It must be remarked, that the drug called civet is not only produced by this animal, but by some others of the same tribe, though in smaller quantity, and of less value. Civet is more pleasant than musk, to which it has some resemblance, and with which, by ignorant persons, it is sometimes confounded.

740. *The GENET (Genetta vulgaris) is a quadruped nearly allied to the civet, but is distinguished by the claws being wholly retractile within the toes, its tail having seven or eight black rings, and the body being of a tawny red colour spotted with black.*

It is an inhabitant of some parts of Asia, and is also found in France and Spain. Its length is about seventeen inches.

Like the civet, this animal produces, and in a similar manner, an agreeable *perfume*. It is not, however, so powerful as that of the civet, and its scent much sooner evaporates. The *skin* of the genet is capable of being made into a light and handsome fur. This was formerly a fashionable substance for muffs, particularly on the Continent; and as the animals are by no means numerous, was sold at high prices. After a while, however, the art of counterfeiting it, by staining the skins of grey rabbits with black spots, having been discovered, its value gradually abated, and at length it has ceased to be in request.

741. *The ICHNEUMON (Herpestes ichneumon) is a quadruped somewhat more than three feet in length, of which the tail,*

which is thick at the base, and tapering and tufted at the extremity, measures nearly half: the hair is hard, coarse, and of a reddish grey colour, and the great toes are remote from the others.

It is found in Egypt, and particularly in the parts of that country which are adjacent to the banks of the Nile.

To the inhabitants of Egypt the ichneumon is an animal of great importance. Being a natural enemy of the whole serpent race, and of other noxious reptiles which infest that country, it unsparingly attacks and destroys them. It combats, without dread, even the most venomous serpents; the address with which it seizes them by the throat, in such a manner as to avoid receiving any injury itself, is very remarkable. It digs the eggs of crocodiles out of the sand; and even kills and devours great numbers of the young ones of those tremendous and dreaded creatures. Both in India and Egypt the ichneumon is domesticated and kept in houses, where it is found more serviceable than a cat, in destroying rats and mice. It is easily tamed, and very active, and springs with great agility on its prey. For its various services, but more especially in the destroying of crocodiles, it was ranked by the ancient Egyptians amongst their deities, and received the honours of divine worship. The Europeans of Cairo call it Pharaoh's rat. An allied species common in India (*Herpestes mungos*) is famed for its combats with the most poisonous serpents, and for the credit of having indicated the efficacy of the *Ophiorhiza mungos* as a remedy against their bites.

The *CATS* are the most powerfully armed of all the Carnivora; their short and round muzzle, short jaws, and especially their retractile claws, which, when not in use, are drawn up within the toes by means of elastic ligaments, and thus never lose their sharp points, all contribute to make them dangerous animals to encounter.

742. The *LION* (*Felis leo*) is an animal of this tribe, distinguished from all others, by his body being of an uniform tawny colour, the tail being long and bushy at the end, and the neck and chest of the male being clad with a shaggy mane.

The deserts of the interior of Africa, Persia, India, and Japan, are inhabited by these animals.

The skin of the lion was formerly used as the tunic of

heroes. At this day it serves both as a mantle and a bed to many of the African tribes. His *flesh*, though of a strong and disagreeable flavour, is occasionally eaten by the savages, who do not dislike it the more on that account. The meat of the Puma or South American lion is, says Darwin, "very white, and remarkably like veal in taste. Dr. Shaw was laughed at for stating that 'the flesh of the lion is in great esteem, having no small affinity with veal, both in colour, taste, and flavour.' Such certainly is the case with the puma."—*Voyage of Beagle*, iii. p. 135. The *fat* of the lion is considered to possess medicinal properties.

It is a characteristic of the lion that he does not often attack any animal openly, unless provoked, or impelled by hunger. The immense strength of his body, his dauntless courage, and the great quantity of food that is requisite to his support, all, however, tend to render him an object of dread. His voice, when irritated, is a horrible roar, which is particularly loud and tremendous when in the act of springing upon and seizing his prey. The only mode of alarming these animals, and preventing a threatened attack, is by fire; the notion of their being alarmed at the crowing of a cock is entirely fabulous.

743. The *TIGER* (*Felis tigris*) is an animal of the cat kind, about the size of a lion, with smooth hair, of a brownish or tawny yellow colour, and marked by long transverse stripes.

He is a native of various warm parts, both of Asia and Africa, but is principally found in India and the Indian Islands.

The *skin* of the tiger is almost the only advantage, trifling as that is, which mankind appears to derive from this destructive beast. Tigers' skins are occasionally imported into Europe, but not in great numbers, as articles of trade. They are rather brought as objects of curiosity than of use; and are chiefly employed as hammer-cloths for carriages. They are, however, much esteemed by the Chinese; the mandarins cover their seats of justice and sedans with them, and also use them for cushions and pillows in the winter. The best skins are of a large size, with a bright yellow ground, beautifully marked with numerous broad black stripes; the more intense the yellow, and the better de-

finer the stripes, the more valuable are the skins. The Indians eat the *flesh* of the tiger, which they find neither disagreeable nor unwholesome. They also attribute medicinal properties to various parts of the tiger's body.

The great military officers of China have the figure of a tiger embroidered on their robes, than which there could not be selected a more appropriate symbol of the evils and horrors of war.

We know of no quadruped so powerful and ferocious as this. He is the terror of the inhabitants of all the hotter parts of Asia, who not only fear for ravages which he commits amongst their cattle and flocks, but even for their own personal safety. The mode of seizing his prey is by concealing himself, and springing suddenly upon it with a hideous roar. This tremendous beast usually resides in woods and thickets, near streams or morasses.

744. *The PANTHER* (*Felis pardus*), *OUNCE* (*Felis unca*), and *HUNTING LEOPARD* (*Felis jubata*), are all animals of the cat tribe. The panther is about seven feet in length, and has the upper part of the body marked with circular spots, many of them with a spot in the centre, and the lower parts with stripes; the ounce is about three feet and a half in length, has the body whitish, with irregular black spots; and the hunting leopard is about the height of a greyhound, has its body tawny, with black spots, and the neck somewhat maned. It has not retractile claws, like the other species of the genus *Felis*.

Each of these animals is found in the hotter parts of Africa and Asia.

In Persia and India, the ounce and hunting leopard are trained for the *chase* of antelopes and other game. Of these, the former is carried on horse-back, behind the rider, upon a small leather pad made for the purpose. As soon as the horseman perceives an antelope or other animal at a moderate distance, he makes the ounce descend; which, creeping unperceived near the spot, springs, at five or six amazing leaps, suddenly upon it, and seizes it securely by the neck. The hunting leopard is generally carried in a small waggon, chained and hooded, lest his precipitation should defeat his master's purpose. His mode of approaching and seizing his prey is similar to that of the ounce.

The *skins* of all these animals are valuable, and are con-

verted into excellent furs. That of the panther is particularly esteemed in Russia.

Of the large American cats, the Jaguar or American panther (*Felis onca*) is one of the most destructive; it is beautifully spotted, and has very thick and compact legs; it is very common in some parts of South America.

745. The LEOPARD (*Felis leopardus*) is an animal of the cat tribe, about four feet in length, of a yellowish colour, and marked with numerous annular spots.

It is an inhabitant of Senegal, Guinea, and most parts of Africa; and has considerable resemblance, both in habit and appearance, to the panther.

Leopards' skins are much esteemed in Europe. They seldom exceed four feet in length; and should be chosen large, of a lively yellow colour, marked on the back and sides with annular spots, the belly covered with longish white hairs, and with large and oblong spots on the tail. Their use is for hammer-cloths, muffs, the trimmings of ladies' dresses, and other purposes. Some of the most valuable of these skins sell for ten guineas each and upwards. The *flesh* of the leopard is said by Kolben to be white and of a good flavour. It is supposed to have been this species which was so often introduced at the games and other public spectacles of the Romans. The numbers of them brought together at one time seem almost incredible; Pompey on the occasion of one of his triumphs having exhibited 410, and Augustus 420.

746. The COMMON CAT (*Felis catus*), in its wild state, is distinguished from all the animals of the same tribe by having its tail marked with rings of different coloured hair.

The body of the wild cat is marked with dusky stripes, of which three on the top of the back are lengthwise, whilst those on the sides are transverse and somewhat curved. Domestic cats are marked very variously; some are grey and striped, others variegated with black, white, and orange, and others are entirely black or white.

Cats are found wild in the woods of Europe, Asia, and America.

The savage disposition and great size of the wild cats render them the most formidable wild animals which are

now left in Great Britain. In the southern and midland parts of England they have all been long destroyed ; but, in the woods which border the lakes of Westmoreland and Cumberland, and in several of the mountainous parts of Scotland, they are yet occasionally found. They have their lodgments in hollow trees, in the fissures of the rocks ; and in deep narrow holes on the face of dreadful precipices ; from which, during the night chiefly, they issue forth in search of prey. This consists of hares, rabbits, and other quadrupeds, and also of various kinds of birds. Wild cats are caught in traps, more for the purpose of destroying them on account of the ravages they commit, than for any uses to which they can be converted. Their *skins* were formerly in request as fur for the lining of robes and other garments ; though they do not appear to have been held in much esteem.

The *domestic cat* is by many regarded as a subdued variety of the wild species. Professor Bell, however, believes it to be quite distinct from the wild cat, and considers its origin as yet unknown. Temminck considered he had found the original in a species (*F. maniculata*) brought by Ruppell from Nubia, and it seems not improbable that the ancient Egyptians did really domesticate it. By the ancient Egyptians cats were considered objects of sacred veneration ; it was accounted a capital crime wilfully to kill one of them, and whoever even accidentally killed one was liable to severe punishment. We are informed by Herodotus, the Greek historian, that whenever a cat died a natural death, the inhabitants of the house were accustomed to shave their eye-brows in token of sorrow, and the animal so dying was embalmed and nobly interred. The Turks entertain a sacred respect for cats ; and the ancient Britons so greatly esteemed them, that in the tenth century, their price was inserted, by a Welsh Prince, Howel the Good, even in the laws of the land ; a kitten, before it could see, having been rated at a penny (equal to at least five shillings of present money) ; as soon as proof could be had of its having caught a mouse, the price was raised to two-pence ; and a tolerably good mouser was considered worth four-pence.

These animals possess a very acute sense both of sight and smell ; and by the peculiar structure of their eyes,

which sparkle in the dark, they are able to discover their prey, such as rats and mice, as well in the night as during the day; a cat that is a good mouser will soon clear a house of these troublesome little quadrupeds. Cats should not, however, either be much handled or too well fed, if kept for this purpose; as, in this case, they become indolent, and disinclined to exert themselves.

Useful as cats are to us, they are, in some respects, unpleasant. If injured or offended, they suddenly express their resentment by scratching and biting, and sometimes with great fury. Constantly bent on theft and rapine, they are never to be trusted in the same room with provisions that are within their reach: and although many persons do not hesitate to let them sleep on their beds, it is a practice much better avoided, as the exhalation from their bodies is considered to be injurious. Mr. Bell, in his work on the British Quadrupeds, has defended the cat from the aspersions of Buffon, and has given many instances of its attachment and affection.

The *skins* of cats form, in some countries, a very considerable branch of commerce; and as furs, they are much esteemed for particular purposes. Those of Spanish cats are the most valuable; but the greatest number is sent from the northern parts of Europe and Asia. The Russians not only export them to other countries of Europe, but even send them into China. In Jamaica, and some of the other West Indian Islands, the negroes frequently eat the *flesh* of cats. From the skins of their intestines was formerly manufactured the article called *cat-gut*, which was used as strings for violins, and other similar musical instruments; but this is now chiefly made from the intestines of sheep. If the fur of the cat be rubbed with the hand, particularly in frosty weather, it yields electric sparks; and if a cat, clean and perfectly dry, be placed during frosty weather on a stool with glass feet, and rubbed for a little while in contact with a coated phial, the phial will become effectually charged. This fur is consequently sometimes used in electrical experiments.

The Caffre women in the South of Africa occasionally use cat-skins as pocket handkerchiefs.

747. The LYNX (*Felis lynx*) is an animal of the cat tribe,

about four feet in length, exclusive of the tail, which is obscurely ringed, and black at the tip; the head and body are whitish tawny, spotted with black; and the ears have a long pencil of black hair at the tip.

This animal is found in the woods and forests of the northern parts of Europe and of Asia, where it climbs with facility into the loftiest trees.

There is a trade in the skins of lynxes, and other animals, betwixt Russia and China. These skins constitute a thick and soft fur, and when of a pale or a whitish colour, with the spots tolerably distinct, they are very valuable. The further north the animals are caught, the whiter and better are the skins; those that are most elegant are taken near lake Balkash in Usbec Tartary. They are sold at a rate of from fifteen shillings to five or six pounds sterling each, exclusive of the fore feet, which are so valuable as to be sold separately, and at high prices.

Cuvier has formed in the order *Carnivora* a small tribe (*Amphibia*), in which the legs are so short, and so enveloped by the skin, that they move with great difficulty on land; but as the toes are connected by membranes, they form most excellent oars, the animals passing the greater part of their life in the sea, to which element the whole structure of their body, and the close-set short hair of their skin, are most admirably adapted.

748. The COMMON SEAL (*Phoca vitulina*) is a marine quadruped, with a large and round head, no external ears, the neck smooth, the body tapering gradually to the tail, the legs smooth, and all the feet webbed.

This animal is found on almost all the northern shores of Britain, and occasionally on the shores of the British Channel, as well as in many other parts of the world. It is easily domesticated. It is generally from four to six feet in length. Its colour varies, being dusky, whitish, grey, black, or spotted.

Seals are eagerly pursued by the inhabitants of nearly all the northern countries of Europe. They are found in hollow rocks or caverns near the sea, and are killed with guns, clubs, or spears. The usual season for hunting them is during the months of October and November.

The flesh of seals is much esteemed by the Greenlanders and the Esquimaux of Labrador, and it has been well said its

chase forms their principal business, and their success in this is at once their fortune and their glory. The *skins* are extremely serviceable, and are converted into clothing; into coverings for beds, houses, and boats; and into thongs and straps of every description. The Americans fill them with air, and make a kind of raft of them. The *fat* yields a clear, and much sweeter oil than that obtained from whales, and is used by the Greenlanders in their lamps, and frequently also with their food. The *fibres* of their tendons are said to be a stronger and better substance for sewing with than either thread or silk. Before the introduction of iron, the *bones* of seals were used for the points of weapons both for chase and war. The *skins of the entrails* are employed instead of glass in windows; and, sewed together, are formed into shirts and other under parts of dress.

When the long and coarse hair of the seal is pulled off, a fine, short, silky, and somewhat fawn-coloured down is left, which in this country is a fashionable *fur* for ornamenting ladies' dresses. This fur, woven with silk, is also manufactured into shawls, which are of an extremely soft and delicate texture. Seal *skins*, when tanned and properly dressed, are converted into a valuable leather for shoes and other uses.

749. The *LEONINE SEAL*, or *SEA LION* (*Phoca jubata*) is a marine quadruped which inhabits the shores of Kamtschatka and Greenland, is sixteen or eighteen feet in length, and is distinguished by the male having its neck covered with a mane.

The great quantity of oil which is yielded by these seals, is the cause of their being pursued and killed by the inhabitants of all countries, on the shores of which they are found. The *skins* of the younger animals are made, in Greenland, into garments for women; and those of the old ones are used for beds. When the latter are freed from the hair, they are applied as coverings for boats and houses. They are also sometimes sewed together as bags to contain provision, and for other uses. The *skins of the intestines* are used for the same purposes as those of the common seal; and the *teeth* are adapted for the points of arrows and spears.

There are numerous other species of seals, all of which are in some respects useful to mankind, and chiefly for the purposes which have been above enumerated.

750. *The GREAT MORSE, or ARCTIC WALRUS* (*Trichechus rosmarus*), is a marine quadruped of an enormous size, with short fin-like feet, two great tusks pointing downwards from the upper jaw, the lips peculiarly thick, the upper lip cleft into two large rounded lobes, and no front teeth in either jaw.

These animals inhabit the sea near the northern parts of the coast of America, and feed on sea-weeds, as well as on animal substances. They are sometimes nearly eighteen feet in length, and ten or twelve in circumference. Their skin is of a dark colour, and thinly covered with short brownish hair. They have small eyes, and small circular orifices in place of external ears.

We are informed that these animals, under the name of horse-whales, were objects of pursuit so early as even the reign of King Alfred, and on account chiefly of their *tusks* and *oil*. The former are a close-grained kind of ivory, and weigh from ten to nearly thirty pounds each; and the latter, which is equally valuable with that of the whale, is in such abundance, that the body of each animal yields nearly half a tun. This oil is burned in lamps, is used for the same purposes as whale-oil, and even eaten by the inhabitants of Greenland with their food. Of the *skins* of the arctic walrus the Greenlanders make a thick and strong harness for their sledges and carriages; and they sometimes twist narrow strips of them together to form cables. They constitute an important article of export from the coast of Labrador. The *tendons* of these animals are capable of being split and used as thread.

So numerous were arctic walruses formerly in the northern seas, that it is said the English, in 1706, killed on Cherry island (betwixt Norway and Greenland) nearly eight hundred of them in six hours; and that, in 1708, they killed nine hundred in seven hours. Of late years, however, their numbers are much decreased. This species is occasionally found on the shores of the Western Islands, and Dr. Fleming tells us, it has been conjectured that the ivory bits which Strabo enumerates in the articles of British commerce, were manufactured from the teeth of this animal.

ORDER VI. MARSUPIALIA, or POUCHED ANIMALS.

This order was formed by Cuvier for the reception of all those animals, in which the young is received in a very early

stage of its existence, into a more or less developed pouch, into which the young, long after they have begun to walk, flee when afraid of any danger. Two particular bones, called the marsupial bones, attached to the pubis, and placed amidst the abdominal muscles, support this pouch. They are found likewise in the male, and even in species where the pouch-formed fold of skin is scarcely perceptible. Professor Owen, in speaking of them says, that "in the female they assist in producing a compression of the mammary gland, necessary for the alimentation of a peculiarly feeble offspring, and they defend the abdominal viscera from the pressure of the young as these increase in size, during their mammary or marsupial existence, and still more when they return to the pouch for temporary shelter."

In their dentition, organs of digestion, and feet, the animals of this order vary extremely, so that if they were classed strictly by these important parts, they would be scattered throughout various orders; remains of a marsupial animal have been found as low in the system as the oolitic formation of the secondary rocks.

Marsupial animals are found in America and the Asiatic islands; but it is in New Holland that the greatest number of species and variety of forms occur; it is only a short time ago since it was thought that the Dingo or native dog was the only non-marsupial quadruped met with in that strange country; but Mr. Gray in his catalogue of the Australian mammalia (*Gray's Journal*, vol. ii. p. 495.) has shewn that out of ninety-seven ascertained Australian species, twenty-three belong to orders not marsupial.

751. *The first known species of marsupial animal was the OPOSSUM, or the VIRGINIAN OPOSSUM (Didelphys Virginiana) a whitish-coloured animal about the size of a small cat, but with feet somewhat like those of the monkey, slender muzzle, and scaly tail.*

This species of opossum was once numerous in Virginia, Louisiana, and other warm and temperate parts of North America. They eat both animal and vegetable food.

Notwithstanding the disgusting smell of these animals whilst alive, when dead and skinned their *flesh* is as sweet and excellent as any other animal food. All the American travellers who have partaken of it appear to agree that it much resembles that of a sucking pig. The *hair*, which is

of considerable length, is spun, by the American Indians, into thread, dyed red, and then woven into girdles, garters, and other parts of dress.

There are many genera and species of marsupial animals. The Kangaroos, (*Macropus*) however, are those which are most useful to man : these are known by the want of canine teeth, and the enormously developed hind limbs and tails, by means of which they can move very rapidly along, some of the larger kinds clearing obstacles seven or eight feet high. The first kangaroo (*Macropus major*) ever imported into Europe, was brought home by Captain Cook, and its preserved skin is in the collection of the British Museum, which is particularly rich in examples of this order. From a work by the late Mr. J. S. Stevens the following notes are taken.—(*The Land of Promise,* London, 1839.)

“The flesh of all the species of kangaroo is wholesome and nutritive ; it has no fat except a small quantity round the root of the tail ; this makes excellent soup.”

“To those,” observes Colonel Light, “who are fond of ox-tail soup, I should recommend a trip to South Australia, to eat kangaroo-tail soup ; which, if made with the skill that soups in England are, would as far surpass the ox as turtle does the French *potage*.” “Kangaroos,” says another “are beautiful eating ; when cut in steaks and fried, they are a little like beef-steaks.” “The best meat I ever tasted,” says a third, “is kangaroo ; it resembles hare more than anything I know ; but we all pronounced it superior. The skins make good leather, whether for shoes or gloves, and form an article of export in New South Wales.”

ORDER VII. RODENTIA, or GNAWING ANIMALS.

This order is composed of animals which have only incisor and molar teeth ; the canines are wanting, so that there is a wide space between the two kind of teeth. In each jaw there are two large incisor teeth, by means of which they reduce their food to minute portions, or in other words *gnaw* it, and hence they derive their name. By means of these teeth they attack the hardest substances, and frequently live on wood and bark of trees. For the more ready accom-

Fig. 75.



Skull of beaver.
(*Castor Fiber*)

plishment of this object, these incisors have the enamel only in front, so that their posterior portion being more easily worn away than the anterior, the teeth are constantly kept sharp edged. As they are used they grow up from the root, and this tendency to lengthen is so great, that if one of them is lost, or is accidentally thrust to the side, the opposite corresponding tooth in the jaw is developed sometimes to an enormous extent, as it has nothing to act on. Instances of this monstrous development are not unfrequent, especially in rats, hares, and rabbits, and under the last mentioned article is given a woodcut representing such a case. The plates of enamel in the molars are always placed across the tooth, and are thus admirably adapted for the horizontal motion of the jaws, which are connected by a longitudinal condyle, and most materially assist in the reduction of their food.

Most of the rodentia are small animals, and some of them, such as the rats, mice, and voles, very destructive to property of all kinds. Their intelligence is very limited, and it may be noticed that the mass of brain is very small, and has scarcely any circumvolutions in it; the powers of instinct, however, are often highly developed, though, as in the case of the beaver, these have been much exaggerated.

752. COMMON SQUIRREL (*Sciurus vulgaris*). In the group to which this well-known animal belongs, the clavicle is well developed. The squirrels live in trees, and are distinguished for the lightness and vivacity of their motions; the lower incisor teeth are very much compressed, and their tail is long and wide, being furnished with long hairs; and it is from this latter character that their name is derived; coming from the two Greek words for *shade* and *a tail*.

The European squirrels have a tuft to the ears which the American are said to want; in Britain the squirrel is always of a more or less lively chesnut colour above, and white below; but in more northerly climates, the chesnut becomes of a fine bluish grey, which then furnishes a fur not unfre-

Fig. 76.

*The Squirrel.* (*Sciurus vulgaris.*)

quently used.—The Laplanders, in winter, annually make war upon the troops of grey squirrels which are found in some parts of their country. This they do chiefly for the sake of their skins, which they make up into bundles of about forty each. But no merchandize is more liable to deception than this. The purchaser receives them without examination, the skins are packed with the fur inward, and all the bundles are sold at the same price.

During a part of the day they remain concealed in a spherical nest constructed with great art; and against the winter they lay up a stock of provision (acorns, filberts, beechmast, &c.) which they conceal in the cleft of an old tree; they are said to be destructive to young plantations.

753. *The GREY SQUIRREL* (*Sciurus cinereus*) is a quadruped about the size of a rabbit, which has the upper parts of its body grey, and the under parts white. It is found in America.

The skins of these animals are sometimes used as a fur for the lining of winter garments, and are frequently imported into England, but they are not of much value. As, however, they are very tough, they are tanned and em-

ployed in America for many of the purposes of leather, but particularly for the making of ladies' shoes.

In several parts of North America these animals, from their immense numbers, and the devastations they commit, are greatly injurious to the inhabitants. Rewards for their destruction are consequently given; in Pennsylvania alone more than 600,000 of them have, in some years, been destroyed.

The grey squirrels reside chiefly in trees, but lay up stores of provision, for winter, in holes which they dig in the ground. They are extremely agile animals, and run about among the branches with as much facility and security as upon the ground.

754. The **BLACK SQUIRREL** (*Sciurus niger*) is a small black quadruped, which is not uncommon in North America and New Spain.

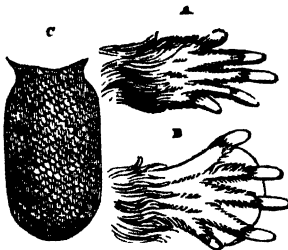
The finest furs which the Iroquois Indians possess are those of *black squirrels*. These they make into robes and garments, which they sell at a price as high as seven or eight pistoles each.

755. **DORMICE** (*Myoxus*). Cuvier says that it was probably a species of this genus (*M. Glis*) which the ancients fattened for the purposes of the table.

756. The **BEAVER** (*Castor fiber*) is a quadruped, with smooth, glossy, and chesnut-coloured hair; and a flat, oval, and naked tail, marked into scaly divisions, somewhat like the skin of a fish. (Fig. 77. c.)

These animals inhabit the banks of rivers and lakes in woody and unfrequented parts of the north of Europe, Asia, and America; their general length is between two and three feet.

Fig. 77.



A fore-foot. B hind-foot. C tail.
(Beaver.)

In ancient times the beaver is supposed to have been found wild in this country, and its skin was so important as to constitute the chief and most valuable fur which the island produced. The hair is of two kinds, of which the upper is long and thick; and the lower, or that immediately next to the skin, is of a dark brown colour,

short, close-set, and as soft as down. In commerce a distinction is made betwixt fresh, dry, and fat beavers' skins. Of these the first are obtained from animals that are killed in the winter; the second sort from those taken during the summer; and the third or fat sort are such as have been carried, for some time, on the bodies of the American Indians, who, as it were, tan the skins with their perspirable matter. It is the fur of the first sort which is chiefly manufactured into hats; but the fat skins are esteemed the most valuable, in consequence of the long hairs having been worn off, and the fine downy fur having been left perfectly free from them. Each full-grown beaver yields about twenty-four ounces of fur. This, besides hats, is wrought into gloves, caps, stockings, and other articles of dress. The *skin* of the beaver, as leather, serves for saddles, the upper leathers of shoes, gloves, the covering of trunks, &c. The Russians sell great numbers of these skins to the Chinese, but probably the greatest traffic in them is from North America. We may form some idea of the numbers which are exported from that country, when it is stated that more than 50,000 skins have been vended by the Hudson's Bay Company at one sale; and that in the year 1788, no fewer than 170,000 beavers' skins were collected in Canada, and exported thence into Europe and to China; in 1808, 126,927 were sent from Quebec alone to this country, which, at an average of 18s. 9d. for each skin, has been estimated at the value of 118,994*l.* 1*s.* 3*d.*; but these numbers are now much reduced, and neutria skins (757), and other materials, all go to the manufacture of "beaver" hats.

Besides their fur, these animals furnish a medicinal substance called *castor*, or *castoreum*, which is contained in two little bags, the inguinal glands, each about the size of a hen's egg. This substance, as found in the shops, is of a brownish unctuous consistence, has a disagreeable narcotic smell, and a bitterish, acrid, and nauseous taste. Russian castor is the best and dearest; that from Hudson's Bay is most used. It has been celebrated as a remedy in hysterical and some other complaints; but it is not greatly esteemed in modern medicine.

The American Indians are partial to the *flesh* of the beaver, and they used its incisor *teeth* for the cutting, hollowing, and polishing of wood, the cutting of bone, fashing

their horn-tipped spears, &c., till it was superseded by the introduction of iron; they also clothe themselves in beavers' skins, and in winter wear them with the hair next to their bodies as a defence against the cold.

Beavers are only found in the most retired situations, always in the immediate neighbourhood of water, and generally in extensive communities. Their mud huts in which they reside are ingeniously constructed, and evince very great intelligence.

757. *COYPOU* (*Myopotamus Coypus*), a large rat-like animal, abundant in many parts of South America, the fur of which is used largely in the manufacture of hats; under the name of *neutria* skins, as many as from 600,000 to 800,000 have been imported for this purpose into Great Britain in the course of a year.

758 *The COMMON PORCUPINE* (*Hystrix cristata*) is a quadruped, the upper parts of which are covered with quills or spines six or seven inches in length, each variegated with black and white rings; its head has a crest of smaller spines.

This animal, which is common in exhibitions of wild beasts in this country, and is about two feet in length, is found wild in Spain and Italy, other species are found in Africa, Asia, and America.

In America porcupines are hunted chiefly on account of their *quills*, which are applied by the Indians to many useful purposes. The women dye them of several beautiful colours, split them into slips, and weave them into bags, belts, baskets, and other articles, the neatness and elegance of which would not disgrace more enlightened artists. The *flesh* of the porcupine is said to be excellent eating, and at the Cape of Good Hope is frequently introduced at the tables, even of the principal families.

It was formerly believed that these animals, when attacked, had a means of defending themselves by forcibly darting their quills at the aggressor; but this opinion has been fully refuted. Their principal mode of defence is by throwing themselves on one side, and erecting their spines against the assailant. They live in dens under the ground, and are chiefly in motion during the night, in search of fruit, roots, and other vegetables, which constitute their

principal food. Though apparently heavy and inactive animals, they are able to climb even to the tops of the highest trees with great facility.

759. The COMMON HARE (*Lepus timidus*) is distinguishable by the ears being tipped with black, and longer than the head; by the hind legs being half as long as the body, and the tail short. It never burrows.

Notwithstanding the great estimation in which the *flesh* of the hare is now held as food, it was absolutely forbidden by the Druids; and was abhorred by the Britons for many centuries after the abolition of that order. At the present day it is not eaten by the inhabitants of many eastern nations. It is prohibited by the Mahometans and Jews; and the Copts, who have adopted many of the Jewish customs, refrain from it. The ancient Romans, however, considered it so great a delicacy for the table, that Martial styles the hare, in this view, the first of quadrupeds.

The *fur* of the hare forms an important article in the manufacture of hats; vast quantities of hares' skins are, for this purpose, annually brought from Russia and Siberia. This is the chief use which we make of them; but in some parts of the Continent, the fur is spun and woven into a kind of cloth. The inhabitants of Dalecarlia, a province of Sweden, set a peculiar value upon such cloth, from an opinion that it is itself so attractive to fleas as to preserve the wearer from their attacks! The Romans spun the fur both of the hare and rabbit into cloth; but Pliny says that such cloth was neither soft nor durable.

In the extreme northern countries, where the frosts of winter are intense, and where snow lies upon the ground for many successive months, all the hares, at the approach of that season, change their coat, and become perfectly white.

The chase of the hare is at this day a popular amusement in most parts of England; four or five centuries ago it was so much followed, that even ladies had hunting parties by themselves, in which they rode astride upon the saddle.

It is sometimes difficult to ascertain the excellence of hares for the table, but the following directions may be of

use. When newly killed, and, of course, cold, the body will be stiff, and the flesh of a pale colour; but when a hare has been some time killed the body becomes limber, and the flesh gradually turns black. A young hare may be known from an old one, after it is dead, by the bones of the knee joint. If, on thrusting the thumb-nail against this joint, the bones are somewhat separate, the hare is young; if there be no space, it is old; and the greater the separation, the younger the animal may be considered. The under jaw of a young hare may easily be broken, and the ears easily torn; the cleft also of the lip is narrow, and the claws smooth and sharp. In an old hare the cleft of the lip spreads very much, the claws are blunt and rugged, and the ears dry and tough. It is said that hares will keep better if they are not opened for four or five days after they are killed; but this is very questionable; they are considered in the best state for the table when the colour of the flesh is beginning to turn.

So numerous are these animals in some parts of England, where attention is paid to preserving the breed, that they become greatly injurious to the crops of all the neighbouring farmers. They feed upon green corn, clover, and other useful vegetables; and frequently commit much damage in young plantations, by eating the bark from the trees. Some years ago a gentleman in Suffolk found it necessary to destroy the hares near some new plantations, and 1082 were ascertained to have been killed. Hares are extremely prolific; were they not so, their race would soon be extinct.

760. *The RABBIT (Lepus cuniculus) is a British quadruped belonging to the same tribe as the hare; and is principally distinguishable from that animal by its proportionally shorter ears, and by the hind legs being only one-third of the length of the body. It is also distinguished from the hare by living in burrows.*

The colour of the wild rabbit is generally dusky brown above, and paler or whitish on the under parts; sometimes, however, though rarely, black. In the domestic rabbit the colour is various, white, grey, black, or black and white.

These animals inhabit nearly all the warmer parts of Europe, as well as several of the temperate countries of Asia and Africa.

There are farms in many parts of England, particularly

in Lincolnshire, Norfolk, and Cambridgeshire, where the breeding of rabbits is rendered an extremely advantageous pursuit. The most desirable situations are those in which the soil is loose and sandy, and where the ground rises in different parts into low hills. Such lands can be more profitably employed as rabbit-warrens than any others, from the great facility with which the animals are able to form their burrows in the earth, and the less liability they have to be flooded by the falling of heavy rains.

In a commercial view rabbits are of much greater importance than hares; because, from their habit of living in greater numbers together, they can be better attended to and managed; and also because they multiply much more rapidly than hares. Their fecundity, indeed, is truly astonishing. They breed several times in the year, and generally produce seven or eight young ones at a birth; it has been calculated that if the progeny from a single pair could, without interruption, proceed in the same ratio for four or five years, the whole stock would, even in that short period, amount to more than one million.

The particular uses of the rabbit are nearly the same as those of the hare (759). The *fur* is the principal substance employed in the composition of hats; and such parts of it as are unfit for this purpose may advantageously be adopted for the stuffing of beds and bolsters. Rabbits' skins are also sometimes used as a cheap and warm trimming for female dress; and the *skins* themselves, after the hair has been stripped from them, are boiled down, and made into size or glue. The *flesh*, though, like that of the hare, forbidden by the Jews and Mahometans, is a very delicate and palatable food. We are informed by Pliny, that the ancients had a favourite dish which was made of sucking leverets or rabbits unpaunched. The modes of ascertaining the quality of rabbits as food are nearly the same as those which have been mentioned respecting the hare.

It is customary in most warrens, to use ferrets (714) in the catching of these animals. The ferrets are muzzled and put into the burrows; and, by pursuing the rabbits under ground, they alarm and drive them into nets that are placed over the outlets. In open and extensive grounds other modes are adopted. These, as we are informed by Mr. Daniel, in his work on Rural Sports, are by implements

called fold-nets, spring-nets, and a kind of trap called *tipes*. The *fold-nets* are set, about midnight, between the burrows and the feeding grounds; the rabbits being driven into them with dogs, and kept enclosed in the folds till morning. The *spring-net* is generally laid round a haystack, or some other object of inducement for rabbits to collect in numbers. The *tipe* consists of a large pit or cistern, covered with a floor. This has, near its centre, a small trap-door nicely balanced, into which the rabbits are led by a narrow road or *meuse*. It was customary formerly to set this kind of trap near a haystack; but since turnips are now grown as food for these animals in an enclosure in the interior of the warren, it is placed within the wall of this enclosure. For a night or two the rabbits are suffered to go through the *meuse* and over the trap, that they may be familiarized to the place where the turnips are grown. After that the trap-door is unbarred, and immense numbers fall in: the fat rabbits are selected and killed, and the others are turned out upon the turnips to improve. Many hundred couples are frequently taken in one night by this contrivance.

Many persons breed rabbits in a *tame* or *domestic state*. The *skins* of these are useful; but as food, the wild animals are greatly preferable. Care should, at all times, be taken to keep them clean; and during the breeding season, the males and females must be kept apart. The best food for tame rabbits is the shortest and sweetest hay that can be had; one load of this will serve two hundred couples for a year.

78.



This figure represents a wild rabbit found by Mr. Lukis, in which the upper pair of incisors are much deformed and elongated, spreading outward, so as to leave the sides of the lips untouched.

This anomaly in the incisors has been attributed to the accidental direction given to the teeth in the first stages of growth, or the loss of one or more of the opposing set.

761. *The ALPINE HARE* (*Lagomys alpinus*) is a *Siberian*

animal, destitute of tail, of a tawny colour, with rounded brown ears, and brown feet.

Amongst the mountains of Siberia alpine hares are very numerous. They live in burrows under ground, and store up, beneath the shelter of trees or rocks, large ricks of dried grass and other vegetables for their winter's subsistence. These collections are anxiously sought after by persons engaged in the hunting of sables, and, in many instances, they are the means of preserving their horses from perishing by famine. Some of the adjacent peasantry also search them out as food for their horses and cattle. The *skins* of the alpine hares supply one of the articles of commerce between the Russians and Chinese.

762. *The CHINCHILLA* (*Chinchilla lanigera*) is a small quadruped, which has a beautifully soft grey fur.

The *fur* of this animal, which is a native of some parts of South America, was formerly used by the Peruvians, as a fine kind of wool, and was spun and woven into stuffs of an extremely delicate texture, to which they attached great value. Of late years, however, the manufacture of it has been much neglected. As a fur, the skin of the chinchilla is much in request in this country, in consequence of its having become a fashionable trimming for ladies' dresses, and a favourite article for muffs.

763. *The AGOUTI* of South America (*Dasyprocta*) represents the hares of our climate. It has only three toes behind, and is also a much larger animal. Darwin says, it is a true friend of the desert; it being a common feature in the landscape to see two or three hopping quickly one after the other in a straight line, across the wild plains near the Rio Negro. The flesh when cooked is very white, but rather tasteless and dry.

ORDER VIII.—EDENTATA.

Composed of quadrupeds characterized by the want of teeth in the front of both jaws; their claws in general are large, and most of the animals are very strong in proportion to their size; some of the extinct fossil species were of very great size (*Megatherium*). The Sloths, Armadillos, Ant-eaters and

79.



Skull of two-toed ant-eater,
(*Myrmecophaga didactyla*.)

Pangolins belong to this order. The *Ornithorhynchus paradoxus*, or duck-billed platypus, a most singular animal found in New Holland; the *Echidna* or hedgehog ant-eater, likewise a native of Australia, belong to this order.

764. The **LONG** and **SHORT-TAILED MANIS** (*Manis tetradactyla*, and *pentadactyla*) are very singular quadrupeds, with a long muzzle, small mouth destitute of teeth, and their body covered with scales. They are distinguished from each other by the former having a very long tail and four toes, and the latter a short tail and five toes.

These animals are natives of India, Africa, and China; and are from four to seven or eight feet in length. From the scales with which their bodies are clad, and the general shape of the tail, they might be mistaken, at first sight, for lizards. The under part of their bodies, however, is clad with hair, which is not the case in any species of lizard.

By the negroes of Africa both the species of manis are much sought for, chiefly on account of their *flesh* as food. There is, however, some difficulty in procuring them, as they live in obscure places, in the midst of rocks, woods, and morasses. When discovered they are unable to escape by flight; and, in self-defence, roll themselves into a ball, and erect their scales; exposing an armed surface on every side, impenetrable by the teeth of dogs, but easily assailable by the spears of the negroes. In their habits these animals are gentle and innoxious, and subsist only on insects of different kinds.

Their *scales*, which are sufficiently hard to strike fire when struck against flint, are applied to many useful purposes.

765. The **ARMADILLOS** (*Dasybus*), are a tribe of quadrupeds, which have grinding, but no canine nor front teeth; their bodies are covered with a crustaceous shell.

There are several species, all of which are inhabitants of Brazil and other parts of South America, and are from eight or ten inches to three feet in length. The species are distinguished from each other chiefly by the number of flexible bands which extend across their back.

Their *flesh* is a favourite food with the inhabitants of South America. Of their *shells* these people make baskets, boxes, and numerous ornamental articles, which they paint and adorn in various ways; and the shells, reduced to powder, are sometimes administered internally as a medicine.

It is customary to hunt armadillos with dogs that are trained for that purpose. They reside in burrows which they dig in the ground. Into these they endeavour to retreat when pursued: or, if at too great a distance, they attempt to dig new ones before they are overtaken. When in their holes, they are either smoked out, or are expelled by pouring in water. The moment they are seized they roll themselves together, and will not again extend unless placed near a hot fire. These animals seldom appear abroad except during the night; they are often caught in snares that are laid for them at the mouths of their dens.

Darwin, in speaking of the Pichy (*D. minutus*) says, "the instant one was perceived, it was necessary in order to catch it, almost to tumble off one's horse; for if the soil was soft, the animal burrowed so quickly, that its hinder quarters had almost disappeared before one could alight."

Of four species which he saw in South America, the habits are nearly similar, one, (*D. villosus*) however, is nocturnal, while the others wander by day over the open plains, feeding on beetles, larvæ, roots, and even small snakes. The Apar (*D. tricinctus*) has, as its name implies, only three moveable flexible bands, the rest of its tessellated covering being nearly incapable of bending. "It has the power of rolling itself into a perfect sphere, like one of the woodlice found in Great Britain, *Armadillo vulgaris*. In this state it is safe from the attack of dogs; for the dog not being able to take the whole in its mouth, tries to bite one side, and the ball slips away."

ORDER IX. PACHYDERMATA, or, Thick skinned Quadrupeds.

The last order (Edentata) terminated the series of the *unguiculated* animals, those, namely, in which the toes terminate in claws; the pachydermata commence the series of *hoofed* animals. They use their feet only as supports, in no

instance possess clavicles, and are entirely vegetable feeders ; some of them ruminates (chew the cud), while others do not possess this power ; the pachydermata do not ruminates.

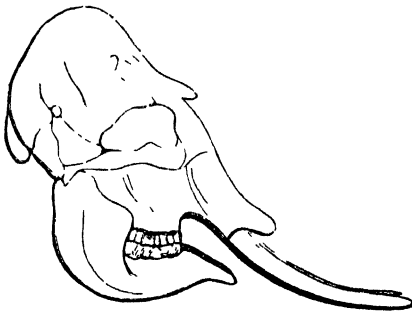
The first group, named *Proboscidea*, from the long trunk with which they are furnished, contains the elephant, and has five toes to each foot, distinctly seen in the skeleton, though only perceptible externally by the five nails at their extremities, the other parts being covered by a hard skin.

766. The *ELEPHANT* (*Elephas*), the only known genus of the tribe to which it belongs, is indigenous to the warmer regions of Asia and Africa, and is distinguished by having two long tusks projecting from the upper jaw, and the snout lengthened into a long and flexible trunk

The general height of the elephant is nine or ten feet. Its skin is of a dingy brown colour, and nearly destitute of hair. The tusks are much larger in the male than in the female. Each of the feet has five rounded hoofs : and the tail, which is short, is terminated by a few scattered and very thick black hairs.

There are two species at present found, one, the Asiatic elephant (*E. Indicus*), with an oblong head, concave

Fig. 80.



Skull of the Asiatic Elephant.

forehead, and small ears, the females have very short tusks, this species is found in various parts of Asia ; the other, or African elephant (*E. Africanus*), has a round head,

convex forehead and large ears, the tusks are as large in the female as in the male, while these tusks are much more bulky than in the Indian species. It is found in various parts of Africa from Senegal to the Cape of Good Hope.

Throughout the whole of the East Indies, as well as in several other parts of Asia, the elephant is an animal of indispensable utility. When tamed and reduced to a state of submission, he becomes so tractable as to obey all the orders of his keeper. Elephants are formed in a particular manner for the service of man in hot climates. They are employed both as beasts of draft and burthen; one elephant is supposed equal to as much work as six horses. They are conducted by a man, who sits on their neck, and who employs as a weapon an iron rod, hooked at the end, with which he pricks the animal to urge him forward, or turn him in any direction that may be required. Almost all the articles that are transported from place to place in India are conveyed by elephants. They bend their knees to accommodate those who mount them: and, with their trunks, they even assist the persons by whom they are loaded. Before the invention of gunpowder, elephants were much employed by the Indians in their wars. They are now chiefly used for the purposes of labour and parade. They require much attention, and are generally fed with rice, either raw, or boiled, and mixed with water, of which each elephant will devour daily near a hundred pounds' weight, besides a certain quantity of fresh herbage which is procured for him. They are led to the water thrice a day, both to drink and bathe: their daily consumption of water for drink has been estimated at forty-five gallons each.

The modes in which elephants are caught and domesticated are curious and interesting. In a wild state they inhabit, in large troops, the thick and boundless forests of Asia and Africa. To obtain the single male elephants, it is customary, in some parts of India, to employ females, which are trained for that particular purpose. When the hunters have discovered a male elephant that suits them, they conduct four of the females silently and slowly, at a little distance from each other, nearly to the place where he is feeding. If, as frequently is the case, he permit their approach, two of them are conducted, one on each side,

close to his neck, a third places herself across his tail, and the fourth is brought up by the proper attendants, who immediately pass under the animal and tie his legs with ropes. After this he is further secured : and at length, though not without much difficulty, is conveyed home and domesticated.

When a herd of elephants is to be secured, a party consisting sometimes of 500 persons is employed. These, by fire and noises, drive them into certain enclosures, formed for the purpose ; an operation which generally occupies several days. These enclosures are three in number, and communicate with each other by narrow openings or gateways. The opening of the outer enclosure is disguised, as much as possible, by bamboos and branches of trees stuck into the ground, so as to make it look like a natural jungle. It is not without much difficulty that the leader can be induced to enter : but, after he has passed, all the others immediately follow. There is still greater difficulty in inducing them to pass into the second and third enclosures : and lastly, one by one, into the roomee, an outlet about sixty feet in length, and so narrow that the animals are unable to turn round in it. Here, after in vain exerting all their powers to break down the fences, and escape, they are all, in succession, secured by ropes that are fastened round their legs.

To domesticate the animals, they are now each placed under a keeper, who is appointed to attend and instruct them. After the elephant has for some days been supplied with food and water, the keeper ventures to approach him. He strokes and pats him with his hand, at the same time speaking to him in a soothing voice ; and after a little while the beast begins to know and obey him. By degrees the keeper becomes familiar ; he ventures to mount upon his back from one of the tame elephants, and at length seats himself on his neck, from whence he afterwards regulates and directs all his motions. In a few weeks the animal becomes obedient ; his fetters are by degrees taken off ; and, in the course of six months, he submits entirely to his keeper's will.

Wild male elephants are frequently hunted and killed, both in Asia and Africa, on account of their tusks, which constitute the *ivory* of commerce. The temptation held

out, at the Cape of Good Hope, to this dangerous pursuit, in which many of the hunters lose their lives, is the payment of a guilder per pound for the tusks; these weigh from 30 to 130 pounds each. For the whitest, smoothest, and most compact ivory that is known, we are, however, indebted to the island of Ceylon. The whole quantity of ivory exported from the Cape of Good Hope in four years, ending in 1804, amounted to 5,981 pounds; and the average annual quantity vendid at the East India Company's sales from 1804 to 1808 was twenty-six tons. Ivory is also brought from various places in the Gulf of Guinea: the small tusks are there called *scrwelloes*.

Ivory is also used for making ornamental utensils, mathematical instruments, boxes, combs, dice, and an infinite variety of toys. This substance is also used for painting miniatures upon, for which, however, it goes through a peculiar preparation. It is capable of being stained of various and very beautiful colours. From the shavings of ivory, as from those of hartshorn, may, by boiling, be obtained a jelly. Bone is frequently substituted for ivory, but is easily known by its pores, which are not to be seen in ivory, and by its wanting the beautiful white veins by which ivory is distinguished.

The *flesh* of the elephant is eaten by the negroes of Africa: the ancients attributed many medicinal qualities to the *blood* and the *trunk*.

After the elephants, Cuvier places another genus (*Mastodon*) of which no living species is at present found; the remains of one or more species are found, and sometimes in great abundance, in various parts of North America. They had the legs, trunk, proboscis, and many other details of structure similar to those of the elephant, but had their teeth with conical projections on the crowns; an immense specimen of a species of this genus, upwards of thirty feet long, and with tusks ten feet in length, has been brought over by Mr. Albert Koch from Missouri, United States, and is at present exhibiting in the Egyptian Hall, Piccadilly (Dec. 1841).

The second group of *Pachydermata* has two, three, or four toes to the foot.

767. *The HIPPOPOTAMUS, or RIVER-HORSE* (*Hippopotamus amphibius*), is an African quadruped of immense bulk, with a large head, extremely wide mouth, strong teeth, and thick and short legs, each terminated by four hoofs.

The body is of a brownish colour, and covered with short and thinly set hair. One of these animals, which M. le Vaillant killed in the South of Africa, measured nearly eleven feet in length, and about nine in circumference.

In the immediate vicinity of rivers, in several parts of Africa, even as far south as the Cape of Good Hope, the hippopotamus is occasionally seen. Notwithstanding his bulk and strength, he is an animal of considerable timidity; whenever he is surprised, he plunges into the water, and walks about at the bottom with great ease, rising to the surface about once every ten minutes to breathe. He feeds on plants of various kinds, and sometimes proves very destructive in the plantations, not only by the quantity of food which he devours, but also by treading down and crushing with his feet much more than he eats.

The *tusks* of the hippopotamus are used as ivory; and from their always preserving their original whiteness and purity, they are considered superior to the tusks of the elephant. They are each from twelve to fourteen inches in length, and weigh from six to ten pounds. Dentists sometimes manufacture them into artificial teeth, for which they are well adapted. Of the *hide*, which in some parts is nearly two inches thick, the inhabitants of Africa make excellent whips, which after a little use become very pliable.

The *flesh*, when the animals are in good condition, is said to be tender and well flavoured, particularly that of the parts near the breast. The flesh of the South African variety, Dr. A. Smith informs us, "is much in request as food, both among the natives and the colonists; and the epicures of Cape Town do not disdain to use their influence with the country farmers to obtain a preference in the matter of *Sea Cows' Speck*, as the fat which lies immediately under the skin is called, when salted and dried." The Hottentots consider it so great a delicacy that they eat it even in a half putrid state. Professor Thunberg states that he one day passed a Hottentot's tent, which had been pitched for the purpose of consuming the

body of a hippopotamus that had been killed some time before : and says, that the inhabitants of the tent were in the midst of such a stench, that the travellers could hardly pass them without being suffocated. The *feet* are considered peculiarly fine eating ; and the *tongue*, when salted and dried, is in great esteem at the Cape.

768. *The HOG (Sus scrofa) is distinguishable by its prominent tusks, the flat termination of its snout, its feet being cloven, the fore part of its back being bristly, and the tail hairy.*

The male is called boar, and the female sow. The appellations of swine and pig are given to the whole breed, though the latter is more peculiarly applicable to the young animals.

The parent stock of our domestic swine is the wild boar, which inhabits the forests of France, Germany, and other parts of Europe, as well as those of Persia and India.

Wild boars usually live in families, and are hunted, as an amusement, in all the parts of the world where they are found. The *flesh* of the wild animals, if they are not old, is said to be much superior to that of our domestic swine. That of the young ones is peculiarly delicate. Of an old wild boar the head only is eatable.

The advantages derived from the breeding of swine are very great. Their flesh, which has the appellation of *pork*, is in universal request, and is of peculiar importance in a commercial view, as it takes salt better, and will keep longer than most other animal food. Pork, after having been salted, is sometimes hung up to dry in the open air ; but generally it is smoked by being hung in a chimney. The fat sides of the pig, salted and dried, constitute *bacon*. *Hams* are the thighs preserved with salt, saltpetre, and sugar. *Westphalia hams* are generally made from such animals as have been well fed, and allowed to range at pleasure in the extensive moorlands of that province ; they have a singular flavour, not so much from any great difference in the salting of them, as from their being smoked in chimneys where only wood fires are burnt. The time of fumigation is from three to six months, according to their size. Pork, though a wholesome food to persons in health, requires a strong stomach to digest it properly ; ham and bacon frequently disagree with persons of weak digestion. *Brawn* is the flesh of the boar pickled in a peculiar manner, and is always better tasted according to

the greater age of the animal of which it is made. After the boar is killed, the head and legs are cut off, and the bones are carefully taken from the remaining part. This, after having been properly salted, is rolled together as hard as possible. It is then boiled till it becomes so tender as to be pierced with a straw. It is afterwards set by till quite cold, and lastly is immersed in a pickle formed of salt and bran boiled together. The usual mode of curing pork is with common salt, or bay salt; but some persons add saltpetre, juniper berries, pepper, and other antiseptic substances.

The Jews and Mahometans abstain from this species of food from a religious principle, and even consider themselves defiled by touching it. The inhabitants of China, on the contrary, are so excessively fond of pork, that multitudes, from this partiality alone, are said to have been prevented from conversion to Mahometanism.

The *fat* of swine differs, in its situation, from that of almost every other quadruped, as it covers the animals all over, and forms a thick, distinct, and continued layer betwixt the flesh and the skin, somewhat like the blubber in whales. *Lard*, which is chiefly obtained from the fat membranes of the abdomen, is applicable to various uses, both culinary and medicinal; it is often employed for ointments. The best lard is at once white and moderately hard; that which is soft, yellowish, and oleous, is least esteemed. The *blood*, the *feet*, and the *tongue* of pigs, are all used as food.

Dairy-fed pork is generally considered the most delicate; the next in quality is that fed on corn, but the flesh is harder than the preceding. The worst pork is that fed on grains, particularly those afforded in large distilleries; even the lard of such pork partakes of the general deterioration.

The *skin*, when properly dressed, is used for the seats of saddles; by book-binders, and other artisans.

In China hogs' skins are much in request by shoemakers. All the shoes that are sold to Europeans at Canton are made of hogs' leather, the hair having previously been burnt off with a hot iron. In our own country, when swine are killed for food, it is not customary to strip off the skin, but merely to rid it of the bristles, by scalding the animals, after they are dead, with hot water, or singeing them with

lighted straw. Consequently the hogs' skins which we use are chiefly imported from abroad. The *bristles* of swine are made into brushes of various kinds, and are also employed by shoemakers in the place of needles. They are chiefly imported from Russia.

Among the other uses of swine, it may not generally be known that, in the island of Minorca, they are employed as beasts of draught, being frequently yoked to the plough with asses : one writer speaks of having seen a cow, a sow, and two young horses, all yoked together, and of these the sow drew the best. In some parts of Italy swine are used in hunting for truffles, an edible species of fungus, which grow at the depth of some inches in the ground. A cord being tied to the hind leg of a pig, the beast is driven into certain pastures ; and we are told that truffles are always to be found wherever he stops and begins to turn up the earth with his nose.

Most writers have asserted that swine are long-lived, but few instances are allowed to occur of their attaining a great age ; as it is neither profitable nor convenient to keep them till they are old. A gentleman in Hampshire kept a sow till she was nearly seventeen years old ; at this period she began to exhibit some signs of old age by the decay of her teeth, and ceasing to be so fertile as she had previously been. This animal afforded an instance of the extremely prolific nature of swine. She is calculated to have been the parent of no fewer than three hundred young ones. The great weight to which swine are sometimes fed would appear altogether incredible had it not been well attested. In one instance a pig was known to weigh 1,410 pounds when alive ; and 1,215 pounds when killed and dressed.

769. *The RHINOCEROS.*—*There are several species of rhinoceros, some of which have one, and others two horns, situated on the nose, and three hoofs on each foot.*

These are animals of a large size and bulky form ; they live in swamps, morasses, and forests, in wet situations, within the torrid regions.

The *skin* of the rhinoceros is an article in great demand in several countries of Asia and Africa. It is manufactured into the best and hardest leather that can be imagined ; and targets or shields are made of it, that are proof against even

the stroke of a scimitar. In this state the colour of the skin is variegated; and when polished it is nearly similar in appearance to tortoiseshell. The inhabitants of Surat make very elegant targets of these hides, which they stud with silver-headed nails. The Hottentots make *chanboks* or whips of them, and Dr. Andrew Smith, speaking of the three smooth-skinned and African species, says, that their "hide is generally about an inch thick, and so compact that a leaden ball will not pierce it, hence, to kill them, it has been found necessary to add to the lead a considerable portion of tin. The hunter who would boast of killing one of these creatures at a single shot, must hit it immediately behind the ear or the shoulder; and if this be not accomplished, and the sportsman be pursued by the enraged animal, which will often happen, then his best chance of escape is either to step aside suddenly from his course, and pass behind a bush, or by a well-directed shot to break one of its legs."

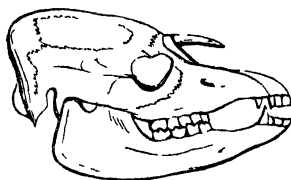
In Sumatra, Ceylon, some parts of India, and in South Africa, the *flesh* of the rhinoceros is a useful food. The *horns*, which are from twelve to fifteen inches in length, and three to six inches in diameter, are much esteemed amongst the Mahometans, not on account of any real utility, but from their being considered an antidote against poison. Good-sized horns, if purchased at three or four pounds sterling each, may be sold in the East Indies, with considerable profit, to the Arabian merchants. They are made into drinking cups. By the Arabians they are frequently made into the hilts of swords; and are sold at an enormous price for that purpose. They are also manufactured into snuff-boxes, which are considered preferable to such as are made of tortoiseshell. We are informed by Martial, that the Roman ladies of fashion used them in their baths, to hold their essence bottles and oils.

The savage tribes of Southern Africa, and even the inhabitants of the Cape of Good Hope, set a high value on the dried *blood* of the rhinoceros, to which they ascribe great medicinal virtues. The *hoofs*, and even the *teeth*, are also used medicinally.

Although the rhinoceros is naturally of a quiet and inoffensive disposition, his strength is such, that few animals are able to contend with him: the thickness of his hide is

so great, as in several parts to be impenetrable even by a musket ball. These animals feed entirely on vegetable food, but particularly on the leaves and tender branches of shrubs. Their horns are not fixed into the bone of the head, like those of other quadrupeds, but only into the skin.

Fig. 81.

*Skull of the Tapir.*

The Tapirs (*Tapirus*), of which there are two species, the one a native of South America, while the other is indigenous to the Asiatic Islands, are placed here. The flesh of the American species is eaten; the nose assumes the form of a short flexible fleshy trunk; the rudiment, as it were, of the elephant's proboscis.

The third group of the *Pachydermata* is named *Solipedes*, and contains the horse, ass, and zebra. In this group, externally there seems to be but one toe and hoof to each foot, but in the skeleton, when the skin is removed, there are appendages visible which represent two lateral toes.

770. *The HORSE* (*Equus caballus*) is distinguished by its tail being covered with long hair.

The male has the name of horse, the female of mare, and the young one of foal.

Wild horses are found in large herds in Siberia, and several other parts of Asia, as well as in some parts of Africa.

Endowed with the most useful qualifications, the horse is an animal of the greatest importance to the inhabitants of all temperate climates. Though naturally spirited, active, and intrepid, he submits with patience to carry burthens, and to toil, for days together, along roads and in agricultural labours. If treated with care and attention, he perseveringly adapts himself to our wants and conveniences. In some parts of Tartary these animals have even been made objects of divine worship, originating no doubt in a principle of gratitude for the services they perform. By the Arabians they are nearly as much attended to and beloved as human beings: they live in the same tents with their owners, and participate in all the kindnesses which this

people bestow upon their own families. In Arabia, indeed, they may be deemed the chief support of the families which possess them; and (surrounded with foes) the very existence of the owner not unfrequently depends upon the powers of his horse.

In no country of Europe is so much attention paid to the breeding and training of horses as in England. The British horses are, therefore, superior in swiftness, in strength, and perseverance in the course, to any others in this quarter of the world.

The fleetest of all the *British horses* is, of course, the *race-horse*: for short distances none of the Arabians which have been tried in England have proved in any degree equal to him. The celebrated horse called Childers, in the year 1721, ran four miles in six minutes and forty-eight seconds, carrying a weight of nine stone two pounds. The greatest distance ever accomplished by a horse is five hundred miles in five days, and was performed at Bangalore, on the 27th of July, 1810, by an Arab horse, the property of Captain Horne, of the Madras Artillery. Had the different racing meetings at Newmarket, York, and other places, no other view than to call together great concourses of people for amusement, their tendency would be injurious rather than beneficial to society; but as such meetings excite attention to the breeding of these valuable animals, they are, therefore, of some utility.

The English *hunters* are allowed to be among the noblest, most elegant, if not the most useful animals that are known; the value of our *hackneys*, or road horses, may be imagined when it is stated, that many of them are able to trot at the rate of more than fifteen miles per hour.

So great is the strength of these animals, that instances have been mentioned of a single horse drawing, for a short space, the weight of three tons; and of others carrying a load which weighed more than one thousand pounds. The immense *dray-horses* that are employed by brewers, and are so frequently seen in the streets of London, though in some measure they are useful as being able better to sustain the shock of loading and unloading than slighter animals, are chiefly kept for ostentation. The British *draught-horses* are extremely valuable animals, but particularly a chestnut-coloured race called Suffolk horses.

In *Scotland* there is a breed of small horses called *gallo-ways*. The best of these seldom exceed the height of fourteen hands and a half¹; they are uncommonly active, hardy, and spirited. The *Shetland Islands* produce a race called *shelties*, which, though exceedingly diminutive in size, are, in other respects, highly excellent.

In *Ireland* the cart-horses, though of sufficient size, are ill-shaped and bad. The saddle-horses appear naturally as good as ours; but, in general, they are ill-kept, worse groomed, and still worse shod.

The *French horses* are extremely various in their kind; but few of them can be called fine. The best saddle-horses of France are produced in the vicinity of Limosin, and in Normandy. The latter, though not so valuable as hunters, are preferable to all the rest for war. Lower Normandy is famous for fine carriage horses. A prevailing fault in the horses of France is too great a width across the shoulders.

The *Dutch horses* are said to be very good for carriages; great numbers of them are annually sent into France. The *Flemish horses* are far inferior to those of Holland. They have generally large heads and broad feet; and their legs are subject to dropsical swellings.

Germany affords some fine horses, but the generality of them are heavy and thick-winded. Those of *Hungary* and *Transylvania*, however, are very light and fleet. The Hussars and Hungarians, it is said, adopt the cruel practice of slitting the nostrils of their horses, with a view to improve their wind, and prevent them from neighing in the field.

The *Danish horses* are so large in size, and so well set, that they were formerly preferred, as carriage-horses, to all others. They are extremely various in colour; many of them are pyed and spotted, which is not the case with the horses of other countries.

In *Spain* the horses are very beautiful and excellent. They have a long thick neck, with a flowing mane. The head is large; the ears are long, but well placed; the eyes full of fire; the air noble and spirited; the shoulders thick, and the chest broad. They have great agility and stateliness. Their prevailing colours are black and light chestnut.

¹ Four inches make a hand. This is the usual mode of estimating the height of horses.

The *Italian horses* were formerly much finer than they are at present, the breeding of them having long been neglected. The kingdom of Naples, however, still affords fine horses, especially for carriages; but they have, in general, large heads and thick necks. They are also untractable, and consequently are difficult to be trained; but these defects are, in some degree, compensated by the largeness of their size, their spirit, and the beauty of their motions.

There is a prevalent and erroneous notion that the *flesh* of the horse is bitter and unpalatable. In several parts of Asia wild horses are killed almost exclusively for food; the Calmuc Tartars, in particular, are so partial to this kind of flesh, that they seldom eat any other. Horses' flesh is constantly exposed for sale in the markets of Tonquin. A celebrated British writer (Dr. Anderson) has strongly recommended the fattening of horses as food in this country, and urges his recommendation by declaring that horse-flesh is superior in delicacy of flavour to beef! In various parts of Paraguay, mares' flesh is the only food which the soldiers have when on an expedition. The first colonist of La Plata landed in 1535 with seventy-two horses, and now they exist on the Pampas there and elsewhere in countless herds (Darwin).

The Tartars drink the *milk* of the mare, and also convert it into butter and cheese. One of their most favoured liquors is *koumiss*; a sort of wine made of fermented mares' milk, and carried, by them, from place to place, in bags made of horses' hides. When in perfection, the taste of koumiss is said to be a pleasant mixture of sweet and sour; but it is necessary to agitate it before it is drunk. Koumiss is also considered of great utility as a medicine.

The *skin* of the horse, after it is tanned, is made into collars, traces, and other parts of harness; it is also used for shoes. In South America large numbers of mares are slaughtered for the sake of their hides, although worth only about half-a-crown a piece; it being thought ridiculous there, Darwin tells us, ever to break in or ride on a mare. The *hair* forms a considerable branch of trade. That of the tail is woven for the covers of chairs, sofas, and for sieves; it is used also for fishing-lines, and the bows of musical instruments. The inferior hair of the tail and mane is employed for the stuffing of bolsters and mattresses.

For this purpose it is baked, by which it is rendered one of the most elastic substances for couches that are known. The short hair of the horse is used for stuffing saddles and horse-collars.

If horses be well treated, and properly attended to, they will sometimes live to the age of fifty years ; but during great part of this time, they are generally so decrepid as to be unable to perform any services whatever for their owners. To ascertain the age of a horse, reference is generally had to the teeth. Deeply sunk eye-pits are usually considered a criterion, though not an infallible one, of an old horse ; and, for colts or young horses, attention must be paid to the appearance of their coat, and of the hairs of the mane and tail, as it is not until they have changed their first teeth that any correct judgment of their age can be formed from the mouth. The deceptions of horse-dealers in changing the appearance of the teeth, and in various other particulars relative to the horse, render great caution necessary in the purchase of these animals.

771. *The ASS (Equus asinus) is characterized by his tail having long hairs only towards the extremity, and the male having a blackish cross over the shoulders.*

Wild asses associate in herds in the mountainous deserts of Tartary, Persia, India ; and also in some parts of Africa.

This animal, which, by care and attention, is rendered, in Spain and some other countries, an elegant, tractable, and valuable servant of man, is in England a stupid and inactive beast. The Sacred Writings speak of asses being in general use throughout the Eastern Countries, both for the saddle, and as animals of draught and burthen. With the Romans they were in such estimation, that Pliny speaks of a male ass having been sold at a price which exceeded 3000*l.* of our money. In Spain the best asses are sold at very high prices, sometimes as much as 100 guineas and upwards each. But such asses are much larger than the asses usually bred in this country.

Doomed as it is with us to slavery and ill treatment, we cannot be surprised that the ass, in many instances, should appear a stubborn and intractable animal. But whenever it is well treated, it is remarkable for meekness, patience, and docility ; it submits quietly to chastisement, is tempe-

rate in its food, and is contented to feed on such vegetables as most other animals would refuse. In proportion to its size, the ass is capable of supporting great fatigue, and of dragging and carrying heavy burthens. Asses are chiefly employed for drawing hucksters' carts, and similar burthens; and if properly trained, there can be no doubt but they would constitute the cheapest team that could be used. Being more hardy than horses, these animals are preferred to them for journeys across the deserts of Asia. Most of the Mussulman pilgrims use them in their long and laborious journeys to Mecca. In the principal streets of Cairo asses stand ready saddled for hire, and answer the same purposes as hackney coaches and cabriolets in London. The person who lets an ass accompanies him, running behind to goad him on.

Asses' *milk* is light, easy of digestion, and so nutritious as to be recommended in many disorders. It is particularly agreeable to the tender stomachs of consumptive persons, and is wholesome for young children; it is chiefly drunk whilst warm from the animals: there is a mode of preparing artificial asses' milk with cringo root, pearl-barley, and liquorice root, boiled in water, and mixed with new cow's milk. In some parts of the Continent asses' milk is occasionally used as a cosmetic.

The *flesh* of the wild ass is so much esteemed in Persia that it is admitted even to the imperial table. The Persians have an adage expressive of their high opinion of it. Notwithstanding this, the flesh of the domestic ass is so bad as food, that it is said few persons would be able to eat of it. From their hardness and elasticity, the *skins* of these animals are capable of being used for various purposes. They are manufactured into shoes, heads for drums, and when varnished over in a peculiar manner, are cut into leaves for pocket-books. The inhabitants of some of the Eastern countries make of asses' skins the substance called *sagvi* or *shagreen*. At Astracan, and throughout Persia, there are great manufactories of this article. It is not naturally granulated; this roughness being altogether effected by art. Of the bones of the ass the ancients are said to have made their best sounding flutes.

772. The MULE, or mixed produce betwixt a male ass

and a mare, is a very hardy and useful animal¹. Its size is larger, its head and ears smaller, and its coat smoother than those of the ass. In countries where the breed of asses is sufficiently large for obtaining mules of considerable size, these are preferred to nearly all animals for cheapness, durability, and general convenience, as beasts of burthen. In England they have never been propagated to any extent; the few that have been reared in this country have, in general, been the produce of such diminutive parents, as to exhibit only a puny race, by no means calculated for the services of which a well-managed breed would be capable. Yet even these, where they have been used, have been found to possess many very estimable qualities. In the brew-house of Messrs. Truman, Harford, and Co. of Limehouse, mules were for a little while used in place of the dray-horses which are employed by other brewers. Each dray was drawn by three mules, and carried three butts of beer, a weight precisely the same as that which the London drays carry with three large horses.

ORDER X.—RUMINANTIA, or, Animals which chew the Cud.

In this most natural order, the animals closely resemble

Fig. 82.



Skull of a Ruminating Animal.
(Sheep.)

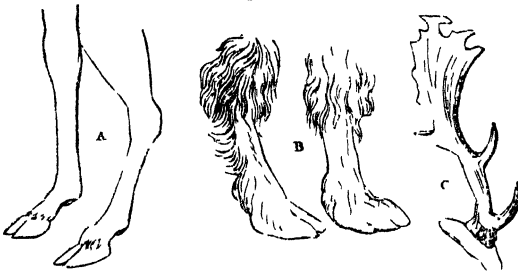
each other in their character. They have incisor teeth in the lower jaw only (Fig. 82), their place in the upper being occupied by a hard rim; only one or two genera have canine teeth; so that in most of the animals of this order there is a wide space left.

The feet are terminated by two toes and two hoofs, which have the appearance of a single hoof split. (Fig. 83. A and B.)

The animals of this order have the power of masticating their food a second time, which is commonly called "chewing the cud." This faculty depends on the structure of their stomachs, which are four in number; three of these are so arranged, that the food can enter into any of that number

¹ The produce of a horse and a female ass is called a *hinny*.

Fig. 83.



A, Legs of a Stag. B, of a Camel. C, Antler of a Stag.

according to the will of the animal, as the œsophagus ends at the point of communication.

The first and largest of these is named the *paunch*; it receives the food coarsely reduced by the first mastication. This is turned over to the second stomach, or *bonnet*, the walls of which have laminæ similarly arranged as in the cells of bees. This stomach, which is very small and round, arrests the grass or herbage, and compresses it into small pellets, which are returned to the mouth to be re-chewed. The animal, during this operation, is in a state of repose, which continues till all the food swallowed has been a second time submitted to the action of the teeth; it then goes directly to the third stomach, or *manyplies*, so called from the many longitudinal laminæ, or folds, on its inner surface; from this the food passes into the fourth stomach, the walls of which are wrinkled: this last is the true organ of digestion. The Ruminants are the most useful, perhaps, of all the animals, to man; all of them are good for food; many serve as beasts of draught or burden. The milk, tallow, skin, wool, horns, and other productions of the animals of this order, are all very useful, and many of them indispensably necessary.

The first section, containing the camels and musks, want horns.

773. *The ARABIAN CAMEL, or DROMEDARY* (*Camelus dromedarius*), is distinguishable from the other species of camel by having a single bunch upon the middle of its back.

This animal, which is a native of many of the deserts of Asia and Africa, is of a tawny grey colour, and has soft hair, which is longer on the neck, under the throat, and on the haunch, than elsewhere.

The Arabian, like all other species of camel, has its upper lip cleft, and its feet with two long hoofs on which it treads, and two others shorter, which do not touch the ground. (Fig. 83. n.)

These animals constitute the principal source of the riches, and the whole force and security of the Arabians. They are the only beasts by which the inhabitants of the sandy deserts of many parts of Asia could travel or convey their burdens. Their tough and spongy feet, which are peculiarly adapted both to the climate and the country, and their abstemious temperament, but particularly their capability of travelling without water for many successive days, enable them to perform such journeys as would destroy, probably, any other species of quadruped. The caravans, or troops of merchants that traverse the deserts of Egypt and Arabia, are always accompanied by camels, which are often more in number than the men. The commercial travels are sometimes to the distance of seven or eight hundred leagues, and are usually performed at the rate of ten or twelve leagues a day, the camels being every night unloaded to rest and feed. For the latter purpose, if better provender cannot be had, they are contented with a small quantity of dates, or a few beans, together with the scattered and oftentimes bitter herbage which the desert affords. The burden of each camel usually weighs about half a ton; at the command of his conductor he kneels down, for the greater convenience of being loaded. It is from this practice that we account for those horny parts that are observable on the bellies, knees, and limbs, even of the animals that are exhibited in England. Camels are trained, from the earliest part of their life, to the labours which they are afterwards to perform: and with this view, when but a few days old, their limbs are folded under their body, and they are compelled to remain on the ground whilst they are loaded with a weight, which is gradually increased as they increase in strength. As soon as they have acquired sufficient strength they are trained to the course, and their emulation is excited by the example of horses, or of other camels.

The pace of the camel is a high and swinging trot, which, to persons unaccustomed to it, is at first disagreeable and apparently dangerous, but is afterwards sufficiently pleasant and secure. The Arabians in general ride on a saddle that is hollowed in the middle, and has at each bow a piece of wood placed upright, or sometimes horizontally, by which the rider keeps himself in the seat. A ring is inserted into the nostrils of the camel, to which a cord is affixed that serves as a bridle to guide and stop him, or to make him kneel when the rider wishes to dismount.

The camels of Sahara are probably more fleet than any others that are known; they are named in North Africa *Heiries*, or *Maharhies*, and are famed for their extraordinary speed and powers of abstinence; on these the Arabs, with their loins, breast, and ears bound round, to prevent the injurious effects of percussion from the quickness of motion, can cross that great desert in a few days. With a goat's skin, or a porous earthen pitcher filled with water, a few dates, and some ground barley, the Arab travels from Timbuctoo to Morocco, feeding his camel but once upon the road. In one instance a camel was known to travel from Fort St. Joseph, on the river Senegal, to the house of Messrs. Cabane and Depras, at Mogador, a distance of more than one thousand miles, in seven days.

It has been observed that the camel is the most completely and most laboriously enslaved of all animals; because of the other kinds of domestic animals, we find at least some individuals in their natural state, and which have not yet been subdued by man: but the whole species of the camel is enslaved; not any of them being now found in their primitive state of independence and liberty. He is the most laboriously enslaved because he has never been trained but as a beast of burden, whom man has not harnessed nor taught to draw, but whose body is a living carriage.

The above are not the only uses of the camel. The *hair* or *fleece* of these animals, which is renewed every year, and which regularly falls off in the spring, is so soft that the finest parts of it may be manufactured into stuffs of beautiful texture: and in Europe, when mixed with the fur of the beaver, it is sometimes made into hats. The inhabitants in some parts of Sahara live in tents formed of woven

camels' hair; this forms a thick covering completely waterproof. After the hair has been stripped off, the *skin* is converted into leather.

In Arabia the *milk* of the camel is a most important article of nutriment; and the *flesh*, though dry and hard, is not unpalatable, particularly when young. By the inhabitants of Egypt camel's flesh is so much esteemed, that at Cairo and Alexandria, it was formerly forbidden to be sold to Christians. In many parts of Africa the *tongues* are salted and dried, both for use and exportation; and with the ancient Romans, the *heels* of camels were eaten as a great delicacy.

774. *The BACTRIAN, or TWO-BUNCHEd CAMEL* (*Camelus Bactrianus*), is known by having two bunches on its back; and by being somewhat larger, and having shorter legs than the Arabian species.

This animal is found in Usbec Tartary, the ancient Bactria: it is likewise a native of Siberia, Thibet, and some parts of China.

The purposes to which the Bactrian camel are applied are the same as those already described respecting the Arabian species (773). These animals, however, are sufficiently hardy to sustain the climate of the temperate parts of Siberia, and to be able, without injury, to traverse even humid and marshy countries, which would soon prove fatal to the Arabian camel.

775. *The LLAMA, or GLAMA* (*Auchenia glama*), is a South American animal closely allied to the camel, of a small size, which has a protuberance on the breast, and no bunch on the back.

The colour of the llama is white, grey, and russet, variously disposed. Its height, to the top of the back, is somewhat more than four feet, and to the head nearly six feet.

Without the aid of these animals, the inhabitants of the mining districts of South America would labour under great inconveniences for the transport of their merchandise and treasures: since mountains that are altogether inaccessible to the horse, are with facility traversed by the llama. This beast, though not so patient, is nearly as abstemious as the camel. He can carry from one hundred and fifty to two hundred pounds' weight, and was the only beast of burden in Peru before its conquest by the Spaniards. He proceeds, when loaded, with a slow but sure pace, and per-

forms journeys in these mountainous regions more than two hundred leagues in extent. Sometimes he will travel four or five days successively without appearing desirous of repose, and then he rests spontaneously for twenty or thirty hours before he resumes his toil. Like the camel, he kneels to be loaded; he is directed in this, and in most of his motions, by the conductor's whistle.

Of the *skin* of the llama a hard kind of leather is made, which is used for harness, the soles of shoes, and for many other purposes. But as it is only tanned, and not curried, it is soon injured by exposure to wet. The *hair*, or fleece, particularly of the wild llama, or *Guanaco*, which is longer than that of the domesticated animal, is much in request for the manufacture of camlets, and other stuffs, some of which are of a very beautiful texture, and also for the making of hats. On this account the animals are frequently hunted in the plains with dogs, or killed with guns; but such is their activity amongst rocks, that if they can once reach these the hunters are generally obliged to desist from any further pursuit. The *flesh* of the llama is a wholesome and excellent food. Sometimes it is salted, and in this state is used as provision for ships proceeding on long voyages. That, however, of the young llamas, four or five months old, is preferred, and is considered as good as veal. Many parts of these animals are used by the inhabitants of South America as medicine.

The ALPACA, also named the Peruvian Sheep, is generally regarded as a mere variety of the preceding. It is covered with a wool which, from the fineness of its texture, length, and glossiness of surface, produces a fabric almost equal to silk. Its average length is eight to twelve inches; it is frequently twenty, and has been seen thirty inches in length. In Peru it is shorn every third year, in the month of April, when it is usually eight inches long on the back, and nine on the sides. The ordinary colours are white, black, and grey. This valuable wool has been in considerable demand, and upwards of six millions of pounds have been imported into Liverpool within five years. Considerable quantities are now manufactured into goods, at Bradford, Halifax, Manchester, Wakefield, and Aberdeen. Shawls have been made of it for a long time, and used to

sell as high as 2*l.* 10*s.* per yard. In the "Quarterly Journal of Agriculture" for 1841, there is an interesting article on the ease with which the animal might be naturalized here, and the great benefits derivable not only from the wool, but from the flesh, which is said to resemble venison, as well as from the skin, which is thick, durable, and has great consistency.

776. *The VICUGNA (Auchenia vicugna) is a small South American species of llama, with a woolly fleece, a flat and blunt nose, an erect tail; and without any bunches.*

This animal inhabits, in a wild state, and in extensive flocks, the highest peaks of the Andes.

Unable to sustain burdens exceeding sixty or seventy pounds in weight, the vicugna is seldom employed in the transport of merchandize. It is chiefly in esteem on account of its *fleece*, which is of a dead rose colour, and as soft and valuable as silk. This, in South America, is spun and woven into gloves, stockings, quilts, carpets, and innumerable other articles, which are sold at great prices, and constitute an important branch of commerce.

In most of their habits these animals have a close alliance with the llama, their general figure being nearly the same. They are gentle and inoffensive, and though not tamed with quite so much facility, are capable of great attachment towards those who have the care of them. Amongst their native mountains they are so light and agile in all their motions, that it is not easy to come within reach of them, except by stratagem.

In consequence of the great advantages which, in America, are derived from the wool of the vicugna, some of them were brought to Spain; but from want of proper attention to their natural habits the experiment entirely failed.

777. *The MUSK (Moschus moschiferus) is a small quadruped somewhat shaped like a deer, but without horns: it has two projecting tusks curved downward; a short tail; about the middle of the under part of the male, there is an oval bag, which contains the musk.*

This animal is seldom more than three feet in height, and is clad with long, upright, and thick set hair. Each hair is waved, and of three different colours; the tip ferruginous, the middle black, and the bottom dusky.

It inhabits the mountains of Thibet, Tonquin and Siberia.

The drug called *musk* is a dark-brown fatty substance,

which appears somewhat like clotted blood. It is contained in the bag or receptacle under the belly, which has two small external orifices; through these, when it is overcharged, the animal squeezes it out upon trees or stones. The mode in which musk is collected for sale is to kill the animals, cut off the bags, and tie them closely up to prevent them from being spoiled by evaporation. In those countries where the animals are most abundant they are pursued in the autumn and winter, and generally with so much success that many thousands of bags are annually collected. It is, however, said that many are formed of other parts of the skin, and filled with musk, adulterated by mixture with other substances. Indeed musk is seldom to be obtained in a pure state. To increase its quantity blood is not unfrequently mixed with it; and to increase its weight, lead finely ground, and sometimes even little bits of lead, are put into the bags. The purest musk is said to be that which is brought from Patna, in the dominions of the great Mogul, where it is collected from various parts of the interior of the country: that obtained from the northern parts of the country is said to have scarcely any odour. It is imported into Europe in bags, each of which is about the size of a pigeon's egg, well filled, and covered with coarse hair.

Musk was formerly much used as a perfume. It is now chiefly in repute as a medicine in spasmodic, convulsive, and other complaints; and when properly given, is thought a remedy of great service. So powerful is the scent of this drug, that the smallest particle of it will perfume a very considerable space; when the bags are fresh, if one of them be opened in a close apartment, every person present is obliged to cover his mouth and nose with several folds of linen, to prevent suffocation.

In all the countries where these animals are found, their *skins* are in great request as a strong and valuable leather; when tanned and properly prepared, the Russians have a method of rendering this nearly as soft and shining as silk. These skins are also sometimes dressed as *furs* for winter clothing. The flesh of the musk is frequently eaten; but that of the young ones only is tender and of a good flavour.

These animals, which are astonishingly light and active

in all their motions, and at the same time of inoffensive and timid habits and disposition, are caught by snares placed near their feeding places; are shot with arrows, and sometimes killed by cross-bows, so placed that they discharge arrows by the animals treading on a string connected with the trigger.

All the other Ruminants have, at least in the male, two horns, that is to say, two more or less elongated projections of the frontal bones, which are found in no other tribe of animals.

778. *The ELK, or MOOSE DEER (Cervus alces), is the largest species of deer that is known, and is distinguished from all others by having broad and flattened horns with several points, no brow-antlers, and a hairy protuberance on the throat.*

In size these animals are frequently larger than a horse. Their upper lip is square, very broad, deeply furrowed, and hangs over the mouth. The hair of the male is black at the points, dusky in the middle, and white at the roots; that of the female is of a sandy brown colour, except under the throat, belly, and flank, which are whitish. The males only are horned.

The elk inhabits the forests of North America, of some parts of Europe, and of Asia as far south as Japan.

Strong and powerful as these animals are, they may be domesticated and trained to labour. Mr. Livingston, at a farm near New York, made the experiment by breaking two elks to the harness. After having been only twice bitten, though two years old, they appeared equally docile with colts of the same age, applying their whole strength to the draught, and proceeding in a steady pace. The motion of these animals is a shambling kind of trot, but it is very rapid; in drawing carriages they are able to out-travel a horse. They are also less delicate in their food than horses, are long-lived, and more productive than any known beast of burden, having annually from one to three young ones at a birth. Elks were formerly used in Sweden for the drawing of sledges; but as they were frequently employed in the escape of criminals from justice, the use of them was prohibited under severe penalties.

The inhabitants of all countries where the elk is found esteem its *flesh* a sweet and nutritious food, though the grain is coarser than that of most other kinds of venison.

The American Indians assert that they can travel further, after having eaten of it, than of any other animal food. After having been properly salted and dried, the *tongues* are better than those of the ox; the nose, when cooked, is stated to eat like marrow, and to be one of the greatest delicacies which are produced in Canada. Of the *skins* an excellent buff leather is made, which is strong, light, and soft. This leather is used by the Indians for tent-covers, snow-shoes, and the coverings of canoes. The long *hair* of the elk is well adapted for the stuffing of mattresses and saddles.

In Canada the hunting of the wild elk is a frequent, but in general a most laborious pursuit, which chiefly occupies the attention of the Indians during winter, when the whole surrounding country is covered with snow.

In a wild state these animals browse on the thick and lofty grasses of the plains, and the leaves and tender branches of trees. During the summer they frequent the banks of rivers and lakes; and in winter they often traverse vast distances upon the frozen snow. Notwithstanding the natural strength of their body, their disposition is so mild and inoffensive, that even when pursued and attacked, they seldom attempt any resistance.

779. *The REIN-DEER (Cervus tarandus) is known by its horns being long, bent back, slender, branched, and generally broad at the extremities.*

It is about four feet and a half high at the shoulder, and is of a brown or greyish white colour above, and white on the under parts of the body. Both the sexes are horned.

These animals inhabit several of the Alpine districts of America, and of the northern countries of Europe and Asia.

Useful, and even indispensable, as many of the domestic animals of this country are to us, the rein-deer is infinitely more so to the Laplander. For travelling, and the conveyance of heavy burdens in sledges and carriages, he supplies the place of the horse; and such is the speed with which he traverses the frozen snows of that dreary region, that he is able with ease to perform a journey of nearly a hundred miles in one day. To this labour the animals are trained from the earliest period of their lives; and neither darkness nor storms can essentially impede their progress. The usual mode of travelling is in sledges, to which one or more of the animals

are yoked. The sledges are extremely light, somewhat shaped like a boat, having at the back an upright board for the driver to lean against. Being rounded and not flat underneath, much dexterity is requisite in the balancing and management of them. The driver is tied in, and protected by a cover which encloses all the lower parts of his body, and shelters him from the inclemency of the weather. The rein-deer is yoked by a collar, from which a trace is brought under the belly between the legs, and fastened to the fore part of the sledge; the animal is guided by a cord or rein fastened to its horns, and tied to a hoop held upon the driver's right thumb. He directs the course of the deer by pulling the rein on the side which he would have him go, encouraging him at the same time with his voice. In general, the Laplanders can travel with ease about thirty miles without stopping.

To persons unaccustomed to the habits of the Laplanders and their animals, it will appear wonderful that they should be able to travel during the winter, by night, as well as by day, the earth presenting one uniform surface of snow, and not a single vestige of human industry and labour being discernible to direct their course; the snow, at the same time, flying about in all directions, and almost blinding them. Yet it is certain that they are under no difficulty in finding the spot to which they are bound; dangerous as these journeys may seem, they rarely experience any accident. When several persons are travelling in company, they fix bells to the harness of the animals, that the whole may be kept together by hearing when they cannot see each other, after the light of their short day has failed them. To guide them in their course, the Laplanders observe in the day time the quarter whence the wind blows, and at night, they are directed by the position of the stars. The missionary Leems, who resided ten years amongst the Laplanders, remarks, that during the whole of that time he did not remember more than one fatal accident to have occurred from this mode of travelling.

As the rein-deer supplies to the Laplanders the place of a horse for conveyance and carriage, so it is an invaluable substitute for the cow in affording them food. The females supply them with *milk*, each yielding about as much as a common she-goat. This, though not so thick as the milk

of the cow, is said to be sweeter and more nutritive, and produces them both butter and cheese. The mountain Laplanders subsist, through the whole winter, upon these, or upon the *flesh* of the rein-deer, slaughtering two or three every week, according to the number of his family. The animals are killed by stabbing them in the neck, and the wound is so dexterously inflicted that no *blood* flows from it; but this is found in the inside, whence it is carefully taken out, and prepared for use. The *fat* of the rein-deer serves also for food.

Of the *skin*, after it has been properly prepared, the Laplanders make garments, gloves, shoes, and caps, which cover them from head to foot, and protect them against the cold. These skins also serve as interior coverings for tents, as linings and coverings for sledges, and as beds. They are more or less valuable, according to the season in which the animals have been killed; the best skins are obtained from those killed in the winter.

The *horns* are used for different purposes; an excellent glue is also made of them. The *bones* are likewise of use; even the *sinews* of the legs, after having been held before the fire and beaten with wooden hammers, are divided into filaments as fine as hair, which answer all the purposes of thread; these filaments twisted together, serve for bow-strings and cords of different kinds.

So numerous and important are the uses of the rein-deer in Lapland, that there are few inhabitants of that country who do not possess them; and some of the wealthiest Laplanders have herds consisting of more than 1000 head. In the summer-time these feed on divers plants which flourish during that season; but in winter, they either browse on the rein-deer liverwort (*Cenomyce rangiferina*), which they dig up from beneath the snow with their feet and horns; or on another kind of liverwort, which hangs on the branches of fir-trees, and which affords them sustenance when the snows are too deep or too hard frozen to allow them to reach the former.

Wild rein-deer live in the mountains and woods; the hunting of them is, in general, attended with excessive fatigue; as they are endowed with astonishing muscular powers, and also possess a nicety and acuteness of precaution which can scarcely be equalled. Some idea may be formed of the

difficulty of this pursuit, when it is stated that a Laplander, in chase of one of these animals, has been known to creep on his hands and knees through shrubs and moss, for nearly five miles, before he could approach within gun-shot of his prey. The various modes in which rein-deer are pursued are too numerous and too intricate to require a detail in this place. It may be sufficient to say that they are assailed by dogs, traps, pitfalls, snares, cross-bows, and fire-arms; in all the ways which the inventive art of man can devise.

780. *The STAG, or RED DEER (Cervus elaphus), is a large species of deer, generally of a reddish brown colour on the upper parts of the body, and white beneath; with large and much branched horns, rounded through their whole length.*

The males only are horned. The male is called stag, or hart, the female hind, and the young one has the name of fawn.

Red deer are still found in the mountainous parts of Scotland; in the Forest of Martindale, Cumberland; in the New Forest, Hampshire; in woods on the river Tamar, in Devonshire; and amongst the mountains of Kerry in Ireland. On the Continent of Europe, they are very common.

The hunting of these animals was formerly considered one of the most important occupations of the English nobility, and, during the Saxon Heptarchy, it was the privileged pursuit of the sovereign and his court. By the kings of the Norman line laws of the most sanguinary description were enacted for the preservation of these the royal game, it being then deemed less criminal to destroy an individual of the human species than a beast of chase. Forests were enlarged for the shelter of wild animals, and for the more ample enjoyment of the diversion of hunting, at the expense of every principle of justice and humanity. Happily for us, the scenes of devastation which this pursuit occasioned have long ceased to exist; and those vast tracts of country which were once dedicated to hunting, are now, for the most part, applied to the advantages and comfort of man.

As, therefore, the breed of red deer is now chiefly preserved in this kingdom from motives of curiosity, rather than as objects of amusement or utility, we are indebted almost wholly to foreign countries for those parts of the stag which are important in a commercial, economical, and medical view. The *skins* are manufactured into an excellently soft,

and somewhat yellow-coloured leather, which is useful for numerous purposes. Many very extraordinary medicinal virtues were formerly attributed to the *horns* of the stag, and indeed to nearly all parts of its body: but the experience of late years gives no countenance to them. The horns are of nearly the same nature as bones, and the preparations of them, by heat, are similar to those of solid animal substances in general. Consequently the articles denominated *spirit of hartshorn*, and *salt of hartshorn*, though formerly obtained only from the horns of different species of deer, are now chiefly prepared from bones. The former of these is water impregnated with a pungent volatile gas called *ammonia*, and a fetid animal oil; it is given in nervous complaints and fainting fits. Salt of hartshorn is chiefly a carbonate of ammonia, but impregnated with animal oil; it is given as a powerful stimulant in various complaints. *Hartshorn shavings* are chiefly employed in the making of *jelly*, which is, of course, very nutritive. *Burnt hartshorn* was formerly employed in medicine as an antacid; but its use is now generally superseded by purified chalk.

The horns of the stag are used by cutlers and other mechanics for the handles of knives, and for cutting instruments of different kinds. The *flesh* of every species of deer has the name of *venison*; that of the young red deer is very delicate eating, that of the female is by no means bad, but that of the full-grown stag has a strong and disagreeable flavour.

These animals generally live in herds that consist of females, with their offspring, headed by one male, and they inhabit the wildest and most unfrequented parts of forests, browsing on grass, and on the leaves and buds of trees. They have a penetrating sight, and an exquisite smell, and are always on their guard against the approach of danger. Their disposition, when unprovoked, is mild and peaceable; but if attacked, they prove extremely formidable opponents. The females produce their offspring (generally one each) about the end of May, or the beginning of June.

781. The FALLOW DEER (*Cervus dama*), is a considerably smaller animal than the stag, generally of a brownish bay colour on the upper parts of the body, sometimes interspersed with brown

spots, and whitish beneath, with branched horns, bent backwards, compressed and broad at their extremity.

The males only are horned. The horns are shed annually. The male of the fallow deer is called buck, the female doe, and the young one fawn.

Common as these animals are in parks throughout every part of England, they are not found wild in this country. They are thought by Cuvier to be indigenous to North Africa, and he regards the species as the *platycerus* of the ancients.

There is no species of food in more general request by epicures and *bon-vivants* than the *venison* of the fallow deer. This, when properly dressed, is an excellent aliment, and easily assimilated to the human fluids; but when half putrid, as is generally the case, it is considered very detrimental to health. The best season for killing the *bucks* for venison is from about the first of July to somewhat later than the middle of September; and that for the *does* is from about the middle of November to the middle of February.

The does produce one, sometimes two, and rarely three young ones each, about the beginning of June; these, for the first year, are called by the park-keepers *fawns*, if during that time they have no horns: the second year, if the young one be a male, it is called a *pricket*; in the third year a *sorel*, and in the ensuing year, a *sore*; when he attains his fifth year he has the name of *buck*, and is accounted fit to be killed; but if he be suffered to live a year or two longer, he will improve both in flesh and fatness. If the young one be a female it is called during the first year a *fawn*, during the second a *teg*, and, after that, it takes its proper name of *doe*. Such does as are intended to be killed in their season are either what have had no fawns in the preceding summer, or have had these killed and taken away.

The *horns* of fallow-deer are used for all the same purposes as those of the stag; and their hides, under the name of *buck-skin* and *doe-skin*, have long been celebrated for their softness and pliability; the manufacturing of them into breeches and gloves affords subsistence to a very numerous and industrious class of people.

Extensive herds of fallow-deer associate together in large parks. These animals are less savage than red deer, yet when offended they often become ferocious. They feed on

several kinds of vegetables, and on the leaves, bark, and young branches of trees; many of which, particularly hollies, are cut down by park-keepers, in the severe weather of winter, for their subsistence. In Greenwich Park, the deer are in the winter occasionally fed with chestnuts.

782. *The ROE, or ROE-BUCK (Cervus capreolus), is a small species of deer, not more than two feet and a half high at the shoulder, of a reddish brown colour; it has short erect horns, divided towards their extremity into two or three points.*

The males only have horns.

Small flocks of these animals are found wild in several of the mountainous districts of Scotland, and also in the mountainous woods of Germany, Switzerland, and other parts of the continent of Europe: a closely allied species is found in North America.

In some countries the *venison* of the roe is esteemed, during the proper season, equal to that of any other species of deer. There is, however, a great difference in it, according to the country in which the animals have fed, and the different races or varieties of the animals themselves. The flesh also of the bucks which have passed their second year is said to be tough and not well flavoured, whilst that of the does, though of a much greater age, is tender. Those animals that are fed in parks, plains, and valleys, are also greatly inferior to such as have resided among mountains.

In America the *skins* of roes are an important object of commerce. They are very light, and are capable, for some time, of resisting the effects of moisture. Of these skins the American Indians make bags or bottles, in which they are able to keep oil, honey, butter, and other similar substances. They are also converted into clothing, and are sometimes dressed as furs, but the hair soon falls off. The *hair* itself is valuable for the stuffing of horse-collars and saddles, and it has the advantage of not becoming knotty like that of the ox. The *horns* are used in making handles for knives and for other purposes.

783. *The CHAMOIS (Antelope rupicapra) is a kind of antelope about the size of a goat, with short, erect, round, and smooth horns, which are hooked backward at the tips.*

Its colour is a dusky yellowish brown on the upper parts of the body, with the cheeks, chin, throat, and belly, yellowish white. The horns, which are common to both the sexes, are generally about eight inches in length, but shorter in the female than the male.

These animals inhabit many of the mountainous parts of Europe, particularly the Alps and Pyrenees.

There are few pursuits more arduous and difficult than the hunting of the chamois. Being wholly confined to rocky and mountainous situations, dogs are nearly useless in it; and such are the sagacity and acuteness of perception of these animals, that they take alarm at the most distant approach of danger; the stratagems which are practised to come within gun-shot of them are almost innumerable. They associate in flocks consisting of from four or five to nearly a hundred in number; and, when alarmed, they are able to spring, at a single leap, up rocks, the perpendicular height of which is more than twenty feet, and in this case, by a few bounds, they throw themselves entirely out of the reach of their pursuers. If hard pressed, they will sometimes turn upon the hunter and attack him with fury: instances have been related of men, thus attacked, having been thrown down precipices and destroyed by them.

The chief objects of this pursuit are the *flesh* and the *skin*. The former is in general a nutritious and wholesome food, and the latter is useful in numerous ways. When dressed with oil it forms a soft, warm, and pliable leather, called *shammy*, and is manufactured into breeches, vests, and gloves, that are very durable, and are much used by the labouring classes of people on the Continent. However, the chief, if not the whole of the shammy leather to be obtained in this country is prepared from sheep skins. The *horns* of the chamois are often cut into heads for canes, and the farriers of the Continent sometimes sharpen and use them for the bleeding of cattle. The *blood* of these animals is in Switzerland a nostrum for the cure of pleurisy and some other complaints.

784. *The COMMON ANTELOPE (Antelope cervicapra) is a quadruped distinguished by having spiral, round, and expanded horns, each marked with a great number of prominent rings; and the body of a brown colour, clouded with whitish and dusky shades and marks.*

It is found in several parts of Africa and India.

One mode of hunting these, and some other species of antelope, is by the hunting leopard and the ounce, but the most frequent mode of killing them is with guns.

Their *skins* are sometimes dressed with the hair on, and sometimes as leather : and the *flesh* constitutes an excellent kind of venison. The *horns* are convertible to nearly all the same purposes as the horns of the different kinds of deer ; and they are also occasionally used as weapons.

There are many species of antelopes found in South Africa, where they congregate often in innumerable flocks. Dr. Smith informs us, that both the colonists and natives, at least the more prudent of them, dry the flesh of the Spring Bok (*Antelope Euchore*) as store against a season of comparative scarcity. The skins of several species are used for cloaks or mantles.

785. The COMMON GOAT (*Capra ægagrus*) is distinguished by having hollow, compressed, and rough horns, which grow first upright, and then bend backward.

Both the male and female are horned.

These animals are found wild in many of the mountainous countries of the European continent, of Africa, Persia, and India.

In many parts of Europe the goat is essentially serviceable to the necessities and the comforts of mankind ; affording even during its life, though fed on the most barren and uncultivated grounds, an abundant supply of milk and cheese.

Goats' *milk* is not only thicker, but has a richer flavour than that of the cow ; and in some situations, especially on ship-board, where the goat thrives better than any other animal, it is peculiarly valuable. This creature eats readily every sort of refuse vegetables, and is kept at little expense. In a medicinal view goats' milk is a useful substitute for that of asses. It is of a very peculiar nature, as its oily and coagulate parts do not separate spontaneously ; they throw up no cream, and yield scarcely any butter. But this milk affords a very large proportion of *cheese*. Hence, in Switzerland and other mountainous countries best adapted to the pasturage of goats, cheese is the chief produce of the dairies.

The flesh of the *goat*, when full grown, is rank, hard, and indigestible ; yet in some countries it is eaten both in a fresh and salted state. That of the kid is peculiarly rich, and by many persons is considered even preferable to

and where the climate and food might not be far different from those of their native country, Asia Minor.

787. The COMMON SHEEP (*Ovis aries*) has in general hollow, compressed, transversely wrinkled, and somewhat crescent-shaped horns; but some of the varieties are entirely destitute of these weapons,

The male is called ram, the female ewe, and the young one has the name of lamb.

Sheep are found in nearly every country of the world.

Fig. 84.



Skull of the Sheep.

The bodies of these animals, in temperate and cold climates, are clad with a curled and closely matted kind of hair, which has the peculiar appellation of *wool*. The distinguishing characteristic of wool is, that when even the coarsest sort is

manufactured into cloth, it thickens in the milling, and forms a close texture, owing to the peculiar roughness of its surface, and to its curly form; whereas the finest possible hair, under the same operation, will neither thicken nor form any texture whatever. It is by the manufacture of wool into various kinds of clothing, that many thousands of people in different countries of Europe, are entirely supported and fed. In temperate countries the fleeces of sheep are shorn or cut off once, and in others, where the climate is warmer, twice in the year, the animals being previously well washed to cleanse the wool. The Shetland sheep, and some others, have the fleece pulled, and not cut off.

When wool is intended to be manufactured into cloth of mixed colours, it is dyed in the fleece before it is spun. When intended for tapestry, it is dyed after it is spun; and when to be wrought into cloth of a uniform colour, it is not dyed until the cloth is made.

Much wool is used in the manufacture of hats. For this purpose it goes through a process called *felting*, to unite or mat it into a firm substance. Felt is either made of wool alone, or of a mixture of wool with camel's or other hair.

The *skins* of sheep, after the processes called tanning and

currying, are manufactured into a thin and coarse, but useful kind of leather, which is much in request by saddlers, bookbinders, and others. These skins, by a different process, are converted into *parchment*, which is used for writing deeds upon. Lambs' skins are made into gloves. During winter sheep-skins are the common dress of the lower class of peasantry in Russia.

Every part of the sheep is advantageous to mankind. The flesh, under the denomination of *mutton*, supplies us with a wholesome and palatable food, which is in greatest estimation when the animals are at least three, and not more than six years old. That of lambs, in the spring of the year, is also in considerable demand. *House lamb* is so denominated from the animals being fattened within doors; but this kind of food is neither so wholesome nor so nutritive as the meat in a natural state. *Suet* is a solid kind of fat which is found in various parts of the bodies (particularly about the kidneys and intestines) of sheep, oxen, and other ruminating animals. Suet is used for culinary and other purposes, and very extensively in the making of candles. The *milk* of sheep is rich and nourishing, and in great esteem among the peasantry of all countries where these animals are bred. It produces an abundance of butter, but this is so unpalatable as seldom to be eaten. It yields a large proportion of strong and tough cheese. Of the entrails of sheep are made the strings generally called *cat-gut*, which are used for different kinds of musical instruments, and for the coverings of whips. Handles of knives, and several other useful articles, are made of the *bones* of sheep; the refuse parts of which are coarsely ground to serve as manure. A very important advantage is in another respect derived from these animals, by folding them upon land on which corn is afterwards to be grown.

There are in Great Britain many different breeds of sheep, some of which are very valuable.

788. Those called LEICESTER SHEEP are chiefly bred in that and the adjacent counties, and are much esteemed for their property of readily fattening. Their *mutton*, when in perfection, has a fineness of grain and a superiority of flavour beyond that of almost every other kind of sheep. These animals are capable of being rendered so fat, that in

some instances they have measured more than six inches deep in solid fat on the ribs.

789. A coarse *wool*, but so long as to measure from ten to more than eighteen inches, is obtained from the breed called LINCOLNSHIRE SHEEP.

790. For united excellence of *wool* and *mutton* the SOUTH DOWN SHEEP are in great demand. This breed, which particularly abounds on the dry and chalky downs of Sussex and other southern parts of England, has of late been dispersed over nearly the whole kingdom. The animals are distinguishable by their grey or speckled face and legs, and being destitute of horns.

791. From the RYELAND or HEREFORDSHIRE SHEEP is obtained a peculiarly short, soft, and fine *wool*, which, if the filaments were of equal thickness and quality throughout, would be as valuable as the best wool that we import from Spain. The *mutton* of these sheep is also fine-grained and of an excellent flavour.

792. A breed of sheep, which is well known in Northumberland by the name of CHEVIOT SHEEP, produces very admirable *mutton*, and *wool* of a fine texture. Of the *milk* of these sheep great quantities of cheese are made, which is sold at a low price. This, when three or four days old, becomes very pungent, and is in considerable esteem for the table.

793. The SHETLAND islands produce sheep so small as seldom to exceed the weight of thirty or forty pounds. Their *wool* is sufficiently soft to be adapted even to clothing of the most delicate texture. A pair of stockings that were made of it were so fine as to be sold for six guineas. The *skins* of these sheep with the fleece on are capable of being converted into a fur of great value; and when the wool is stripped from them they are, as leather, peculiarly estimable for aprons, and are purchased by mechanics for this purpose at double the price of other skins of the same size.

794. It is to the breed called DORSETSHIRE SHEEP that the London markets are principally indebted for the *house-lamb*, which at an early part of the season bears so high a price. After the lambs are produced they are confined in small dark places, and never see the light except when

brought out to be fed by the ewes ; and at the times when thus brought out, their cabins are cleansed and littered with fresh straw, as a great part of their value depends upon the cleanliness in which they are kept.

795. The *mutton* of the HEATH SHEEP, a breed which is found in most of the north-western parts of England, and even as far as the western Highlands of Scotland, is accounted peculiarly excellent ; immense numbers of these sheep are annually sold at the north country fairs. The animals themselves are hardy and active, and well adapted to subsist in heathy and mountainous districts.

796. MERINO SHEEP are a celebrated Spanish breed of sheep, with small horns, white face and legs, small bones, a loose skin hanging from the neck, the wool fine, the external part of the fleece dark brown in consequence of the dust adhering to it, the interior delicate white, and the skin of a rosy hue.

The celebrity of this breed for the production of a remarkably fine *wool*, has been such, that all the finest cloths manufactured in this country, until of late years, were made of Spanish wool. In the year 1787 some of these sheep were first introduced into England ; and although it was formerly a prevailing opinion that the excellence of their fleece depended in a great degree upon the temperature of the Spanish climate, it has been satisfactorily ascertained that the fineness of Spanish wool is not in the slightest degree impaired by breeding the sheep in this country. Even in Hungary sheep of this kind have for many years been so successfully reared, that much of the fine wool used in our clothing counties has been imported thence. The average weight of the Merino fleece is about three pounds and a half. It has lately been a great object of attention in England to improve our own breeds, particularly the Ryeland, by a mixture with Merinos ; this cross breed is said to retain all the principal characteristics of the Spanish race. The *mutton* of these sheep is much in demand, and sells in the market at a higher price than that of most other kinds of sheep.

797. The BROAD-TAILED SHEEP are a very remarkable kind of sheep, distinguished by their tails being extremely large, and so long as sometimes to drag upon the ground.

They are found in several parts of Persia, Syria, Egypt, and

and excellent *cream cheese* is made. In Scotland, *Dunlop cheese* has long been known and celebrated; thus named from *Dunlop*, in Ayrshire, in the neighbourhood of which it is principally made.

Of foreign cheese the most celebrated is *Parmesan*. This is made of ewes' milk, or of a mixture of ewes' or goats' milk with that of the cow. We receive it from various parts of Italy, and also from other countries, although the name would imply that it is made at Parma. In the district of *Gruyere*, a small town in the canton of Friburg in Switzerland, a well known cheese of a large size is made, which goes by that name. *Gouda* cheese is famous in Holland. The common *Dutch cheeses* are of a globular shape, and each three or four pounds in weight. They are prepared in the same manner as Cheshire cheese, with the exception that, instead of rennet, the Dutch use, it is said, sulphuric acid. Hence this kind of cheese has a sharp and saline taste, which is said to exempt it from the depredations of mites. *Green Swiss cheese* has a strong and peculiar flavour, derived from melilot (*Melilotus officinalis*). It is to many persons very disagreeable.

When milk has been suffered to stand a few hours, a substance called *cream* rises to the surface. This is skimmed off for several uses, but principally for the purpose of being made into *butter*, which is usually done by agitating it in a vessel called a churn. In Cheshire it is customary to churn the butter from the whole milk, without its being skimmed, but this is contrary to the practice in most other parts of England. The consumption of butter is so great that not less than 50,000 tons' weight of it are stated to be annually used in London only. That which is principally in esteem there is produced in Essex, and known by the name of *Epping butter*.

To make butter keep for a greater length of time than it would otherwise do, it is salted and packed in small tubs or barrels; in this state, it is a very considerable article of commerce. In the salting and packing of butter many abuses are practised, to increase its bulk and weight, against which there is an express act of parliament. Lumps of good butter are sometimes laid for a little depth, at the top of a barrel, with butter of inferior quality beneath it. Sometimes the butter is packed hollow; and sometimes the

exterior part of the butter is good whilst the whole interior is bad.

After the butter has been separated there remains in the churn a kind of whey which is called *butter-milk*, the quality of which greatly depends on the manner of churning. Before it turns sour, butter-milk is a favourite beverage in the families of some farmers. It is also occasionally used as a wash for the face, being considered a remedy against freckles; but it is principally applied to the feeding of pigs.

The flesh of the oxen we call *beef*. This is usually eaten while fresh, but it is also, particularly in the northern parts of England, Ireland, and Holland, salted; and in this state it is a considerable article of trade. Beef affords a strong and invigorating nutriment, superior to any other that we are acquainted with.

Meat roasted with the skin on it is as superior to common beef, as venison is to mutton. Darwin partook of it at the Falkland islands, and tells us so—he observes, “a large circular piece taken from the back, is roasted on the embers with the hide downwards and in the form of a saucer, so that none of the gravy is lost. If any worthy alderman had supped with us that evening, ‘Carne con cuero,’ without doubt, would soon have been celebrated in London.”

Beef-tea, a decoction of the lean parts of beef in water, is a very useful and valuable liquor in many complaints. *Veal*, or the flesh of calves, is a highly esteemed and delicate food.

The *skins* of cattle, after they have undergone the processes of tanning and currying, are employed for making harness, saddles, bridles, the soles of shoes, and for various other purposes. *Calves' skins* are used for the upper leathers of shoes, and by saddlers, book-binders, &c. The skins of sucking calves are manufactured into *vellum*, a thin substance, which is employed by book-binders; also for writing and drawing upon, and for other uses. From the parings and other offal of the hides of oxen, and the parings and scraps of the legs, by boiling them in water is made *glue*. This, in a state of jelly, is poured into flat frames or moulds; when congealed it is cut into square pieces, and

afterwards dried by being suspended on a coarse kind of netting.

The leg *bones* of oxen, after having been whitened by boiling them with quick-lime, are used in the manufacture of the handles of knives and forks, and for innumerable other purposes. This substance, when good, is nearly allied to ivory; but is easily distinguished by its porous nature, its coarse grain, and its wanting the beautiful white veins which are so conspicuous in ivory. Bones, after having been burnt, are used by the refiners of gold and silver.

The *horns* of oxen are used for many of the same purposes as bone. After having been softened by heat they are capable of being moulded into almost any shape. They are sometimes stained to imitate tortoiseshell, and they are then used for the making of combs. By a peculiar process they are rendered semi-transparent, and when formed into thin plates, are employed instead of glass for lanthorns. Horn was the first transparent substance that was ever used for lanthorns and windows.

Tallow is the fat of sheep and oxen, cleared of its fibrous parts by melting, straining, and other management. It is further improved and clarified by the addition of alum, and in this state is used for the making of candles. Tallow is also a chief ingredient in soap. From the feet of oxen is procured *Neats'-foot oil*, of great use in the preparing and softening of leather. The *blood* is employed in the clarifying of sugar; great quantities of it, during the late war, were exported from London to Sweden for this purpose. The skins of the intestines are used for beating gold into leaf; these, under the name of *gold-beaters' skin*, are sometimes used as adhesive plaisters for healing small wounds. Of gold-beaters' skin the French manufacturers of toys sometimes construct little balloons for the amusement of children. A few years ago, there was in London an exhibition of animals formed of this substance and inflated with air.

799. British cattle are considered preferable to the cattle of any other country in the world. Those called DEVONSHIRE CATTLE, which are distinguished by their mahogany colour and light yellow horns, are adjudged to be the best

of any. They are much used in agricultural labours, being peculiarly fitted for draught both by their hardness and activity. The *beef* of this breed is particularly excellent. Their *skins* are thin, but improve much in tanning; the *tallow* is of a peculiarly good quality.

800. In the northern parts of England there is a very useful kind called *HOLDERNESS*, or *DUTCH CATTLE*. These in size and weight exceed all the British cattle. The cows have great celebrity for yielding a very extraordinary quantity of *milk*; instances have been mentioned of their yielding thirty-six quarts in a day. This stock is well known in the neighbourhood of the metropolis, being that which is generally kept by the London cow-keepers. The "wonderful ox," exhibited in London in 1802, was a variety produced from this breed, and weighed more than two hundred stone.

801. The *LANCASHIRE*, or *LONG-HORNED CATTLE*, are much esteemed for the dairy. The cows yield from sixteen to twenty-four quarts of *milk* per day; and on an average about three hundred weight of cheese per annum. They are hardy animals, readily become fat, and produce remarkably well-flavoured *beef*. But they are chiefly celebrated for the thickness and substance of their hides, which are very valuable, and sell at high prices. In many instances the *hides* have been known to produce a greater price per pound than the *beef*.

802. *ALDERNEY CATTLE* are a favourite breed that have long been known and esteemed, in the southern counties of England, for their *milk*, which is richer than that of any other breed. These animals are of a small size, the cows seldom exceeding the height of four feet; yet they are known to produce so much milk as to yield from two to more than three hundred pounds' weight of butter per annum. In the islands of Guernsey, Jersey, and Alderney, where these cattle are chiefly bred, they are sometimes employed in ploughing; but their greatest use is in carting; in this respect they are found to answer peculiarly well in bad roads and hilly countries. Their *beef* is generally yellow or very high coloured; but it is peculiarly fine in the grain, and of an excellent flavour.

803. Scotland is famous for the **HIGHLAND STOTS**, or **KYLOE CATTLE**; they are small in size, with fine white upright horns tipped with black. Having great celebrity for the fineness and sweetness of their *beef*, as well as the facility with which they are fattened, they are in such esteem as to be driven into the southern counties of England, and occasionally to supply even the London markets. The cows, in proportion to their size, yield a great quantity of rich milk.

804. *The AMERICAN BISON (Bos Americanus) is a large species of ox, with round and distant horns, which point outward, a long and woolly mane, and a large fleshy protuberance on the shoulders.*

The "Buffalo," or Bison, of North America, an animal once spread over the whole country from the Rocky Mountains to the Atlantic, is now confined to the Prairies of the West. These large animals are gregarious, but not migratory. At particular seasons several thousands may be seen together. There are, according to Catlin, more than three hundred thousand Indians who subsist on the flesh of the buffalo, and by these animals are supplied with all the luxuries of life which they desire, as they know of none others. The great variety of uses to which they convert the body and other parts of this animal, are almost incredible to the person who has not actually dwelt amongst these people, and closely studied their modes and customs. Every part of their flesh is converted into food, in one shape or another, and on it they entirely subsist. The robes of the animals are worn by the Indians instead of blankets; their skins, when tanned, are used as coverings for their lodgings, and for their beds; undressed they are used for constructing canoes, for saddles, for bridles, l'arrets, lassos, and thongs. The horns are shaped into ladles and spoons; the brains are used for dressing the skins; their bones are used for saddle-trees, for war-clubs, and scrapers for grain-ing the robes, and others are broken up for the marrow fat which is contained in them. Their sinews are used for strings and backs to their bows, for thread to string their beads and sew their dresses. The feet of the animals are boiled with their hoofs for the glue they contain, for fastening their arrow-points, and many other uses. The hair

from the head and shoulders, which is long, is twisted and braided into halters, and the tail is used for a fly-brush."—*Catlin's Letters and Notes on the North American Indians*, vol. ii.

805. The *BUFFALO* (*Bos bubalus*) is a species of ox, which has large horns of a compressed form, with the outer edge sharp, growing straight for a considerable length from their base, and then bent slightly upward; on the shoulders there is a bony protuberance. The general colour of the hair is black or dusky.

In a wild state these animals are natives of Asia and Africa; they are domesticated in India, and in some of the warmer parts of Europe.

Although the buffalo is naturally a savage and ferocious beast, yet, when properly trained, it is very serviceable to mankind. These animals are used both for draught and burthen, and are sometimes even trained for the saddle. They are guided by a cord attached to a ring, which is made to pass through the cartilage of the nose. Two buffaloes, harnessed to a carriage, are considered able to draw as much as four horses.

The *milk* of the buffalo, though not so good as that of the cow, is in greater quantity, and in much esteem. *Ghee*, a kind of butter made from the milk of these animals, and clarified, is an article of commerce in various parts of India, and is generally conveyed in bags or bottles, made of the hide, each of which holds from ten to forty gallons. The *flesh* is said somewhat to resemble beef, but to be of a darker colour: that of the calves is considered peculiarly delicate. Of the *skin* is made a strong and durable leather, which, under the name of *buff* leather, is applicable to a great variety of uses. The *horns* have a fine grain, are strong, and bear a good polish; and are, therefore, much used by cutlers and other artificers. They are occasionally imported into this country from Bengal.

These animals usually associate in large herds, in marshy and woody plains. So great is their ferocity, that the hunters are at all times fearful of attempting to kill them, unless they are perfectly sure of their aim. They swim over even the widest rivers with a facility which can be equalled by few quadrupeds.

806. The *YAK*, or *GRUNTING OX* (*Bos grunniens*), is an

animal of a large size, with round, upright, and slender horns, a lump on the shoulders, long and pendent hair, white on the back and tail; and the tail somewhat resembling that of a horse.

In a wild state this animal is an inhabitant of the mountains of Thibet.

With the oriental princes the white *tails* of the yak are of great value for military standards; the use of them is very ancient. These tails are also employed, in many parts of the East, to ornament the trappings both of elephants and horses; when mounted on a silver handle, they are used by the principal men of India as a brush to chase away flies. The Chinese dye the hair of a red colour, and form tufts for their caps of it. Many beautiful kinds of stuffs are woven of a fine wool which these animals have next to their skin.

807. *The CAPE BUFFALO (Bos Cafer) is an excessively strong and ferocious beast of the ox tribe, which has thick horns that are rugged at the base, and lie so flat as to cover almost all the top of the head.*

These animals are found in herds of a hundred and fifty or two hundred together, in the plains of Caffraria, and other parts of the south of Africa.

There are no animals of the ox tribe so savage, so much dreaded, nor so wantonly mischievous as these: they attack and destroy mankind without being themselves previously assailed, and commit devastations of the most alarming kind in the neighbourhood of the places where they are found. They are killed on account of their *flesh*, which is lean, but juicy and of a high flavour; and also on account of their *hides*, which are so thick and tough that even musket-proof targets are formed of them. Of these hides also the strongest and best thongs for harness are made. The Hottentots, who are never inclined to take much trouble in dressing their victuals, cut the *flesh* off into slices, and then smoke, and at the same time half broil, it over a few coals. They also frequently eat it in a state of absolute putrefaction.

808. *The MUSK OX (Ovibos moschatus) is a North American animal of a small size, with horns broad, and approaching each other at the base, bent downward, and the tips upward and pointed; a protuberance on the shoulder; the body covered with long silky hair of a dusky red tinge.*

To the North American Indians the musk ox is an animal

of considerable importance. Its *flesh* furnishes them with a useful food, which, though it has a musky flavour, is not on that account the less esteemed. This flesh, in a frozen state, is also an article of traffic with the British and American forts during winter.

At the roots of the long hair of the musk ox there is a peculiarly beautiful ash-coloured *fleece*, which is finer and softer than silk, and may be wrought into very elegant articles of dress. It is of the long hair of these animals that the Esquimaux Indians make those caps which give them their very extraordinary appearance, by the ends being contrived so to fall down over their face, as to protect them from the bites of musquitos. The *skins* are convertible into leather, and are also frequently used, by the Indians, with the hair on, as coverings of various kinds.

ORDER XI.—CETACEA, or Whale Tribe.

These are mammalia without hind legs, which have outwardly quite the appearance of fishes, excepting that the tail fin in the latter is vertical in place of horizontal, as it is in the cetacea. The neck is very short and thick; the anterior extremities have their terminal bones enveloped in a tendinous membrane, which reduces their use to that of true fins. These animals always live in water, but as they breathe by means of lungs, they are obliged frequently to return to the surface to take a supply of air. Their warm blood, externally open ears (although the apertures be very small), their viviparous generation, the nipples and secretion of milk, and all the details of their anatomy, sufficiently distinguish them from fish, with which class they were confounded by the older naturalists.

At the beginning of the order, Cuvier places the *Herbivorous Cetacea*, which have teeth with a flat crown, and frequently leave the water to graze on the shore. They have two pectoral mammæ, and vibrissæ above their mouth, two circumstances which, if they be viewed from a distance, when rising vertically out of the water, give them some resemblance to men or women, and may be the innocent occasion of the accounts of some old travellers, who say they have seen

tritons and sirens. Here come the Sea Cow (Manatus) and Dugong (Halichore Dugong).

Next to these come the Cetacea, examples of which we now proceed to give. They are distinguished from the other section by having *blowers* in the head, those apertures through which the jets of water are driven, which so often mark them out to man.

809 *The COMMON, or TRUE DOLPHIN* (Delphinus delphis), is nine or ten feet in length, with a row of large teeth in each jaw, and a single orifice near the top of the head; an oblong and roundish body, a fin on the back, and the snout narrow and pointed, having a broad transverse band or projection of the skin on its upper part. The body is black, with a bluish tinge above, and white below.

Dolphins are found in nearly every part of the ocean.

Few animals have had greater celebrity than these. Their activity in playing about near the surface of the ocean, their undulating motion, and the evolutions and gambols of whole shoals of them together, occasionally afford to mariners and others a very entertaining spectacle. By the ancient Greeks and Romans dolphins were supposed to entertain a kind of friendship towards mankind, and were consecrated to the gods. In cases of shipwreck they were believed to be in waiting to rescue and carry on shore the unfortunate mariners. Pliny was credulous enough to believe that dolphins had been rendered so tame as to allow of persons mounting on their backs, and being carried in safety over a considerable space of sea. As these animals, in their progress through the water, often assume a crooked form, in order to spring forward with the greater force, both ancient and modern artists have depicted the dolphin with its back curved.

The *flesh* of the dolphin is hard and insipid, yet it was formerly in repute as food even in this country. We are informed by Dr. Caius, that a dolphin which was caught in his time, at Shoreham, in Sussex, was sent to the Duke of Norfolk, who had part of it roasted and served up at table with a sauce made of the crumbs of white bread mixed with vinegar and sugar. The *tongue* of the dolphin is said to be very agreeable to the taste, and to be delicate eating. The *fat*, which, as in other cetaceous animals, lies for the most

part immediately beneath the skin, is not in great abundance.

It is to be remarked that scamen give the name of dolphin to another kind of animal, the DORADO (*Coryphæna hippuris*). The latter, however, is a genuine fish, and not, like the present, a warm-blooded and mammiferous animal.

810. The PORPOISE (*Phocæna vulgaris*) is from four to five feet in length, with a somewhat conical body, a row of pointed teeth in each jaw, a single spiracle near the top of the head, a broad fin about the middle of the back, and a short and bluntish muzzle.

Its colour is bluish black above, and white beneath; the skin is bright, smooth, and soft to the touch.

These animals are found in the Baltic Sea, near the coasts of Greenland and Labrador, in all parts of the Atlantic, and even in the Pacific Ocean, and are plentiful around our own coasts and at the mouths of our large rivers.

In most of their habits the porpoises have a near resemblance to the dolphin, but they are not so active. They generally associate in troops of from six or seven to thirty and upwards in number, and feed on fish of all kinds, but particularly on such as swim in large shoals, as mackarel, herrings, the different species of the cod, and salmon, of which they are great destroyers. The writer of this saw a large porpoise once dissected, which contained the bones of five salmon in the stomach.

In proportion to the size of their body, porpoises yield a great quantity of excellent oil: but from the difficulty there is in catching them in sufficient number to repay the labour, they are seldom thought worth pursuing. The flesh, as well as that of the dolphin, was formerly in great estimation in England. Among the provisions for the celebrated in-thronization feast of George Neville, Archbishop of York, in the reign of Edward IV., are enumerated no fewer than twelve porpoises and seals. These animals, however, are now entirely neglected with us as food; yet the inhabitants of Greenland and Lapland consider the flesh of the porpoise as highly excellent. It is similar in appearance to pork, but redder. The former even eat the fat, the entrails, and the skin; but they seldom cook the flesh till its hardness is destroyed by long keeping. The Americans use the skins (dressed in a peculiar manner) for making waistcoats and

breeches ; they also form them into an excellent covering for carriages. When porpoises enter our rivers, it is generally in pursuit of salmon ; at such times our fishermen often pursue and destroy them.

811. *The NARHWAL, or SEA UNICORN (Monodon monoceros), is from twenty to thirty feet in length, with a long, tapering, twisted, and pointed weapon of ivory in front of the head.*

It has a small fin on each side of the breast, in place of fore feet, a horizontally flattened tail, and a spiracle or breathing hole on the highest part of the head. The skin is white, variegated with numerous black spots on the upper parts of the body. The weapon is generally from five to eight feet in length.

These animals are found in the Greenland seas, and occasionally migrate southward off the British coasts. Their name of narhwal signifies a whale that subsists on dead bodies, nar, in Islandic, meaning carcass.

The Greenlanders pursue the narhwals as they do other whales, chiefly on account of the *oil* which they obtain from them. This is considered superior in many respects to the oil of the great whale, and is used by them both with food and to burn in their lamps. These people also eat the *flesh* of the narhwal prepared by fire, dried in a half putrid state, and sometimes even raw ; and they are also partial to the *intestines* as food. The *tendons* serve them as a strong kind of thread. The projecting *weapon*, which is not a horn, but a species of tusk, sometimes ten feet long, in its substance not much unlike the tusk of an elephant, is sometimes cut into the heads of arrows ; and in some parts of Greenland, where wood is scarce, these weapons are occasionally used in the structure of tents and sledges. As ivory they are not of much use, since, from their twisted form, they cut to great disadvantage. The kings of Denmark have in the castle of Rosenberg a throne formed of the tusks of the narhwal.

It has of late years been ascertained that the Japanese have a very extraordinary opinion of the medical virtues of these tusks. A Dutch merchant, on his return to Europe, happened, among other curiosities, to transmit one of them to a friend in Japan, who by the sale of it became extremely rich. From that time the Dutch wrote to their correspondents in Europe for as many as could be sent, and great profit was made of them ; and although by the continued

importation the price has since been considerably diminished, it still continues very high.

Narwhals are quick, active, and inoffensive animals. They swim with considerable velocity. When harpooned they dive in the same manner as the whale, but not so deep. They generally descend about two hundred fathoms, after which they return to the surface, where they are dispatched in a few minutes with a lance.

812. *The BLUNT-HEADED CACHALOT, or SPERMACETI WHALE* (*Physeter catodon*), is a marine animal from sixty to seventy feet in length, with large teeth in the under jaw, which fit into corresponding sockets of the upper jaw; the orifice of the spiracle single, and at the upper part of the extremity of the muzzle; and without any fin upon the back. Three varieties.

The head occupies about one-third of the length of the whole body. The colour of this whale is generally black, but in the old animals the under parts become whitish. The skin is smooth, oily, and almost as soft to the touch as silk.

It is frequently seen in the northern ocean, in the latitudes of Greenland, Spitzbergen, and Iceland; yet it is occasionally observed off the British coasts, and sometimes even in the Mediterranean, but it is most commonly obtained in the seas south of the tropic of Capricorn.

Fig. 85.



Spermaceti Whale.

Lucrative as the several parts of these animals are, the whale-fishers have a great dread of them, in consequence of their astonishing activity in the water. Much care is re-

quisite. in striking the harpoon, to keep the boats out of danger of being overturned, and great dexterity in following their track. From the relation given by the Danish voyagers Olafsen and Povelsen, it would appear that the spermaceti whales become occasionally so ferocious as even to seize the fishing boats with their teeth, and in an instant to destroy the whole crew. Notwithstanding all these dangers, so highly valued are they that they are searched for with much assiduity; and happy are the owners of those vessels which can obtain the greatest number of them.

The *oil* that is obtained from them is not in great quantity, but is of excellent quality. In burning it yields a bright flame, without exhaling any noxious smell.

The particular formation of the head affords room for that remarkable deposit *spermaceti*, which is contained between two rising plates composed of the front, temporal, and occipital bones. The space between these plates is divided into two parts, which, from their vast size, have been compared to caverns. This peculiar secretion has been ignorantly mistaken for the *brain*, the place of which it apparently occupies, that organ being very small, and situated far back in the head. A spermaceti whale was taken at Whitstable in Kent on the 15th of February, 1829. Its length was sixty-three feet, its circumference thirty-six feet. The head of this whale was, as it were, tapped by driving a bar of wood into it, and the spermaceti flowed out in a full stream. This substance is also diffused through various parts of the body, in a chain of membranous sacs, which communicate with each other like the air-cells of birds; it is also mingled, in small quantity, with the general oil of the blubber¹. *Spermaceti*, now called in the *Phar. Lond.* CETACEUM, is obtained, therefore, chiefly from the head of this animal, and is called by the dealers in it *Head-matter*; as stated, it is in a fluid state when taken from the head, but it concretes, when cold, into a yellowish white, greasy, and somewhat flaky substance, and, separated by pressure from the oil with which it is mixed, and afterwards purified by being boiled with an alkaline ley, it becomes the crystalline solid known as spermaceti². It is

¹ For a more particular account of refining spermaceti, see JENNINGS' Family Cyclopædia, article SPERMACETI.

² Mag. Nat. Hist., Vol. II. p. 200.

not of much value as a medicine; but it makes beautiful candles. Good spermaceti is in fine white flakes, glossy, and semitransparent; soft and unctuous to the touch, yet dry and easily friable, in taste somewhat like butter, and of a faint smell. If exposed to the air, it soon becomes rancid and yellow. Its quality and colour may, however, be recovered by steeping it in alkaline liquors, or in a sufficient quantity of spirit of wine.

The *flesh* of this kind of whale is of a pale red colour, appears not much unlike coarse pork, and is not unpalatable as food. The *skin*, *intestines*, and *tendons*, are all useful to the inhabitants of the northern countries of Europe. The *tongue* is considered excellent eating. The *teeth* are formed

Fig. 86.



Lower jaw of spermaceti whale.

into the heads of spears and arrows, and may even be used as ivory; the *bones* are sometimes applied as timber for tents and

cottages; and a very tenacious glue or size is manufactured from the *fibres of the flesh*.

It is to these, and some other animals nearly allied to them, that we are indebted for the perfume called *ambergris*. This is generally found in the stomach, but sometimes in the intestines, and in lumps from three to twelve inches in thickness, mixed with many substances very different from itself. As we see it in the shops, ambergris is an opaque substance, which varies in solidity, according to its exposure to a warm or cold atmosphere. It is, however, in general, sufficiently hard to be broken. Its smell is extremely powerful, and agreeable to some persons, but unpleasant and even nauseous to others. When first taken from the stomach or intestines of the animals which produce it, ambergris is quite soft to the touch; and, as may well be conjectured from the situation in which it is found, has a fetid and most disgusting smell; but after it has, for some time, been exposed to the influence of the atmosphere, it becomes harder, and yields the powerful and peculiar odour by which it is characterized.

Oil, spermaceti, and ambergris, are supposed to be yielded in greater or less quantity from every species of cachalot.

Mr. Beale has published an admirable account of the cachalot; it is from his work that our figure is copied.

813. The GREAT or GREENLAND WHALE (*Balaena mysticetus*), is a marine animal of immense magnitude, measuring from fifty to seventy feet or more in length, of which the head is nearly one-third, and having several horny blades in the upper jaw, and a spiracle or breathing hole on the upper part of the head.

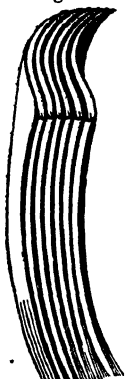
The bulk of these animals is such, that their greatest circumference is nearly equal to their length; and their weight has been known to exceed 400,000 pounds. The mouth is of an enormous size, extending as far back as to the eyes; the tongue is sometimes eighteen or twenty feet in length, and nine or ten feet in width. Notwithstanding this, the gullet, or passage of the throat, is seldom more than four or five inches across. The eyes are situated a little above the corners of the mouth, and are scarcely larger than those of an ox; the external openings of the ears, which are merely auditory holes, is likewise very small. There is a large fin on each side of the breast, and the horizontally flattened tail-fin is equal to about one-sixth part of the length of the animal. On the back there is neither fin nor protuberance. The skin is very thick and strong, entirely destitute of hair, and always covered with an oily substance which issues through the pores, and which, when exposed to the rays of the sun, makes the surface appear as resplendent as that of polished metal. Whales vary much in colour; some being entirely black, others reddish, or black above and white beneath, and others variously mottled with black or brown and white.

The great whales are inhabitants of the ocean, and found chiefly in the Greenland and other seas, near the Arctic Pole; they, however, sometimes migrate so far south as to be seen in the neighbourhood of the British shores.

The animals of the whale tribe are of great use to mankind in a commercial view. They are pursued by the inhabitants of nearly all the maritime countries of Europe, and to us are not merely a source of profit, but from the whale fishery requiring many ships, are the means of training a great number of seamen. To this fishery it is that we are indebted for those two valuable articles—*whale* or *train oil*, and *whalebone*.

The fat of all the whales has the name of *blubber*, and is principally found beneath the skin, to the depth of ten or twelve inches. Its use to the animals appears to be for the double purpose of poisoning their bodies, and keeping off the immediate contact of the water from the flesh, the continued cold of which, in the frozen climates of the north,

Fig. 87.



would tend to chill the blood. The *whalebone* (Fig. 87) supplies, in these animals, the place of teeth, for catching and securing their food. It is attached to the upper jaw, and is arranged in thin plates or blades, sometimes nearly seven hundred in number, and parallel to each other on both sides of the mouth. The largest blades measure from ten to fifteen feet in length, and twelve or fifteen inches in width; they all terminate in a kind of fringe of considerable length, which has the appearance of the blades split into innumerable small fibres. A large whale sometimes yields a ton and a half of whalebone.

The number of ships employed in the whale fishery is very great: but in consequence of the incessant pursuit of these animals for the last two centuries, their numbers have been greatly diminished. One of the most fortunate years that ever was known was 1697, when the following ships entered the bay of Greenland:

15 from Bremen, which had taken.....	190
50 from Hamburgh	515
121 from Holland	1252

Total number of whales taken.... 1957

The year 1814 was a singularly prosperous one to the British whale fishery; seventy-six ships, fitted out from different ports of this country, obtained 1,437 whales, besides seals, &c. -The British ships, during four years, ending with 1817, returned with 5,030 whales, which produced 54,508 tuns of oil, and 2,697 tons of whalebone.

The season for the whale-fishery commences in May, and continues through the months of June and July; but the ships must come away before the end of August, otherwise they might be blocked up and destroyed by the ice.

Every ship sent out from this country carries along with it six or seven boats, each of which has one harpooner, one man at the rudder, one man to manage the line, and four men as rowers. In each boat there are also two or three har-

poons, several spears, and about six lines, each 120 fathoms in length, fastened together. As soon as the men in the boats discover a whale, swimming near the surface of the water, they approach to the spot, and strike a harpoon deeply into his body. To this instrument the line is attached; and on the whale plunging into the water, this line is allowed to run out, great care being taken not only to prevent it from catching, lest the animal should overset the boat, but also (by continually wetting the place against which it runs) to prevent its rapid motion from setting fire to the wood. After a while the wounded animal is obliged to return to the surface to breathe. His direction is followed, and his re-appearance carefully marked. With great dexterity fresh wounds are inflicted, till, at length, he appears exhausted, when a long spear is thrust into his intestines, which soon destroys him. The whale is then dragged to the ship, and securely fastened to the side by ropes attached to the fins and tail. The blubber is cut out, in large square pieces, by men who get upon the animal, having their shoes armed with a kind of iron spurs to prevent their slipping. As soon as the blubber is taken on board the vessel, it is divided into smaller pieces, and thrown into the hold to drain.

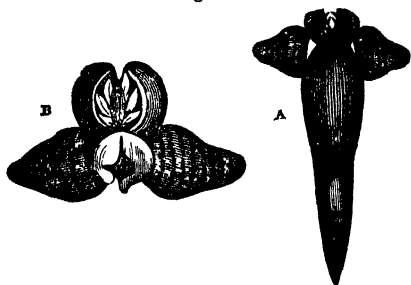
The next operation is to extract the whalebone. This is done entire, along with the gums, which are hoisted on deck, where the blades are cut and separated, and left until the men have leisure to scrape and clear them. The *tongue* consists of a soft and spongy fat substance, which, when boiled down, yields five or six barrels of oil; the oil that is drained from the two upper jaw-bones is the peculiar perquisite of the captain. As an encouragement to the whale fishery, a bounty of twenty shillings is allowed by government for every ton of blubber which is imported into this country.

The inhabitants of Greenland, and of other northern countries of the world, eat almost every part of the whale. The *skin*, the *tail*, the *fins*, are sometimes eaten even raw. The *flesh* is eaten both fresh and dried. That of the young animals is of a red colour; and, when cleared of fat, broiled, and seasoned with pepper and salt, is said to eat not unlike coarse beef. That of an old whale appears black, and is exceedingly coarse and unpalatable. The Esquimaux,

however, eat both the flesh and fat of the whale, and drink the oil with greediness. Indeed, some of the tribes carry, in their canoes, bladders filled with whale oil, which they use in the same way, and with a similar relish, that a British sailor does a dram. They also eat the *skin* of the whale raw. It is not unusual for female Esquimaux, when they visit whale ships, to select for eating, pieces of skin to which a portion of blubber is attached. They also give it for food to the infants suspended at their backs, who suck it with great apparent delight. The *heart* of a young whale which was caught in the year 1793, and measured fifteen feet in length, is said by Captain Colnett to have afforded a delicious repast to his ship's crew. Of the *intestines* of the whale the Greenlanders prepare a substance which serves instead of glass for their windows. They make fishing-lines of the *filaments* which terminate the blades of whalebone; and in many countries, the ribs and other large *bones* supply the place of timber, in the construction of houses, and as fences to surround gardens and fields. The smaller bones are converted into harpoons and spears. The *tendons* are split into filaments, and used as cordage, and for nets of various kinds. With the Esquimaux some of the membranes of the abdomen are used for an upper article of clothing; and the thinnest and most transparent of them are adopted, instead of glass, in the windows of their huts. The *blubber* of the whale, when pickled and boiled, is said to be very palatable; and the *tail*, when parboiled and fried, is often used in the Greenland ships as food. The blubber, when in a fresh state, is destitute of any unpleasant smell: indeed it is not until the termination of the voyage, when the cargo is unstowed, that a Greenland ship becomes disagreeable. The use of the *whalebone* in our own country is well known; but since ladies have left off wearing much of it in their stays, it is comparatively in little demand. By a late invention it is manufactured into hats, bonnets, and brushes.

Whales are sometimes seen in troops sporting about near the surface of the ocean. They spout water through the spiracles on the top of their heads, with the rushing noise of a cataract, and to the height even of thirty or forty feet. Such are their powers in the water, that in some instances their motion through that element has been calculated at

Fig. 88.



Clia borealis, a principal food of the whale. They feed only on the smaller kinds of fish and other marine animals, especially the *Clia borealis* (Fig. 88), according to Scoresby, as their throat is not sufficiently wide to admit of their swallowing any substance of a large size, and they are not furnished with teeth to divide their food. The female produces only one young at a time: this she suckles for many months, and is peculiarly affectionate and attentive towards it.

These animals are occasionally stranded on the British shores, in which case, by the ancient laws of the land, they are deemed royal fish; the king being entitled to the anterior, and the queen to the posterior half.

A skeleton of this species was exhibited in London. It was found dead, floating in the sea near Ostend, in Nov. 1827. It had been exhibited there, and also at Paris, where *Cuvier* and other naturalists estimated that it had lived from 900 to 1,000 years; one proof of its great age being in the ossified cartilages of the hands or side fins. The weight of this animal when found was 480,000 lbs.; the oil obtained from the blubber was 40,000 lbs.; its total length ninety-five feet; its breadth eighteen feet; length of the head twenty-two feet; width of the tail twenty-two feet and a half. The upper jaw contained 800 pieces of *baleen* or whalebone.

The best account of the whale yet published is that in Scoresby's Arctic Regions.

814. *The FIN-BACKED WHALE, or FIN-FISH* (*Balænoptera physalus*), is from sixty to ninety feet in length, with a thick fin on the hinder part of the back, the muzzle tapering, and the jaws somewhat pointed.

This species is of a more slender form than the last, its greatest circumference in general not exceeding fifteen or twenty feet. The spiracle or breathing hole is double, and situated on the middle of the fore part of the head; the colour of the body is generally dark or blackish olive above, and white below. The whole surface appears polished and shining.

These whales are chiefly found in the northern Frozen Ocean, and particularly about the coast of Greenland and Spitzbergen. But they sometimes enter the Mediterranean, and are not uncommon in the South American and Indian seas.

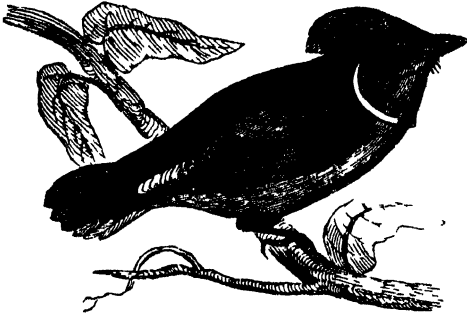
Although a smaller proportion of *oil* is obtained from these than from the great whales, it is of much better quality than that. The inhabitants of Greenland consume it with their food, preferably to burning it in lamps, if oil of less value can be obtained for that purpose. The *whalebone* is too short and narrow to be of much value. From the small quantity of oil, and little value of the whalebone, added to the difficulty and danger which are attendant on the pursuit of these active and powerful animals, they are not very eagerly sought after by the whale-fishers.

We are assured that the *flesh* of the fin-backed whale is as well tasted, and in every respect as excellent as that of the sturgeon. In most of the northern countries, both of Europe and America, the *fins*, the *skin*, and the *tendons*, all serve for many useful purposes.

There are other species of these whales which are useful, in a certain degree to mankind, but few of them are objects of pursuit, on account of the difficulty there is in killing them, or of the very inferior quantity of oil which they afford. The blades of their whalebone are also too small to be of any use as an object of commerce.

Class II.

BIRDS (AVES).

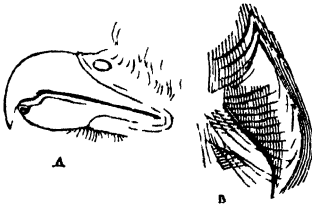


Himalayan lunated Broadbill.
(SIALLOPHUS LUNATUS.)

ORDER I.—ACCIPITRES, or Birds of Prey.

The Birds of this order are distinguished by their hooked beak and claws, powerful weapons, by means of which they overcome other birds, and even feeble quadrupeds and reptiles. They are to this class what the Carnivora are in the class Mammalia. The muscles of their legs show the strength of their talons; they have all four toes, the claws of the hind and innermost toes are the most powerful.

Fig. 89.



A, Beak of a diurnal Bird of Prey.
B, Beak of a nocturnal ditto.

They are divided into two families, the *diurnal* and *nocturnal birds of prey*.

The Diurnal Birds of Prey (Fig. 89 A) have the eyes directed sideways, and have a membrane (*cere*) at the base of the beak, in which the nostrils are placed.

815. *The AQUILINE or EGYPTIAN VULTURE* (*Neophron percnopterus*) is a large bird of prey, which has a naked head and neck; a black and hooked beak, yellow at the base; the quill feathers of the wings, except the first two, are black, edged with hoary.

The male is of a dirty white colour, and the female brown, with the above exception of the quill feathers.

Immense flocks of *aquiline vultures* are observable near all the principal towns of *Egypt, Syria, and Persia.*

Filthy and disgusting as these birds are, not only in their appearance but in all their habits, they are of almost indispensable utility to mankind in those countries where they are found. They may be considered the scavengers of hot climates. In conjunction with other animals of similar appetites and propensities, they clear away, by devouring them, all the remains of animal substances which otherwise would be left to putrefy, and would infect the air with the most noxious effluvia. They are consequently protected and encouraged by mankind. The ancient Egyptians held them in such veneration as to punish with death any person who destroyed them. In consequence of this protection, they have become fearless of mankind, and even in the streets of the most populous towns of Egypt, feed with the greatest familiarity; they are there named *Pharaoh's Chickens.*

These vultures devour also the eggs and young of the crocodiles, and destroy myriads of rats and mice, as well as reptiles of every description, which abound among the mud, and in all the grounds that are fertilized by the overflowing of the Nile.

816. *The CARRION VULTURE, or TURKEY BUZZARD* (*Cathartes aura*), is an American bird, about four feet and a half high, with a small head covered with a red skin, the bill hooked and white; the plumage is dusky, except the quill feathers, which are black.

In America these birds are protected for the same services as are performed by the *aquiline vulture* in Africa and Asia. They not only devour the filth of the towns and villages, but also destroy in great numbers the eggs of alligators, which animals otherwise would become intolerable by their prodigious increase. The vultures watch the females in the act of depositing their eggs in the sand, and as

soon as they retire into the water, dart to the spot and feed upon their contents.

817. The *CINEREOUS EAGLE* (*Aquila albicilla*) is about the size of a turkey, of a cinereous brown colour, with a white tail, the quill feathers white, the middle ones tipped with black ; the base of the bill and the feet are yellow.

This bird is found in England, and in nearly every other country of Europe.

The flesh of the cinereous eagle is eaten in Greenland, and is said not to be of a bad flavour. The skins, sewed together, are used as under garments, and are also frequently employed as beds. The beak and claws are employed as amulets or charms, and are considered efficacious for the cure of various complaints. The Greenlanders either kill these birds with arrows, or catch them in snares laid in the snow, and baited with flesh.

The cinereous eagles feed on dead animals of every description, as well as on fish, young seals, and several kinds of birds.

818. The *FALCON* (*Falco*). A genus of birds, many of which were in great repute in *falconry* ; a sport which, some centuries ago, was pursued in all the principal courts of Europe, and anterior to that by the ancient Greeks and Romans. The estimation in which this sport was held may well be supposed when it is stated, that, at one period, scarcely any person of rank appeared abroad without a hawk on his hand ; and that in old paintings this representation is considered even a criterion of nobility. The English laws enacted for the preservation of falcons were so rigorous, that in the reign of Edward III. it was felony to steal one of these birds ; and for a person to take the eggs, even on his own grounds, he was liable to be imprisoned for a year and a day, besides a fine at the king's pleasure. The falcons or hawks chiefly used in the British dominions, were the *Peregrine falcon* (*Falco peregrinus*), *Iceland falcon* (*Falco islandus*), and *Goshawk* (*Falco palumbarius*). After the invention of gunpowder this sport fell gradually into disuse ; until at length hawks were discarded, and the whole pleasure of killing feathered game was confined to shooting.

819. *The SECRETARY VULTURE* (*Serpentarius reptilivorus*) is of a large size, with a bill hooked at the point, and bearded at the base, black plumage, a crest on the hind part of the head, the tail feathers white at the tip, the two middle ones the longest, and the legs of great length.

This bird is about three feet in height, and in its general appearance has some resemblance both to the eagle and the crane.

It is an inhabitant of the interior of Africa, of some parts of Asia, and several of the Asiatic islands.

As a destroyer of noxious reptiles and other injurious animals, the secretary falcon is of great service to mankind. He attacks without fear even the most poisonous serpents, approaching them with the point of one of his wings, and either trampling them to death with his feet, or catching them on the pinion of the other wing, and throwing them into the air several times successively until they are dead.

This bird is easily domesticated, in which state he is not only serviceable in destroying reptiles and serpents, but he might probably also be useful in devouring rats and mice. Poultry of all kinds ought, however, to be kept out of his way, or he would devour them also. The French once tried to introduce this bird into Martinique, to destroy the lance-headed serpent, which abounds there.

The Nocturnal Birds of Prey, or Owls, are distinguishable by their round head, a circular arrangement of feathers round each eye, the bill being hooked, and the nostrils covered with bristly feathers (Fig. 89 B).

820. *The TAWNY OWL, or SCREECH OWL* (*Strix stridula*), and the *WHITE OWL* (*Strix flammea*), are the most common in this country.

These birds are of great service to farmers, by devouring mice and other small animals, the uninterrupted increase of which would be extremely injurious to the fruits of the harvest. White (see his *Natural History of Selborne*) paid considerable attention to a pair of white owls, which constantly bred under the eaves of the church. He says that, generally, about an hour before sunset they sallied forth in quest of mice; that he has often minuted the birds with his watch for an hour together, and found that the one or the other of them returned to the nest about once in five minutes with a mouse in its claws.

Though serviceable in thus destroying mice, these birds also destroy young rabbits, hares, and partridges; they also sometimes enter pigeon-houses, where they commit great devastation.

ORDER II.—PASSERES.

The most numerous order of the class, characterized, as Cuvier well remarks, at first sight, by purely negative marks, as it embraces all those birds

Fig. 90.



Al. psalurus.
(Flycatcher of Paraguay.)

which are not rapacious, climbers, gallinaceous, waders, or swimmers.

Their food is various, although insects, fruit, and grain, form the principal part; if the beak be stout and strong it is generally of grain, while, if it be slender, it is on insects that they principally feed. The toes are formed for perching, and they have always three before and one behind.

In the first family, or Dentiostres (Fig. 90.), the upper mandible is notched on each side near the tip. Most of the Insectivorous birds occur in this division.

821. The **GREAT** or **CINEREOUS SHRIKE** (*Lanius excubitor*) is distinguished by having a straightish black bill; the back hoary, the wings black, with a white spot, and the tail white at the sides.

There is likewise a black stripe on each side of the head, extending backward from the base of the bill. The length of this bird is about eight inches.

It inhabits the woods of Europe and America.

Such are the courage and address of the cinereous shrike, that it is capable of being trained to hawk for and catch small birds. We are informed that Francis I., king of

France, was frequently in the habit of chasing the smaller kind of game with shrikes.

In some parts of the Continent where these birds are very numerous, they are considered so useful, by waging continual war against rats and mice, and destroying great numbers of noxious insects, that the farmers will not allow them to be destroyed.

It is the singular propensity of the cinereous shrike to stick the insects on which it feeds upon the thorny branches of trees, previously to eating them. Even when confined in a cage, it often adopts a similar mode with respect to its food, by sticking it against the wires.

822. *The SONG THRUSH, or THROSTLE* (*Turdus musicus*), is known by its almost straight bill, and its quill feathers being rust-coloured at their inner base. Its throat yellowish, speckled with brown or black.

This bird inhabits woods in all the temperate parts of Europe.

Although the singing birds may not, on account of their melodious notes alone, be considered of any absolute use to mankind, yet these afford us so much delight, and convey to our minds so many pleasing and cheerful emotions, that they must not be overlooked even by such persons as are in search of the useful productions of nature:

“ Tribes of the air ! whose favour'd race
 May wander through the realms of space,
 Free guests of earth and sky ;
 In form, in plumage, and in song,
 What gifts of nature mark your throng
 With bright variety.

“ Nor differ less your forms, your flight,
 Your dwellings hid from hostile sight,
 And the wild haunts ye love ;
 Birds of the gentle beak ! how dear
 Your wood note to the wanderer's car,
 In shadowy vale or grove !”

Mrs. Hemans' Works, vol. iv. p. 258.

For fulness and clearness of tone, the throstle is excelled by none of the British song-birds ; and in compass and execution it is much superior to the blackbird. Its notes are heard in woods and thickets during nearly nine months of the year, but are much too powerful to be pleasant when kept in a room. Some of the inhabitants of Poland catch

thrushes in such numbers, as even to load small vessels with them for exportation to other countries.

During long droughts in the summer-time, these birds are of great service by hunting out shell-snails, which they eagerly pull in pieces as food for their offspring.

They build their nests in various places; on the sides of ivied trees, in thickets, in orchards, and sometimes in thick hedges near the ground. The outside consists of moss interwoven with dried grass or hay, and the inside is curiously and smoothly plastered, sometimes with cow or horse-dung, and sometimes with rotten wood mixed with a cement. The female generally lays five eggs, of a deep blue colour marked with black spots.

823. *The FIELDFARE (Turdus pilaris) is of the thrush tribe, distinguished by the tail feathers being black, except the outermost, which at their inner edge are tipped with white; and by the head and upper part of the body near the tail being of a hoary colour.*

These birds annually visit England at the beginning of winter, arriving in large flocks from the northern parts of Europe. They are also found in Syria and Siberia.

By the ancients, fieldfares, with some other species of thrush, were in great esteem as food. The Roman epicures, as we are informed by Varro, had them fattened with crumbs of bread mixed with minced figs; and the people employed for this purpose kept thousands of them in successive states of preparation for the table. With us they are sometimes eaten, but they are by no means esteemed a luxury.

Fieldfares seldom if ever breed in this country. They generally leave us about the end of February or the beginning of March, and do not return till the commencement of winter.

824. *The BLACKBIRD (Turdus merula) is a species of thrush, of a black colour; the bill of the cock is yellow, by which and his more deeply black plumage he is chiefly distinguished from the female.*

The plumage of the female is generally brownish on the under parts.

These birds are found in nearly all the countries of Europe, and in several parts of Asia.

The song of the male blackbird is much admired in woods and fields, but it is too loud for the house. In mellowness

and sprightliness it is esteemed equal to that of the thrush, but in compass and execution it is considerably inferior. The blackbird begins its song in the first fine days of spring, and continues it for about three months; in its natural state it is generally silent the remainder of the year.

Blackbirds devour vast numbers of worms and shelled snails. They form their nests in thick bushes, externally of moss, roots, and other similar materials; plastering them internally with clay, and lining them with dry grass. The eggs are five in number, of a dirty green, with pale rust-coloured spots. Persons who rear these birds feed them as soon as they are taken from the nest with a mixture of raw meat chopped small, bread, and bruised hempseed, somewhat moistened with water.

825. *The WHEAT-EAR* (*Saxicola ornanthe*) is about the size of a sparrow, distinguished by its back being of a hoary colour; the forehead, a line above the eyes, and the rump being white, and by having a black band through each eye.

These birds are migratory, and found in the southern parts of England from about the beginning of May till the middle or end of September. They are also found on the continent of Europe, in Asia, and Africa.

On the downs of Sussex the number of wheat-ears is sometimes so great, that more than eighty dozen have been caught by one person in a day. They become fat in the autumn, and are then much esteemed for the table. During a rainy season they are fatter than in a dry one: this is accounted for by their feeding not only on insects, but on earth-worms, which come out of the ground in much greater numbers during wet than in dry weather. These birds are caught by the shepherds in snares made of horse-hair, and placed beneath a long turf. Part of them are eaten in the neighbourhood, part are pickled and sent to London for sale, and many are potted. When eaten fresh, they are generally roasted, wrapped up in vine-leaves.

The wheat-ear breeds in old rabbit-burrows, in holes of cliffs, under old timber, and in other situations on the ground. It forms a large nest, and lays from five to eight light blue eggs. This bird sings prettily.

826. *The REDBREAST* (*Erythacus rubecula*) is distin-

guished by the dusky olive colour of its plumage, and its red breast. It is found in nearly every country of Europe.

This interesting little bird is by no means despicable as a songster, being equal or superior to the goldfinch in every particular except the sprightliness of its notes; and its song is more valuable, as it is occasionally heard even in winter and the earliest part of spring. So quick are its powers of imitation, that a young red-breast, educated under a very fine nightingale, which began already to be out of song, and was perfectly mute in less than a fortnight, sang three parts in four of the nightingale's notes.

These birds are serviceable to mankind by the myriads of injurious insects which they devour.

They form their nests in thickets, holes of old buildings, or dry banks; and have from five to seven eggs, of a dull white colour, sprinkled with reddish spots.

827. *The NIGHTINGALE (Luscinia philomela) is distinguished by the rusty brown colour, tinged with olive, of its upper parts, and by an ash-coloured ring on the naked part of the thigh above the knees.*

It is a migratory bird, generally arriving in this country in the month of April, and leaving it in September, and then retiring, as is supposed, into some parts of Asia.

This bird delights in solitude, and is naturally of a wild and timid disposition. His usual resort is woods and thickets. Here, perched upon the branch of a tree or bush, he most delights to sing.

The song of the nightingale is peculiarly mellow, plaintive, and rich; its compass is such as to reach through three octaves, and sometimes even more. In sprightliness it yields to the notes of the sky-lark, the linnet, goldfinch, and even the redbreast. A nightingale in singing its whole song, was remarked to have sixteen different beginnings and closes; at the same time that the intermediate notes were generally varied in their succession with so much judgment as to produce a most pleasing variety. Nightingales do not in general sing in a wild state more than ten weeks in the year; whilst those in cages continue their song for nine or ten months. Notwithstanding the naturally beautiful song of these birds, they readily adopt the notes of any other. They will even modulate their voice to a given key, and that so readily, that if any person whistle a note to

it, the nightingale will immediately try in its strain an unison with that note.

Delightful as the song of the nightingale is, some people have a dislike to it. We have even been told of a person who entertained so great an abhorrence for these birds, as to have all the trees in his neighbourhood cut down, that being thus without shelter, they might be driven away. It may perhaps be worth while to remark, in addition, that this person was delighted with the croaking of frogs.

The nightingale sings by day, as well as sometimes throughout the night; the cock is generally the songster, but the hen occasionally sings in confinement.

The food of nightingales consists principally of insects, small worms, and the grubs of ants. They usually build their nests near the ground, among briers, in some low tree by a hedge or bush, and have four or five eggs, olive green.

828. In Patagonia and some other parts of South America, there is a genus of birds called *Furnarius* or *OVEN BIRD*, from the singular form of their nests. This is placed in the most exposed situations, is composed of mud and bits of straw, the walls being strong and thick; it is shaped like an oven or depressed beehive. Another species, called the little house-builder, builds its nest at the bottom of a narrow cylindrical hole, somewhat similar to our sand-martin.

The second family of the Passeres has the beak short, broad, flattened, slightly hooked, very deeply cleft; it is from their great gape that they are named *Fissirostres*. They live entirely on insects, which they catch when on the wing. Their food renders them birds of passage which quit Europe in winter. Here come the swallows, (*Hirundinidæ*) and goatsuckers, (*Caprimulgidæ*) two tribes of birds exceedingly useful to us from the great number of insects which they destroy. Humboldt informs us that the *GUACHARO*, (*Steatornis caripensis*) a species of goat-sucker inhabiting deep caves in South America, lives on berries, and that the fat of the young is much employed in cookery.

829. *The SWALLOWS are a tribe of birds chiefly distinguished by their short and depressed bills, their long wings, and the tail being generally forked.*

Only four species are found in this country. These are all migratory. The common or CHIMNEY SWALLOW (*Hirundo rustica*) usually appears about the middle of April, and departs in October; the MARTIN (*Chelidon urbica*) appears in the beginning of March, and leaves us early in October; the SAND MARTIN (*Cotyle riparia*) appears after the middle of March, and departs about the middle of September; the SWIFT (*Cypselus apus*) appears before the middle of May, and departs in the beginning of September.

All the English species of swallow skim along the air in pursuit of flies, gnats, and other insects; which, if it were not for the all-wise ordination of Providence, in directing their regulation by supplying food to these and other species of birds, would soon fill the atmosphere and destroy all our comfort. Hence (to say nothing worse of it) we see how injurious it is to destroy these birds, as is frequently the case, for mere amusement, and under an idle pretext, by many persons, of improving their skill in shooting game.

Chimney swallows are sold as food in the markets of France, Spain, and Italy.

830. *The ESCULENT SWALLOW* (*Collocalia esculenta*) is a very small bird, distinguished by being blackish above and whitish beneath, and having the tail tipped with white.

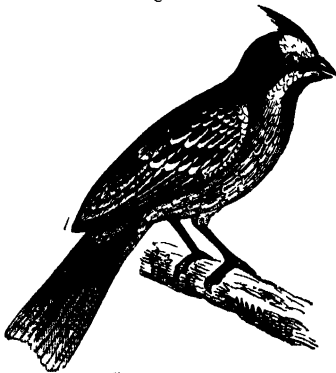
It is found in Sumatra, Java, and some other islands in the Eastern seas.

There is a great trade to China in the nests of these birds. They are of a texture resembling isinglass, and in shape somewhat like a saucer with one side flattened. Their thickness is little more than that of a silver spoon, and their weight from a quarter to half an ounce. They are very brittle, have a shining gummy appearance internally when broken, and are wrinkled or slightly furrowed externally. The best and clearest of these nests are nearly as white as writing paper, and semitransparent, having a few downy feathers hanging about them; but their general colour is white inclining to red. They are usually packed one within another, to the length of twelve or fifteen inches, and secured with split canes to prevent their breaking. The use to which they are principally applied is for the making of soup, which with plover's eggs boiled up with it, constitutes a favourite dish with the wealthier classes in China; to these they are said to communicate an exquisite

flavour ; or, after having been softened in water, they are mixed with ginseng, and put into the body of a fowl, and the whole is stewed together, and constitutes a very favourite dish with the Chinese epicures. It has been calculated that the island of Java alone exports to China 242,000 lbs. of these nests annually, estimated at 284,290*l.* sterling. A few are brought to Europe as curiosities and presents. They appear to consist chiefly, if not entirely, of gelatine, supposed to be obtained by macerating in the stomach a peculiar species of fucus (see 352).

Sir George Staunton speaks of having seen great numbers of them in two caverns which ran horizontally into the side of a rock, in the island of Cass, near Sumatra. They adhered to each other and to the sides of the cavern, mostly in rows, without any break or interruption. The nests are not taken until after the young ones are fledged ; and, in general, this is done by persons who descend to the places where they are situated by rope ladders.

Fig. 91.



Crested Bunting
(*Gubernatrix cristatella.*)

The third family of Passeres (*Conirostres*) (Fig. 91.) are distinguished by the beak being more or less conical, strong and very slightly if at all notched, the mouth has no bristles, as none of these birds take their food on the wing. They are omnivorous, feeding both on insects and vegetables : their feet are so formed that they can perch and walk with equal ease.

831. The SKY-LARK (*Alauda arvensis*) has a slender bill ; the hind claw very long ; the upper parts of its plumage are of a varied greenish brown colour, the external webs of the outer tail feathers are white, and the two middle feathers are rust-coloured.

To all persons capable of experiencing pleasure from rural scenes, the notes of the lark are beyond description

animating and delightful. During fine weather, from the earliest part of spring, for several succeeding months, they are every day heard. These birds sing whilst hovering in the air, and sometimes at so vast a height that they seem but a speck in the sky. In sprightliness their notes exceed those of any bird except the goldfinch; and in compass and execution are inferior only to those of the nightingale.

Sky-larks, whilst in the nest, are fed on worms and insects; but when they are fledged they subsist chiefly on seeds, herbage, and other vegetable substances. It is remarkable, respecting them, that owing to the great length of their hinder claw they rarely perch on trees, but generally alight on the ground. Here they form their nest in a tuft of grass, or amidst growing corn, and lay four or five dusky eggs spotted with brown.

In the winter season sky-larks collect into large flocks, and are caught with different kinds of nets in vast numbers for the table. The neighbourhood of Dunstable is chiefly celebrated for them. The season commences about the 14th of September, and ends the 25th of February; and during that time, as we are informed by Mr. Pennant, about 4000 dozen have been caught. In the country adjacent to the river Rhone, in France, as many larks have been caught by one person in a day as loaded two mules: and in Saxony, where they are liable to a tax, an average sum equal to about 900*l.* sterling is annually paid to the city of Leipsig, on account of the larks that are caught in that neighbourhood.

832. *The WOOD-LARK (Alauda arborea) is a bird smaller than the sky-lark, with a slender bill, long hind claws, and a white streak over each eye, extending backward so as to form almost a ring round the head.*

It is a very common bird in this country; and is found in other parts of Europe, and in Siberia.

There is in the song of these birds, a plaintiveness and mellowness of tone which exceed those of any English songster except the nightingale; but their execution is much inferior to that of most others. They are not only heard in the day-time, but it is said also during the night; and not only whilst in flight, but also when perched upon trees. Wood-larks are tender birds, and not easily to be reared in a cage.

Towards the beginning of winter they become fat, and are then considered excellent eating

They generally form their nests in a bush near the ground, and have about four eggs of a pale red colour, clouded and mottled with red and yellow.

833. *The ORTOLAN* (*Emberiza hortulana*) is a bunting, known by its quill feathers being brown, the first three whitish at the edges; and the tail feathers brown, the two lateral ones black on the outer side.

It is found in most countries of the Continent, but has been but seldom caught in England.

During the months of July, August, and September, these birds become excessively fat; and at that season they are in great demand by epicures on the Continent. They are caught in vast numbers at a time, are kept in dark cages, and fattened for the table with oats and millet seed.

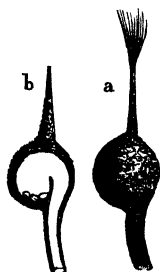
There is a great traffic in ortolans carried on by inhabitants of the island of Cyprus, where they are pickled in spice and vinegar, and packed in casks, each containing from 300 to 400 birds. In this state they are exported to France, Holland, and England, where they are sold at very high prices. We are informed that, in productive years, 400 such casks, or, on an average, 140,000 of these birds, are sacrificed to the palate of man, in the island of Cyprus only.

By many persons ortolans are kept in cages as singing birds; and they are much esteemed on account of their song.

834. *The INDIAN BAYA BIRD* (*Ploceus Philippinus*), a small yellow bird, spotted with brown, and having the throat black.

It is found in the East Indies and some of the Asiatic Islands.

Fig. 92.



Nest of Indian Baya Bird.

The nest is about fifteen inches long, and is usually composed of fibres from the fronds of the Palmyra cocoa nut palm, and wild date, and occasionally of grass. These fibres are neatly interlaced, and form a texture of great strength. The nest is suspended from the tip of a palm frond, or the extremity of a slender branch of some tree. The entrance as seen in the accompanying sketch, which is from the 6th vol. of "Loudon's Magazine of Natural History," is from below; the natives have a pretty fancy that the bird lights up

its nest with fire-flies. The Baya lays from four to six white eggs.

835. The *COMMON HOUSE SPARROW* (*Passer domesticus*) is mentioned in this place only under a hope, in some measure, of rescuing its character from the extreme degree of odium with which it is loaded, in consequence of the supposed injury that it commits by feeding upon corn. This bird is by no means without utility, even to the very persons who incessantly seek its destruction. On a calculation made by the late Professor Bradley, it was ascertained that a pair of sparrows, during the time they have young ones, destroy on an average 3360 caterpillars every week. He observed the two parents to bring to the nest at least forty caterpillars in an hour; and, on a supposition that they might have been thus occupied twelve hours every day, it will yield the above number every week. But their utility is not confined to the destruction of caterpillars. They likewise feed their young ones with butterflies and other winged insects, each of which, if not thus destroyed, would be the parent of hundreds of caterpillars.

In many parts of the world sparrows are in considerable demand as articles of luxury for the table.

836. The *GOLDFINCH* (*Carduelis elegans*) is well known, but distinguished by having all the quill feathers, except the two outermost, marked with yellow in the middle; the front of the head red, and the crown black.

These birds are found in Europe, Asia, and Africa, and are very common in most parts of England.

As a songster this bird ranks high, but particularly on account of the vivacity and sprightliness of its tones; and, in addition to these, the beauty of its plumage, and the facility with which it may be instructed to perform many amusing tricks, have rendered it a great favourite. One of the commonest of these is to draw up their own food and drink, in small cups formed for that purpose. If a young goldfinch be placed with any other singing bird it will readily learn its song.

Goldfinches during the winter season assemble in flocks; but they separate into pairs at the commencement of spring. They frequently construct their nests in orchards and gar-

dens; forming them externally of moss interwoven with other soft materials, in a most beautiful, compact, and artificial manner; internally with grass, horse-hair, wool, and feathers. The eggs are five in number, and of a white colour, speckled and marked with reddish brown.

837. *The CANARY-BIRD (Fringilla Canaria) is a finch, the bill and body of which, in a domesticated state, are generally of a straw-colour, and the quill and tail feathers greenish.*

It is found wild in the Canary Islands, at Madeira, St Helena, and some other places; but in all, its plumage differs much from the domesticated canary.

It was not until about the middle of the fifteenth century that these birds were first brought into notice. They were then called *sugar birds*, from an opinion that they were peculiarly partial to the sugar-cane as food. For some time afterwards they continued so dear that they could only be purchased by persons of fortune.

In Germany, and particularly in the Tyrol, great attention has of late years been paid to the breeding and rearing of canary-birds. At Ymst, in the Tyrol, there was formerly a company, who, after the breeding season was over, sent out persons to different parts of Germany and Switzerland, to purchase birds from those who bred them. Each person generally brought with him from three to four hundred birds. These were afterwards carried for sale, through almost every country of Europe: and were usually conveyed on the backs of those who sold them.

It has been said that in the Canary islands this bird has no song; this is unquestionably a mistake; but it is nevertheless a well-established fact, that nearly all the canaries kept in cages are indebted for their song to parents, the progenitors of which have been bred in company with other song birds.

If canary-birds be treated with proper care they will breed three or four times in the year, and become as vigorous and healthy in this country as in their native islands. They are subject to many diseases, to prevent which the greatest care should be taken to provide them with pure water and simple food.

The eggs of the domesticated canary are whitish with red spots; according to Dr. Heineken the eggs of this bird at Madeira, in its wild state, are from four to six, and *pale*

blue : from this circumstance it may be presumed that the real original of the domesticated canary is yet not exactly ascertained.

838. *The GREY LINNET* (*Cannabina linota*) is a finch, of a chestnut-brown colour, whitish beneath, the wings with a longitudinal white band, and the tail feathers edged on each side with white.

It is a native of woods and thickets in most parts of Europe, and is sufficiently common in our own island.

The plumage of these birds is of an obscure colour, but their song is very sweet. In compass and execution it is inferior only to that of the nightingale. And so imitative are they, that they will adopt the notes of almost any other bird with which they are brought up. The experiment was tried with three nestling linnets, one of which was reared under a sky-lark (831), another with a wood-lark (832), and the third under a tit-lark, and each adhered to the song of its instructor.

Linnets, when full grown, are caught, during the summer months, by twigs smeared with birdlime, or in nets; and if properly attended to, they soon become tame. But if it be required that they should imitate the notes of other birds, they ought to be taken from the nest when only about ten days old.

These birds generally construct their nest in some thick bush or hedge, forming the outside with dried weeds and straw, and the inside of horse-hair and such soft materials as they can pick up. They lay four or five white eggs speckled with red.

839. *The BULFINCH* (*Pyrrhula vulgaris*) is a grosbeak, of a cinereous colour, with the head, wings, and tail black, the breast and under parts red, the parts near the tail and the hindermost quill feathers white.

This bird is common in England and other parts of Europe.

Though in considerable esteem as a song bird, the bulfinch, in a state of nature, has but three cries, all of which are unpleasant. With attention, however, it may be taught to whistle almost any simple tune of moderate compass. It is even possible to instruct these birds to whistle in duet; but in this case, the composition should be so arranged as

to be in correct harmony, let the birds begin, stop, or go on in whatever parts they please. The Germans are noted for training these birds; great numbers of them are annually imported into this country from Germany.

Bulfinches are very common in some parts of England, building their nests in bushes or low trees about the month of May. Their eggs are four or five in number, of a bluish colour, with brown and faintly reddish spots towards the large end.

840. *The RAVEN (Corvus corax) belongs to the crow tribe; it is known by its large size, its plumage being of a bluish black colour, and its tail being roundish at the end.*

It is found in almost every country of Europe, Siberia, and North America.

In Egypt these birds are held nearly in equal veneration with the vultures (815), on account of their propensity to devour dead animals, and putrid substances of almost every description. They also destroy rats, mice, and small reptiles. It is said that in the Bermudas the inhabitants were, several years, annoyed by a prodigious increase of rats, which devoured the corn and plants, and swam from island to island, committing great depredations in every place; and that at length they suddenly disappeared, without any other assignable cause than the unexpected presence of several flocks of ravens. By the ancients these birds were esteemed of much importance, from a notion that, by the various modulations or tones of their voice, certain future events might be predicted.

Ravens are easily domesticated, and in this state may be trained to fowling, somewhat in the same manner as falcons. They may also be taught to fetch and carry small objects like spaniels; but they are so mischievous that they ought not to be trusted in any place where spoons or other valuable articles are deposited, lest they also carry them away and hide them.

The *flesh* of the raven is eaten by the inhabitants of Greenland; and the *skin*, with the feathers on, is preferred to most other substances as a warm under garment. The *beak* and *claws* are used in that country as amulets. With us the *quills*, cut to a point, were formerly much in request for what are called the jacks of harpsichords, to strike the

wires in playing. They are now chiefly employed for drawing and writing with.

841. *The ROOK* (*Corvus frugilegus*) belongs to the crow tribe; it is distinguished by its black and glossy colour, its yellowish white bill, the base of which is naked and dusky, and the tail roundish.

These birds are found in Europe and Siberia.

Notwithstanding the prejudices which are entertained by many farmers against these birds, notwithstanding they sometimes feed upon corn, and consequently are destructive to the crops, there can be little doubt that the services they perform are infinitely greater than any injury which they commit. Often may flocks of them be seen following at a little distance the ploughs, to devour the grubs or caterpillars of such insects as may be thereby exposed to their attacks. Those of the cockchafer are destroyed by them in thousands; and it is remarkable that the nostrils, chin, and sides of the mouth, in old rooks, are white, and bared of feathers, in consequence, as it is supposed, of their frequent habit of thrusting their bill into the ground in search of these insects. The late Mr. Stillingfleet was informed by an intelligent farmer in Berkshire, that one year, while his men were hoeing a field of turnips, a great number of rooks alighted in a part of it where they were not at work; and that the consequence was, a remarkably fine crop in that part, while in the remainder of the field there were scarcely any turnips.

Young rooks are sometimes used as food; but it is requisite to skin them previously to their being cooked, as otherwise they would be too strong-tasted to be eaten.

842. *The BIRD of PARADISE* (*Paradisea apoda*) is characterized by its having a chestnut-coloured body, the neck being of a gold green colour beneath, the feathers of the sides being longer than the body, and the two middle tail feathers very long and bristly.

These birds inhabit New Guinea and the adjacent islands of Aroo; being found on the former in the fine, and the latter in the rainy seasons.

To the inhabitants of the islands of Aroo the birds of paradise have for many centuries been an important article of commerce. They are shot with blunt-headed arrows, or caught by birdlime or in snares. As soon as they are killed their legs are generally cut off, as by that means the skins

are more easily preserved, and also because the persons who purchase them prefer them thus. The entrails and breast-bone are taken out, and they are dried with smoke and sulphur, for exportation to Banda and other commercial settlements. This accounts for the shrunk-up appearance of the skins as we see them, and the disproportionate size of the beak and legs.

They are in great demand both in Persia and India, to adorn the turbans of persons of rank, and even the handles of sabres and the trappings of horses. Many of them are also sold to the Chinese; and a few years ago they were a very fashionable ornament for female head-dress in England.

Various fables concerning these birds were formerly credited, which had no foundation but the cupidity of the dealers in their dead bodies and their beautiful feathers. They were even named by naturalists *apoda*, from the belief that they really had no feet, because they were brought to market without these natural appendages.

Birds of paradise, of which there are several species, generally associate in flocks of forty or fifty together. They form their nests in trees, and feed on fruit and insects. Their legs are so short, that when they alight upon the ground, they cannot without difficulty rise again into the air.

The Third Order, the Climbers (*Scansores*), contains such birds as have two toes before and two behind, that is, have the outer toe directed backwards, like the hind toe or thumb, so that their feet are particularly adapted for climbing trees, on which they generally procure their food. In this order come the gaily-coloured Parrot tribe, the large-billed Toucans, the Cuckoos, and Woodpeckers.

843. *WOODPECKERS* (Picidæ) are a numerous race of birds, distinguished by having a straight, strong, and angular bill; the tongue very long, slender, bony, hard, and jagged at the end.

Woodpeckers are of great use, as they subsist on such insects as are found upon the bark, or in crevices or holes of trees; so that there can be no doubt that they are very serviceable by destroying great numbers of the grubs of those timber-eating beetles, some of which bore to great depths, and have holes of considerable size.

The English species of woodpeckers are at times somewhat injurious in woods and plantations, from their propensity to pick holes in trees as places for their nests. By this means the rain has admission to the wood, and often causes its speedy decay. In forming these holes the birds fix themselves firmly against the trees by their claws and tail, the feathers of which are remarkably stiff; and they are able to pierce even the soundest and hardest timber.

Some of the tribe of Tunguses roast these birds; then bruise their bodies, and mixing the substance thus formed with fat, cover with it the points of arrows which they use in the chase, under a notion that such animals as are struck with these arrows immediately fall dead.

Of the bills of the *WHITE-BILLED WOODPECKER* (*Picus principalis*) some of the American Indians make a kind of coronets, by setting them in a wreath with the points outward. Such is the value at which they estimate these coronets, that they frequently purchase the bills at the rate of two and even three deer's skins each. The flesh of some of the species is accounted good eating.

841. The *BEE CUCKOO, MOROC, or HONEY GUIDE* (*Indicator major*), is an African bird somewhat larger than a sparrow, of a rusty grey colour above, and whitish beneath; it has naked and black eyelids, a yellow spot on the shoulders, and the feathers of the tail somewhat rust coloured, marked with white. Their skin is singularly tough, so that they are thus protected from the stings of the bees, on the honey of which they feed.

Fig 93.



Honey Guide. (Indicator.) The great partiality which these birds have for honey, and the maggots of bees, as food, is the cause of their pointing out the nests of wild bees to the inhabitants of those countries in which they are found. As soon as the moroc has itself discovered a nest of bees, it utters a loud and continued cry, as if for the purpose of exciting attention to its wants. If followed by any person, it flies slowly towards the place, alighting from time to time to

give opportunity for its attendant to come up. If the nest be in the cleft of a rock, a hollow tree, or in some cavity of the earth, the moroc will hover over the spot for a short time, and then sit at a little distance in expectation of the result, and apparently with a view of sharing in the plunder. When the bee-hunter has taken the nest, he generally leaves a share of the comb to supply the wants and repay the services of the bird. We are informed by M. Le Vaillant, that the Hottentots have so great a regard for these birds, that they consider it criminal to kill them.

845. *The RED-BELLIED TOUCAN* (*Ramphastos dicolorus*) is about twenty inches in length, with an enormous large bill of a yellowish green colour, and serrated at the edges; the upper part of the body blackish, the breast yellow, and the belly and the tip of the tail red. The bird is found in South America

We are assured by travellers in South America, that the red-bellied toucans are held in great esteem by the Indians, not only on account of their *flesh* as food, but also for their *plumage*; particularly the feathers of the breast, which are used to ornament their dresses. The Indians even cut out the skin of this part with the feathers on, and after it has been dried, glue it to their cheeks, considering it a great addition to their beauty. We are informed by one of the French voyagers, that whilst he was off the island of St. Catherine, near the coast of Brazil, the governor, among other presents, sent on board the ship fifty skins of toucans, which had been dried with the feathers on.

The Fourth Order of birds (*Gallinæ*), or the Gallinaceous order, have in general a heavy carriage, and short wings, so that they but seldom fly; the feet are very strong, and have the hind toe placed on a greater elevation than the fore toes, so that the foot, unlike that in the preceding orders, has but little power of grasping. In their habits they are social, and most generally polygamous; in that case the male is always larger and more gaily plumaged than the female; in such species as are monogamous, the male and female are nearly similar both in size and colour.

This order contains the domestic poultry, and most of the best game.

846. *The CURASSOWS* (*Cracidæ*) are large poultry

birds of South America, which have a broad round tail, composed of very stiff quills. They inhabit woods, on the trees of which they nestle and feed, are very sociable, and readily domesticated. In this country, however, we do not appear to have been at all successful in this latter respect, as they are confined almost exclusively to zoological gardens, though prizes have been offered to encourage the breed, which might form a very valuable addition to the list of our domesticated birds.

847. Near the Curassows comes the *BRUSH TURKEY* of New South Wales (*Talegalla Lathamii*), which has been lately observed by Mr. Gould in its native haunts; he tells us that it does not hatch its own eggs, but employs artificial means. This bird, for some weeks before the period of laying, collects an immense mass of vegetable matter, varying from two to four cartloads; in this pyramidal heap it plants its eggs, about eighteen inches deep, and from nine to twelve inches apart, the larger end being upwards. The eggs are then carefully covered, and left to hatch by the heat produced by the fermentation of the surrounding matter. Several pairs of birds engage in forming these heaps. The eggs have an excellent flavour, and are eagerly sought after. The flesh of the bird is of a pale salmon colour, and is both juicy and tender.

848 *The PEACOCK* (*Pavo cristatus*) is a well-known bird, a native of the woods of the East Indies, and other parts of Asia.

It is peculiarly distinguished by having on its head a crest of twenty-four feathers, and a single hard spur at the back of each leg. The male has over its tail several feathers, sometimes four or five feet in length, and each marked at the extremity with an eye-like spot. These feathers can be elevated or depressed at the will of the bird; the real tail consists of a range of short, brown, and stiff feathers, which are beneath these. Three varieties.

In some parts of the East Indies the shooting of wild peacocks is not an uncommon diversion; the size and heavy flight of the birds are such that it does not require a good marksman to bring them down.

Peacocks are mentioned in the Sacred Writings as constituting part of the cargoes of the fleet which conveyed the various treasures of the East to the court of King Solomon. They are said to have been introduced into Europe by

Alexander the Great. They were so much esteemed for the table by the Romans, that one person who had devised a mode of fattening them, obtained thereby alone an annual income equal to about five hundred pounds of our money. In England these birds were formerly introduced at sumptuous dinners, and sometimes the skin and all the feathers, particularly those of the tail, were kept to serve them up in. The flesh of the old birds is coarse and unfit for food; but young pea-fowls are at this day much esteemed by epicures.

The *train feathers* of the peacock are used among the Chinese for ornamental work of different kinds, and particularly for decorating the caps of the mandarins; and they are an article of traffic from the East Indies to their country. Peacocks' *crests*, in ancient times, were among the ornaments of the kings of England; and it appears from records, that in fines to the crown these crests were sometimes among the articles to be paid.

Pea-fowls are fed in the same manner as turkeys; the females, when allowed to range at liberty, always deposit their eggs in some sequestered place. These birds are very injurious in gardens, from their scratching up the ground in search of food. They love to perch on the highest trees; and their voice is a harsh scream in two notes, one of which is an octave from the other.

849. *The TURKEY (Melcagris gallo-pavo) is found wild in the woods of America, and is distinguished by its forehead and chin having a red and naked skin, and the breast of the male being tufted.*

Wild turkeys are hunted with dogs by the inhabitants of those parts of America where they are found. As soon as their haunts are discovered, the hunters send into the flock a dog that has been trained to this pursuit. The turkeys do not attempt to escape by flight, but run before him until they become fatigued, when they seek for safety in the trees. The dog gives notice to his followers of the places where they are concealed, and they are then easily knocked off the branches with poles, and secured.

Such is the size of these birds, that they frequently weigh more than forty pounds each. The Indians not only esteem them as food, but make an elegant clothing of the

feathers. The webs of these they twist into a double string with hemp, or the inner bark of the mulberry-tree, and work or weave them somewhat like matting. The article thus produced is said to have a rich and glossy appearance, and to be as fine in texture as silk shag. The inhabitants of Louisiana make fans of the tails; the French, in the American colonies, used formerly to construct parasols by joining four of these tails together.

It does not appear that turkeys were known in England anterior to the reign of Henry VIII.; and it is supposed that the first of these birds which appeared in Europe were brought from Mexico, after the conquest of that country in 1521.

These birds, in a domestic state, subsist on grain and insects, and breed early in the spring; the females, whenever they have an opportunity, wander to a considerable distance from the poultry yards to construct their nests, and lay and hatch their eggs. These are from fourteen to seventeen in number, of a large size and white colour, marked with reddish or yellow freckles. Young turkeys are so tender as to require much attention in rearing them. The housewives of Sweden frequently plunge them into cold water the day they are hatched; and after having forced each of them to swallow a pepper-corn, restore them to the care of the parent.

Few birds are more in request for the table than these. The principal counties in which they are fed are Norfolk and Suffolk. About Christmas the demand for them in London is so great, that the coaches are sometimes laden with them even to the exclusion of living passengers. Occasionally turkeys are driven along the roads in flocks of several hundreds together, the drivers having no other implement for keeping them in order than a long stick with a piece of scarlet rag tied at the end, to which colour they have a very extraordinary antipathy.

850. *The GUINEA-FOWL, GALLINA, or PINTADO (Numida meleagris), is an African bird, now domesticated in most parts of Europe, and is known by the red or bluish wattles under the throat, a naked protuberance on the head, its slender neck, and beautifully spotted plumage. There is a white variety.*

The flesh of Guinea fowls is tender and sweet, and by

some persons is thought to resemble that of the pheasant. In Guinea and the adjacent parts of Africa, their native country, where they are not unfrequently seen in flocks of two or three hundred together, they are hunted and caught by dogs. These birds chiefly delight in marshy and morassy places, and subsist on insects, worms, and different kinds of seeds. Their eggs are a very delicate food.

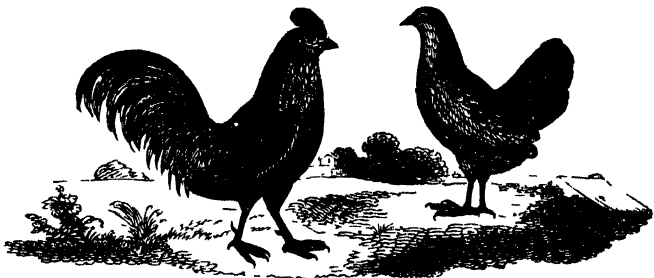
Guinea fowls were originally introduced into England somewhat earlier than the year 1260; they are now common in our poultry yards. The females generally lay their eggs in some concealed situation, and on the bare ground; the chicks, when hatched, require warmth and quiet, and should, for some time, be fed on rice swelled with milk, or with bread soaked in milk. The common hen is in this country a much better mother for the young ones than the female Guinea fowl herself.

These are restless, clamorous, and overbearing birds, and have a harsh, and to some persons an unpleasant cry, which consists of two notes, sounding like "camac, camac, camac," frequently repeated.

851. DOMESTIC POULTRY (*Gallus domesticus*) belong to the pheasant tribe, and are found in a wild state in some of the forests of India, and the Indian islands. Many varieties.

The Jungle Fowl (*Gallus Sonneratii*, Fig. 94.) is supposed by some authors to be the origin of our domestic poultry; by others, the *Gallus Bankivus* is regarded as the parent stock, and this seems the more probable.

Fig. 94.



Gallus Sonneratii (Jungle Cock).

There are few birds so important to mankind as these.

Whilst living they supply us with eggs ; and when dead their bodies afford us food, and their feathers are useful for making beds.

It is said that hens will sometimes lay as many as two hundred *eggs* in twelve months. The chickens are naturally produced by the warmth of the parents sitting upon them, and generally in about three weeks after the operation has commenced. In Egypt, however, it is customary to hatch chickens in ovens by artificial heat. These ovens are sometimes so large as to contain from forty to eighty thousand eggs ; and it has been calculated that more than one hundred millions of chickens are annually brought to life in this manner. A similar mode of hatching them was, some years ago, introduced into France by M. de Reaumur ; but the practice does not appear to have been much followed.

Some villages in Sussex are famous for poultry, which are fattened to a size and perfection not known elsewhere. They are fed on ground oats made into gruel, by a mixture with hog's grease, sugar, pot-liquor, and milk ; or on ground oats, treacle, suet, &c. They are kept warm, and crammed for about a fortnight before they are sold to the higglers. The cramming is performed by rolling their food into pieces of sufficient size to be passed down their throats. When full grown these fowls weigh six or seven pounds, and are sold at four shillings and sixpence or five shillings each. What are called *Dorking fowls* are a very large breed, reared at *Dorking* ; this breed is remarkable for having *five* claws.

To ascertain whether eggs are fresh, some persons hold them up against a strong light, to see that the white has not lost its transparency ; others put their tongue to the large end, and if this feel warm they are considered to be good. If on shaking them they are heard to rattle, they are bad. It is said that eggs may be preserved for many months by being covered with a thin coat of mutton suet, or other fat substance ; but perhaps a better mode than this would be to cover them with a cheap varnish, by which, as well as by the fat, the air would be prevented from penetrating the shells, and thereby rendering the eggs putrid.

Eggs are an agreeable and nourishing food to persons of good digestion, but they often disagree with weak stomachs :

they are used in various ways in cookery. The whites are of use in medicine; they have been employed with advantage in burns. They are likewise used by gilders and other artisans. The yolks are employed in medicine in several different ways, but most frequently in emulsions. The shells of eggs serve for various purposes, but chiefly as a white colour in painting, which is considered preferable to that called flake white.

The *feathers* of poultry are used to considerable extent for making beds, pillows, and bolsters; but they are by no means so excellent as those of geese.

852. *The COMMON PHEASANT* (*Phasianus Colchicus*), is distinguished by the general reddish chestnut colour of its plumage, its head and neck being blue, and each eye being surrounded with a red, naked, and warty skin.

There is a small and moveable tuft of feathers on each side of the head. The plumage of the female is much less brilliant and beautiful than that of the male.

These birds, though now found wild in our woods, are supposed to have been originally brought into Europe from the banks of the Phasis, a river of Colchis, in Asia, situated to the east of the Black Sea. Pheasants are also found in other parts of Asia, and in several varieties.

These birds constitute a rich and wholesome nutriment. They breed in woods and fields, forming their nests upon the ground, in places where the herbage is thick and close; and laying from twelve to fifteen eggs. These are sometimes taken away, and committed to the care of poultry hens, which will hatch them, and rear the young ones as their own. Pheasants feed on corn, wild berries, beech-mast, acorns, and other similar food. They roost on the branches of trees, and in the short days of winter generally fly into them for this purpose about sun-set; the male birds making a noise, which they repeat three or four times successively, called "cocketing," and the hens uttering one shrill whistle. Poachers, well acquainted with these sounds, easily discover the place, and either shoot them on their perch, bring them down by burning sulphur underneath, or catch them by a snare made of brass-wire, and fixed to the end of a long pole. They are also caught by snares placed in tracks through which they are known to run, towards the adjacent fields, to feed.

If noblemen and gentlemen of extensive landed property did not preserve the breed of pheasants by forbidding them, except under certain regulations, to be destroyed, the race would soon be extinct in this country.

853. *The ARGUS PHEASANT* (*Argus giganteus*), is a splendid bird, of a pale yellow colour, spotted with black, the feathers of the wings grey, with eye-like spots, and the two middle feathers of the tail very long, with similar spots.

It is a native of Chinese Tartary, the island of Sumatra, and other parts of the East, and is about the size of a turkey.

The beauty of the plumage of the argus pheasants, but particularly of the wing feathers, and the two long feathers of the tail, has rendered them objects of considerable attention. These feathers were, some years ago, in considerable request in England as an ornament in female head-dress; but from their natural stiffness, both of texture and appearance, they are at present but little regarded.

In their native country these birds are killed as food, their *flesh* being as much esteemed as that of the common pheasant is with us.

854. *BLACK GROUSE, or BLACK GAME* (*Tetrao tetrix*), is of a violet black colour, with the tail forked, and the secondary quill feathers white towards the base.

Its weight is from two to four pounds. These birds are found in mountainous and woody parts of the north of England, and in the New Forest, Hampshire; in Scotland, and several countries of the Continent.

The pursuit of this and other species of grouse is a much more important occupation in the northern parts of the Continent than it is in this country. In some parts of Russia they are caught in traps of wicker-work baited with corn. Huts full of loop-holes are sometimes formed in woods that are frequented by them, and upon the adjacent trees artificial decoy birds are placed. The persons in the huts fire upon the grouse as they alight, being careful to kill those first which are upon the lower branches; and, in this case, so long as the men are concealed, the report of the guns does not alarm the birds.

These birds feed on mountain fruits, and in winter on the tops of heath; and although they always roost on trees, they form their nests on the ground. Each female lays six or eight eggs, of a dull yellowish white colour, marked

with numerous small rust-coloured specks, and towards the smaller end with some blotches of the same colour. The young male birds quit their parents in the beginning of winter, and usually associate in small packs until the spring. Black grouse will live and thrive, but they have not been known to breed, in aviaries.

855. *The WOOD GROUSE, or CAPERCAILZIE (Tetrao urogallus), is nearly as large as a turkey, its plumage varied, but bay above, marked with blackish lines; the tail rounded, and the under parts of the base of the wings white.*

This bird is found in the northern parts of Europe and Asia; and in former times in the Highlands of Scotland.

There can be no doubt but in ancient times these birds were common in the mountainous parts of South Britain. In countries where pine forests are numerous, they feed on the buds of fir-trees, and on the young cones, so as sometimes to render the taste of their flesh extremely unpalatable. They are also partial to the berries of the juniper.

The females form their nests on the ground, and lay from eight to sixteen eggs, which are of a white colour spotted with yellow.

856. *The RED GROUSE, or RED GAME (Lagopus scoticus), is from fifteen to nineteen ounces in weight; its plumage is beautifully mottled with deep red and black; the six outer tail feathers are blackish.*

Over each eye is an arched and naked scarlet spot; the feet are feathered to the claws.

This bird inhabits the mountainous heaths of Derbyshire, Yorkshire, Wales, and Scotland.

It is generally supposed that red grouse are peculiar to the British Islands. They are found "in packs," consisting sometimes of from forty to fifty birds; and are an object of eager pursuit by sportsmen. They principally frequent high and heathy grounds, where they feed on mountain berries and the tops of heath; they seldom descend into the valleys. The birds are eaten roasted, like most other game, but they are sometimes potted, and are in general much admired for the table.

Red grouse have been bred, and successfully reared, in confinement, by supplying them almost every day with fresh pots of heath.

857. The *PTARMIGAN*, or *WHITE GAME* (*Lagopus mutus*), is a species of grouse which, in summer, is of a pale brown colour, elegantly mottled with small bars and dusky spots; and has the bill and the tail feathers black. In winter it is almost wholly white.

These birds, which are somewhat larger than a pigeon, are inhabitants of the extreme northern countries of the continents both of Europe and America. They are also found among the mountains of Scotland, and are sometimes seen in the alpine parts of Westmoreland and Cumberland.

By the inhabitants of Greenland, not only the *flesh* but even the intestines of these birds are much esteemed as food. The *skins*, with the feathers on, are made into clothing; and the black *tail feathers* were formerly much in request among this people for female head-dresses.

So numerous are these birds in the northern parts of America, as at the commencement of winter to assemble in flocks of 150 or 200 in number; and more than 10,000 have, in some years, been caught near Hudson's Bay, betwixt the months of November and May. They are killed in various ways; by snares, with nets, and with guns; and indeed so fearless are they of the approach of mankind, that they may be knocked down with sticks or clubs. Instances have occurred of their having been driven almost like poultry, into nets or snares that have been laid for them.

In our own country these birds associate in small packs, and live among rocks, perching on the stones, and when alarmed taking shelter beneath them. They feed on mountain berries, the buds of trees, and the young shoots of the heath. The females form their nests on the ground, and lay in them from six to ten eggs, which are of a dusky colour, with reddish brown spots.

It is a very extraordinary ordination of Providence, that these birds at the commencement of winter should assume a white plumage, by which, being incapable of defence, they are able, amidst the winter's snows, to elude the pursuit of their enemies. And not only this, but as an additional protection against the cold, all the feathers except those of the wings and tails are now doubled.

As food, these birds are said very much to resemble the red grouse in flavour.

858. *The COMMON PARTRIDGE* (*Perdix cinerea*) is particularly distinguished by having under the eye a naked scarlet spot; the tail rust-coloured, the breast brown, and the legs of a light colour.

These birds are found in nearly all the countries of Europe, and in many of the temperate parts of Asia.

In the autumn and winter, partridges are generally found in coveys, as they are called, of ten or fifteen birds, consisting of the parents and their brood. They are killed by sportsmen in immense numbers for the table; in all the ways in which they are cooked they are a highly esteemed food.

Partridges are remarkable for never perching or alighting on trees. They live in cultivated lands, constructing a rude nest upon the ground, and having usually from fifteen to twenty-one eggs, which are yellowish white, and about the size of a pigeon's egg. These are hatched towards the beginning of June, and the young ones are able to run as soon as they come into the world. If the eggs happen to be destroyed, the female will, in many cases, form another nest, and produce a second offspring. The birds of this brood are not perfectly fledged till the beginning of October, and are always a puny race. If the eggs of partridges be placed under a common hen, she will hatch them, and rear the young ones without difficulty. But these, after they are grown, almost always escape into the fields and become wild. It is said that the inhabitants of Scio, one of the islands of the Grecian Archipelago, rear large flocks of partridges, which during the day are permitted to visit the fields, and in the evening always return home to roost. At the commencement of the breeding season they abscond for some time; but after having hatched their coveys, they return with their families to the farm-yard.

The attachment of partridges to their offspring, and the stratagems which they adopt to draw off the attention of their enemies, whilst they seek their safety by flight or concealment, are well known to almost all persons who are resident in the country.

It is usually considered that the dark-coloured feathers on the breast of the partridge are peculiar to the male; but it has been ascertained beyond a doubt that these are also common to the female. The males can be distinguished from the females only by a superior brightness of the plumage about the head.

859. The QUAIL (*Coturnix dactylisonans*) is considerably smaller than, but much resembling the partridge: its form, however, is more slender, the body is spotted with grey, the eyebrows are white; and the tail-feathers have a rust-coloured edge and crescent.

These birds are found in some parts of England; but in other countries of Europe, as well as in several districts of Asia and Africa, they are extremely numerous.

Quails are migratory birds, generally arriving in this country betwixt the middle of August and the middle of September, and departing in April. They are greatly esteemed for the table; and are usually eaten roasted (without being drawn), and served on toast, in the same manner as woodcocks. So numerous are they in many countries of the Continent, that they may be purchased, even by dozens, at a very low price. In some parts of Italy thousands of quails are caught in a day, at the periods of their migration. The Russians also take them in immense numbers, and packing them in casks, send them for sale to Petersburg and Moscow. We formerly imported great numbers of these birds alive from France. They were conveyed, in large square boxes, divided into five or six compartments one above another, and just high enough for the birds to stand upright, each box containing about a hundred quails. These boxes had a wire in front; each partition was furnished with a small trough for food. The object of this importation was solely for the table.

So irritable is the disposition of the quail, that whenever the males are kept together, they always fight. This propensity rendered them esteemed by the ancient Greeks and Romans, for the same purposes as game cocks are by many of the moderns. The fighting of quails is, at this day, a fashionable diversion with the Chinese, and in some parts of Italy. The ancients did not eat these birds, under a supposition that they were an unwholesome food.

Quails are not so prolific as partridges. They seldom have more than six or seven eggs, which are of a whitish colour, marked with ragged rust-coloured spots.

860. The TINAMOUS (*Tinamus*) may be called the partridge of South America; the flesh when cooked is delicately

white; they are remarkable for their long and slender neck, and their tail being exceedingly small.

861. The *WILD PIGEON*, or *STOCK-DOVE* (*Columba cenas*), is distinguished by its bluish plumage, the neck being of a glossy green colour above; by the wings being marked with two black bars, and the tip of the tail blackish.

These birds are in some degree migratory; large flocks of them arriving in England from the northern regions of the Continent at the approach of winter, and returning in the spring. Many of them, however, remain in this country during the whole year, and only change their quarters to procure food. Similar, but much more extensive, flights of wild pigeons are observed in some parts of Italy, where great numbers of them are caught for sale as food.

They build their nests in the holes of rocks, in old castles, churches, and towers, and sometimes in the hollows of trees, but never on the boughs; they lay two white eggs.

The name of Stock-dove has been given to these birds, from their being supposed the stock or origin of our domestic pigeon; but this is now generally thought to be derived from the *Columba livia*, the WHITE RUMPED PIGEON or ROCK-DOVE, which inhabits some of the cliffs on the sea-shores of this country, as well as other parts of Europe.

In a domesticated state artificial cavities are formed for pigeons to breed in; and they are frequently known to have young ones eight or nine times in the year. Thus, although they have only two eggs for each brood, their increase is sometimes extremely rapid.

The uses of pigeons in cookery are well known. The young ones are chiefly selected for this purpose; and they are generally taken just before they are fledged.

There is a mode of enticing pigeons to resort to and reside in any place, by putting there what is called a "salt cat." This is made of loam, old rubbish and salt, and is a substance they are so fond of, that instances have been known of farmers having thus deprived their neighbours of their whole stock of pigeons. But, by act of parliament, this practice is now rendered illegal. The shooting of pigeons is also an offence against the law. With respect to the formation of pigeon-houses, it may not perhaps be generally known, that although a lord of a manor may build them on

his own land parcel of the manor, and a freeholder on his own ground, yet a tenant cannot do this without his lord's license.

Pigeons are generally considered an injurious stock to the farmer, as they subsist almost wholly on grain, and devour, in the course of a year, infinitely more than would amount to their own value.

There are more than twenty different varieties of the domestic pigeon, of which those called *carriers*, *tumblers*, *croppers*, and *pouters*, are perhaps the best known.

The CARRIER PIGEON, which is easily distinguished from others by a broad circle of naked white skin round each eye, and by the dark bluish colour of its plumage, is remarkable for the celerity and certainty with which it has been known to convey letters from distant parts. This arises from the natural attachment which the birds have for the places where they have been bred. The mode of employing them is to take them to the spot whence intelligence is to be brought, to tie the letter under their wing, and let them loose. They rise to a great height in the air; then, by an unaccountable instinct, they dart onward in a direct line to their home. The rapidity of their motion is such, that they have been known to fly at the rate of nearly thirty miles an hour.

862. *The RING-DOVE (Columba palumbus) is known by its cinereous plumage, the tail feathers being black on the hind part, the first quill feathers being whitish on the outer edge, and the neck white on each side.*

It is common in our woods, and is also found in most other parts of Europe.

These birds differ from the last in the habit of constructing their nests on the branches of trees, and particularly on those of the fir-tree, and not in holes of rocks and buildings. As they are considerably larger than the domestic pigeon, and, whilst young, are almost equally good for the table, several attempts have, at different times, been made to domesticate them, by hatching their eggs in dove-houses under pigeons; but it has always happened, that as soon as they were able to fly, they have escaped to their natural haunts in the woods.

863. *PASSENGER PIGEON* (*Ectopistes migratorius*) is known by its long tail, the circles round the eyes being naked and blood coloured, and the breast being of a reddish colour

These birds are found in different parts of North America.

Some idea of the immense numbers of passenger pigeons may be formed by stating that one continued flight of them is calculated by Mr. Weld to have extended at least eighty miles; and that a person is known to have killed more than a hundred and twenty at one shot with a blunderbuss. They migrate, at certain seasons, from one part of the country to another in search of acorns, berries, and other food. During these migrations they are very fat, and are either killed with clubs and guns, or caught in nets extended upon the ground, into which they are allured by tame pigeons of their own species.

Passenger pigeons are brought for sale in sackfuls to Quebec, where they are eagerly purchased as food. Such numbers of them are killed by the American Indians, that they prepare their fat so as to be eaten like butter. We are informed, that some years ago there was scarcely any Indian town in the interior of Carolina, in which 100 gallons of this fat might not at any time have been purchased.

It will easily be imagined, that in every part of the country where these pigeons feed, they must prove, beyond all calculation, injurious to the farmer, by devouring the fruits of the harvest.

864. *The CROWNED PIGEON* (*Goura coronata*), is about the size of a turkey, of a bluish colour, with a crest four or five inches high upon its head, and the shoulders somewhat rust-coloured.

It is found in New Guinea, and some of the adjacent islands.

By the inhabitants of New Guinea crowned pigeons are killed for food; and from their great size, they often afford a very important supply. As they are easily domesticated, they are frequently reared in poultry-yards in the East Indies; their appearance there is highly pleasing and ornamental.

The Fifth Order of birds (*Grallæ*, or wading birds), have in general their legs so long, that the birds seem as if they were mounted on stilts. The lower part of their shank is devoid of feathers. They are of an elongated form, and the

length of their neck and of their beak is such, that high mounted as they are on their legs, they can without bending them pick their food from the ground.

Nearly the whole of the birds of this order, except the Ostrich tribe, have long wings, and fly well; when flying they stretch their legs backward, in place of folding them under their belly as other birds do, and this seems to be to balance their long neck. Most of them make periodically long migrations, and are then united into large flocks.

865. *The OSTRICH* (*Struthio camelus*) is of a great height, measuring from seven to nine feet from its head to the ground; and is distinguished by its extremely long neck, somewhat conical bill, the wings not being formed for flight, and the feet having each only two toes.

It inhabits extensive plains and deserts in Arabia and Africa.

Ostriches are pursued by the Arabs principally on account of their *feathers*, which are a considerable article of traffic. This people use the *fat* of these birds in cookery; and they occasionally subsist upon the *flesh*.

The *eggs* of the ostrich are of a large size, and in the south of Africa are considered a great delicacy. They are prepared for eating in various ways: but the best way is simply to bury them in hot ashes, and through a hole made in the larger end, to stir the contents till they acquire the consistence of an omelet. Ostriches' eggs are capable of being preserved for a great length of time even at sea; and without any trouble of constantly turning them, as is requisite with hens' eggs. This is owing to the great thickness of the shells. At the Cape of Good Hope they are usually sold at the rate of about sixpence sterling each. The Egyptians suspend the shells of these eggs, as ornaments, under the vaulted roofs of their houses; and they are frequently hung between lamps in the mosques of the Mahometans, and also in the Greek and Coptic churches. The *shells* are cut by the Hottentots into necklaces, bracelets, and ornaments for the waist. In the eggs of the ostrich are frequently found a kind of small oval-shaped stones, about the size of a marrow-fat pea, which are sometimes set, and used for buttons. The *skins* of ostriches are employed by the Arabians as a substitute for leather.

But no parts of the ostrich are so valuable as the *feathers* of the wings and tail. These are divided into loose and

silky filaments, and are most admired when plucked from the birds whilst alive. They are packed in bundles by the Arabs, who put them, large and small, good and bad, together for sale. In Europe they are used for female head-dresses; and for this purpose the shortest and lightest are most esteemed. The ostrich feathers that are imported into this country from the Cape of Good Hope are not considered so good as those which we receive from Barbary; they are of a better colour, but not so perfect in the flue or feather, and are thin and irregular.

Two, three, or sometimes four, ostriches deposit their eggs, thirty or forty in number, in the same hollow place in the sand; but they do not, as is generally supposed, leave them entirely to the heat of the sun to be hatched. These birds are sometimes reared in a domestic state.

866. *NANDOU, or AMERICAN OSTRICH* (*Rhea Americana*), has three toes to each foot, is about half the size of the Ostrich, and is of a greyish colour, inclining to brown above.

Inhabits South America.

Each of the eggs of this bird is said to equal in weight eleven hen's eggs; so that in a nest, found by Mr. Darwin's party on the Pampas, containing twenty-seven eggs as much food was obtained, as 297 hen's eggs would have yielded.

867. *The BUSTARD* (*Otis tarda*), the largest land bird which is produced in England, is distinguished by its plumage being waved and spotted with black and dusky, and whitish beneath; the bill is convex and strong, with a tuft of feathers on each side of the lower mandible.

These birds are about four feet in length, and are found in small flocks on open plains of different countries of Europe, Asia, and Africa. They were formerly seen on Salisbury Plain in Wiltshire, and other parts of England; but in consequence of the enclosures which have of late years been made, the breed is almost extinct in this country.

When these birds were more numerous than they now are, they were hunted by greyhounds for amusement, and as they run with great rapidity (seldom being known to rise on the wing), the chase was sometimes very long.

Their flesh has been compared to that of the turkey, and epicures on the Continent are stated to prefer the thigh of the bustard to most other kinds of game.

Such is the timidity of these birds, that they seldom

allow any person to approach within gun-shot of them. They fly slowly, and have some difficulty to rise from the ground, but when in flight, they are able to continue their course for many miles without resting. Bustards feed on green corn and vegetables; and on worms, frogs, mice, and other animals. They form no nest, but the female lays her eggs, two in number, on the ground. The eggs are as large as those of a goose, and of a pale olive-brown colour, marked with brown spots.

868. *The DOTTEREL (Eudromias morinellus) is a species of plover distinguished by its roundish and obtuse bill and black legs, its breast being rust-coloured, and by having a white line over each eye, and another upon the breast.*

These birds seldom weigh more than three or four ounces. About the latter end of April, during the month of May, and part of June, they are found, in flocks of eight or ten together, on the heaths and moors of Cambridgeshire, Lincolnshire, and Derbyshire, and among the mountains of Westmoreland and Cumberland. They are also seen on the Wiltshire and Berkshire downs in the months of April and September.

Such is the singularity of manners of these birds, that it is possible to catch them, even with the hand, by a very simple artifice. It was formerly customary for the fowler to proceed, in the night, with a candle and lantern, to the places where he knew the birds were in the habit of roosting. Roused, but unalarmed, by the light, if he approached with caution they would continue immoveable until he was able to discover them. He would now stretch out one of his arms, which induced the imitative bird to stretch its wing; then a foot, which the birds likewise mimicked. This he did alternately until he was sufficiently near to extend and entangle them in his net. There were other contrivances besides this: but the greater facility of killing these birds by the gun has of late years rendered them all useless.

When dotterels are best in season they are very fat, and delicate eating.

There are several birds which are sold by the London poulterers under the appellation of *plovers*. These are chiefly the GOLDEN PLOVER (*Charadrius pluvialis*), the GREY SAND-PIPER (*Squaiarola helvetica*), and the GREEN SAND-PIPER (*Totanus ochropus*), all of which are much esteemed for the table.

869. *The LAPWING, or PEE-WIT (Vanellus cristatus), is a well-known marsh bird, which has a crest at the back of the head, the upper part of its plumage green, the breast black, and the legs red.*

Its general weight is seven or eight ounces. This bird frequents moist heaths and marshy grounds in nearly all the temperate parts of Europe, Asia, and Africa.

The name of lapwing has been given to these birds, on account of the flapping noise which they make with their large wings during flight; and that of peewit has been obtained from their cry. They associate in flocks during the winter-time, and are caught by nets, in the same manner as ruffs, but are killed as soon as they are caught. Lapwings are in considerable demand by the London poulterers, particularly about the month of October, when they are fat, and excellent eating. Their *eggs*, which are olive-coloured spotted with black, are esteemed a peculiar delicacy during the whole season in which they can be obtained.

Lapwings feed chiefly on worms; the females lay each four eggs on the ground, in some hollow place, on the dry parts of marshes.

The eggs of the *teru-tero*, a species of lapwing found in Patagonia, are also esteemed as great delicacies; the name of this bird, like that of the peewit, is derived from the sound of its voice, and what is applied by Grahame in his "Birds of Scotland" to the one, is equally true as regards this:

"She, if or dog
Or man intrude upon her bleak domain,
Skims, clamouring loud, close at their feet with wing
Stooping, as if impeded by a wound;
Meantime her young, among the rush-roots lurk
Secure."

870. *The COMMON HERON (Ardea cinerea) is of the stork tribe, distinguished by the cinereous colour of its plumage, by the male having a long and pendent crest on the hind part of the head, the feathers of the neck long; and by having a double row of black spots on the neck.*

This bird, which is somewhat more than three feet in length, is common in most of the fenny parts of Great Britain.

A few centuries ago heronries, or *craneries*, as they are sometimes called, were nearly as common in the neighbourhood of noblemen's houses as rookeries. These birds, like

rooks, delight in building their nests in society, and on the highest trees. As many as eighty herons' nests are mentioned by Mr. Pennant to have been counted on a single tree at Cressi Hall, near Gosberton in Lincolnshire.

When heron hawking, or the pursuing of these birds with falcons, was a favourite diversion in this country, great attention was paid to the preservation of the breed. They were ranked among royal game, and were so far protected by the laws, that any person destroying or shooting at one of them was liable to a penalty of twenty shillings. A penalty of ten shillings was exacted for taking young herons from the nest, and any one taking or destroying the eggs, betwixt the twenty-first of March and the thirteenth of June, was punishable by twelve months' imprisonment, and a forfeiture of eight pence for every egg so taken. These birds were formerly as much esteemed for the table as pheasants are now; no fewer than four hundred herons are stated to have been served up at Archbishop Neville's inthronization feast, in the reign of Edward IV.

Plumes formed of feathers of the heron and egret are used as ornaments for the caps of Knights of the Garter.

Heron subsist chiefly upon fish, and are very destructive in fish-ponds. It has been calculated that a single heron will destroy nearly three thousand carp in a year. These birds take their prey by wading into the water, and seizing the fish as they pass by: they also sometimes catch them in shallow water, by darting from the air and securing them against the bottom.

871. *The BITTERN (Botaurus stellaris) is of the stork tribe, distinguishable by its brownish yellow plumage, variously marked with black; by the feathers of the neck and breast being peculiarly long; and the bill being strong, of a brown colour above, and greenish below.*

This bird is not quite so large as the heron. It is found in marshes of several parts of England, as well as on the continents of Europe, Asia, and America.

The *flesh* of the bittern was formerly much esteemed at the table. Amongst other provisions at Archbishop Neville's inthronization feast, there appear to have been 204 bitterns. These birds are now sometimes to be seen in the poulterers' shops in London, where they are generally sold for about half-a-guinea each. The *hind claws* were once in

esteem as tooth-picks, from an opinion that the use of them tended to preserve the teeth from decaying.

Few birds of their size are more strong, or when attacked are more ferocious than these. They subsist chiefly on fish, frogs, mice, and other animals. During the months of February and March the males, in the mornings and evenings, make a kind of deep, lowing noise, called *booming*, which is supposed to be their call to the females. These birds form their nests among rushes, and generally lay four or five greenish-brown eggs.

872. *The COMMON, or WHITE STORK* (*Ciconia alba*), is distinguished by its strong and sharp red bill, its white plumage, the orbits of the eyes and the quill feathers being black. The feathers of the breast are long and pendulous.

This bird is upwards of three feet in length. It is found in every quarter of the world, except America; and though rarely seen in England, is extremely common in Holland and some other parts of Europe. It is a bird of passage, and leaves Europe in the autumn for Egypt, Barbary, and some of the countries of Asia.

The Mahometans have the highest veneration for the stork; and any person would be held in abhorrence who attempted to kill or even to molest these birds. They frequent the streets of the most populous towns, where they devour offal and filth of almost every kind: in fenny countries they are of great service, by feeding upon noxious reptiles and insects. In ancient Thessaly it was a crime expiable only by death to kill one of them.

Storks are easily tamed and rendered domestic, and may be trained to reside in gardens, which they soon clear of frogs, toads, and other reptiles. In a wild state they make their nests of sticks and dried plants, on lofty trees or the summits of rocks. The inhabitants of Holland frequently place boxes on their houses for them to build in.

The *quills* of the stork are large, and make excellent pens for writing with.

Near the storks come the Adjutant-birds of India and Africa, from beneath the wings of which are procured the light downy feathers which are made into tufts called Marabous.

873. *SACRED IBIS* (*Ibis religiosa*). *This bird has the plumage white, the tips of the quills black, the greater coverts of the*

wings have the barbs long and loose, covering the end of the wing and tail ; it is found in various parts of Africa.

This bird was reared in the Egyptian temples, and regarded with great veneration ; after death it was embalmed. It is supposed to have derived its title to this, in the eyes of the ancient Egyptians, from its great use to them in destroying noxious serpents.

874. *The CURLEW (Cracticornis arquata) is known by having a long arched black bill, bluish legs, and blackish wings, with snowy spots and marks.*

Its general weight is betwixt twenty and thirty ounces.

In winter large flocks of these birds are seen on our sea-coasts ; in summer they often retire into mountainous parts of the interior of the country. They are found in Europe, Asia, and Africa.

Curlews are frequently shot for food, and sometimes are very palatable, particularly if killed at a distance from the sea : but such as are killed near the sea-coasts have often a fishy and bad taste.

They feed on marine and other worms and insects, and build their nests upon the ground in unfrequented places distant from the coast, laying four eggs, which are of a pale green or olive colour, marked with irregular brown spots.

875 *The WOODCOCK (Scolopax rusticola) has a varied plumage, a long straight bill, reddish at the base, legs ash-coloured, the thighs clad with feathers, and the head with a black band on each side.*

The weight of the woodcock is generally about twelve ounces.

These birds are migratory, and usually begin to arrive in England about the first week in October, and depart about the middle of March.

The woodcocks which arrive in the southern parts of England probably come from Normandy ; and those in the northern parts from Sweden. The latter appears evident by the time of their departure from Sweden exactly coinciding with that of their arrival in Britain, and their retreat from this country coinciding with their re-appearance there. In their migrations they chiefly fly during the night, and arrive in greatest numbers with north-easterly winds and during foggy weather.

Few birds are so much in esteem for the table as these : they are fattest, and consequently in best condition, during the months of December and January. Before they were

protected by the game laws, it was customary in some of the northern parts of England to catch woodcocks by traps. Notwithstanding the high opinion entertained by British epicures respecting the woodcock for the table, we are assured that the inhabitants of Sweden, Norway, and other northern countries, wholly reject them, under a notion that they are unwholesome. They however eat, and are particularly partial to, the *eggs* of the woodcock. These are carried for sale in great numbers to the markets of Stockholm and Gottenburg.

In commencing its flight this bird rises heavily from the ground, and makes a flapping noise with its wings. It does not long continue in flight, and stops so suddenly as to fall apparently like a dead weight. A few moments after being on the ground it runs swiftly, but soon pauses, raises its head, and casts a glance around before it ventures to lurk in concealment under the herbage or bushes.

Woodcocks are seldom known to breed in this country. Those very few, however, that happen to remain after the great flights have departed, construct their nests on the ground, generally at the root of some tree, and lay four or five eggs of a rusty colour, marked with brown spots. They feed on worms and insects.

876. *The COMMON SNIPE (Scolopax gallinago) has a long straight bill, brown legs, the plumage varied with blackish and tawny colour above, and white beneath; and the front marked with four brown lines.*

These birds, which usually weigh about four ounces, are found in marshy places in most parts of the world. They are migratory, a considerable portion of them leaving Great Britain in the spring of the year, and returning in the autumn. Many, however, continue with us through the whole year.

Snipes, on account of their delicate flavour, are in great request for the table. But as, like woodcocks (875), they are eaten with their entrails, which contain many stimulant insects, &c., it has been supposed that a frequent indulgence in such food is apt to induce the gout, or at least to accelerate its paroxysms. It is remarkable respecting these birds, that though generally fat and rich eating, they seldom cloy even the weakest stomachs.

In winter they usually continue near marshy grounds, concealed among rushes and thick herbage; but during

severe frosts they resort to sheltered springs, unfrozen boggy places, or any open streams of water. In summer they disperse throughout the country, and are occasionally found even among the highest mountains. When roused by the sportsman they utter a feeble whistle, and generally fly off against the wind, in a zigzag direction. Snipes are fattest and in best season in November and December.

These birds feed on small worms, slugs, and insects. They form their nests of dried grass and feathers, in concealed and inaccessible parts of marshes, and have each four eggs of a dirty olive colour, marked with dusky spots.

877. *The RUFF and REEVE* (*Philomachus pugnax*) are the male and female of a species of sandpiper, which have very varied plumage, the face covered with yellow pimples, the three lateral tail feathers without spots, and the covert feathers of the wings brown, inclining to ash-colour.

The males, or ruffs, have round their heads, after they are twelve months old, a very singular arrangement of long feathers, which drop off every year at the season of moulting. The female, or reeve, has no feathers of this description. The weight of the ruff is generally more than seven ounces, and that of the reeve about four.

These birds are found in the fens of Lincolnshire, Cambridgeshire, and Yorkshire.

In the early part of spring they begin to appear in the fens, and they disappear about Michaelmas. These birds are caught in nets; a skilful fowler has been known to catch six dozen in one morning. In general the males only are taken, the females being allowed to escape on account of their smaller size, and that they may be left to breed. When caught, they are generally put up for some days to be fattened; and for this purpose are fed with boiled wheat, and bread and milk mixed with hempseed, to which sugar is sometimes added. By this treatment, in the course of a fortnight, they become excessively fat. The usual mode of killing them is by cutting off their head with a pair of scissars. They are cooked like woodcocks, with their intestines, and when in perfection are esteemed by epicures a most delicious food.

It is a very singular habit of the males, which are much more numerous than the females, to take possession each of

LAND-RAIL.

a small piece of ground, upon which they run in a circle until all the grass is worn away. These *hills*, as they are called by the fowlers, are near each other; and as soon as a female alights, all the ruffs of the neighbourhood immediately begin to fight for her. It is during this contest that the fowlers seize the opportunity of entangling them in their nets.

The reeves form their nests of a few straws and dried grass loosely put together upon the ground; and lay each four white eggs, marked with large rust-coloured spots.

878. *The LAND-RAIL, or CORN-CRAKE (Ortygometra crex), is distinguished by having a short and strong bill, and the legs situated far back; the feathers of the back black, edged with bay, and the wings of a reddish rusty colour.*

The usual weight of these birds is from six to eight ounces. They are found, during summer, in corn-fields, but are migratory, and seldom seen after the middle of September.

The remarkable cry of "crek, crek, crek," uttered by these birds in meadows and corn-fields before the grass and corn are cut, is well known. It is heard from the thickest part of the herbage; and when any person approaches the spot, so great is the rapidity with which they run, that it is almost in an instant afterwards heard forty or fifty paces distant.

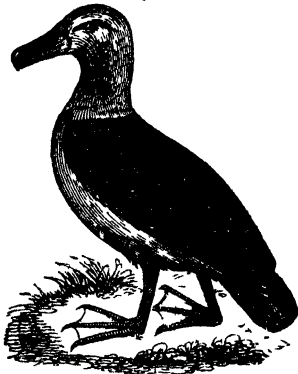
When pursued by dogs, these birds persist in keeping upon the ground, and they may sometimes be taken even with the hand. They often stop short and squat, and the dog overshooting the mark, loses his trace. When driven to the last extremity they rise, but they fly heavily, and generally with their legs hanging down. They do not fly far before they alight: they then run off, and before the sportsman can reach the place are at a considerable distance. Sometimes the land-rail will alight upon a hedge, in which case it will perch and sit motionless till the pursuer (who thinks it is upon the ground) almost touches it.

When they first appear these birds are quite lean, but before their departure they become so fat, that the author of "Rural Sports" informs us he has frequently been obliged to wrap his handkerchief round them, when killed, to prevent the fat which exuded from the shot-holes from soiling other birds.

The females lay twelve or more eggs, of a reddish cinere-

ous white colour, marked with rusty and ash-coloured spots and blotches. The nest is loosely formed of moss and dry grass, generally in some hollow place among thick grass.

Fig. 95.



Supercilious Albatross
(*Diomedea melanophrys*).

The Sixth and last Order of birds is named *Palmipedes*, or web-footed; they have the feet formed for swimming; the legs are placed far backwards on the body, the tarsi are generally short and compressed, and the toes are webbed; the plumage is close and shining, and next the skin there is a quantity of down which protects them from the water, in which they spend most of their life. (Fig. 95.)

In some of the Shetland islands, Miss Catherine Sinclair tells us, the rent is paid in the feathers of sea fowl, which are sold for ninepence per pound.

879. The PUFFIN (*Fratercula arctica*) is a marine bird about the size of a pigeon, and distinguished by having a large bill compressed at the sides, and marked with four grooves; the top of the head, a ring round the throat, and all the upper parts of the plumage, black, and the under parts white.

These are birds of passage, arriving in this country about the beginning of April, and leaving it in August. They are chiefly found on rocks and elevated ground, in unfrequented places, near the sea-shore.

The breeding of puffins is encouraged in the island of Priestholme, North Wales, and other parts of the British dominions, as a source of profit. The birds, which in some places are numerous beyond all calculation, form their nests in holes in the ground, each nest containing only a single white egg. The young ones are seized before they are quite fledged; and after the bones are taken out, the skin is closed round the flesh, and they are pickled in vinegar impregnated with spices. In this state they are sold as a

delicacy for the table. The flesh of the old birds is rank and unpalatable, in consequence of their feeding on seaweeds and fish. We are informed, by Dr. Caius, that in Roman Catholic countries, puffins are permitted to be eaten instead of fish during Lent, and on other fast days.

880. *PENGUINS* (*Spheniscinæ*) are a tribe of marine birds with straight and narrow bills, furrowed at the sides; the legs situated so far back that they walk in an upright position; the wings are small, not calculated for flight, and covered with a broad and strong membrane.

Most of the penguins are found in different islands of the South Seas.

The *Aptenodytes Patagonica*, or *PATAGONIAN PENGUIN*, is the largest of the genus, found on the Falkland Islands, &c.; it sometimes weighs forty pounds.

Vast numbers of these birds inhabit the Falkland islands, and to mariners they have sometimes afforded a very seasonable supply of food. They are in general extremely fat, and must be skinned before they are eaten. Sometimes they have been salted and packed in casks to supply the place of beef. These birds are so fearless of the approach of mankind, that there is no difficulty in knocking them down and killing them with sticks.

Penguins form their nests in holes in the ground, and generally lay one egg in each nest. The eggs are an excellent food.

881. *PELICANS* are a tribe of birds distinguished by their bills being hooked at the end, and furnished with a nail at the point and a pouch beneath, and having their face naked.

There are more than thirty known species of pelicans, some of which are found in nearly every part of the world.

Of these the most remarkable species is the great, or *WHITE PELICAN* (*Pelecanus onocrotalus*). It is furnished with a bag attached to the lower mandible of its bill, so large as to be capable of containing a number of fish. On these the pelican feeds, and by means of this bag, is enabled to convey them as food for its offspring. We are informed that the inhabitants of Mexico sometimes obtain a supply of fish by cruelly breaking the wing of a live pelican, and then tying the bird to a tree. Its screams are said to attract other pelicans to the place, which give up a portion of the provisions they have collected to their imprisoned companion.

As soon as this is observed, the men, who are concealed at a little distance, rush to the spot, and take away all except a small portion, sufficient for the support of the prisoner.

The Chinese train a species of the family (*Carbo sinensis*) to catch fish, and the birds are so well trained that they do not appear to swallow any, but such as are given to them for encouragement and food.

882. The GANNET (*Sula bassana*) is a species of pelican so numerous, and at the same time so important to the inhabitants of some parts of Scotland, that in the island of St. Kilda only, more than 20,000 are said to be annually killed by the inhabitants as food. The young birds, however, alone are eatable: to obtain these and the eggs, the bird-catchers undergo the greatest risks. They not only climb the rocks, but even allow themselves to be lowered from the top of the most dangerous precipices by ropes, to the ledges on which the nests are placed. As gannets and their eggs are a principal support of the inhabitants of St. Kilda throughout the year, they are preserved, for this purpose, in a frozen state, in small pyramidal stone buildings covered with turf and ashes.

883. The WILD SWAN, or HOOPER (*Olor ferus*), is distinguished from the tame swan by having the cere or naked skin at the base of the bill yellow and not black; by being of a smaller size; and also by an extraordinary convolution of its windpipe.

These birds are found in the northern parts of Europe, Asia, and America.

On several of the lochs or lakes of Scotland wild swans are very numerous; and they are known at a great distance by their cry, which is not much unlike the sound of a clarionet blown by a novice in music.

About the month of August these birds change their feathers, during which, in some countries, they are killed with clubs or hunted by dogs. Their *flesh* is esteemed a wholesome and palatable food, and the *eggs* are considered peculiarly delicious. Of the *skins*, which are used in England with the down upon them, for muffs, tippets, and powder puffs, the inhabitants of Iceland and Kamtschatka make garments of different kinds. The North American Indians sometimes weave the down into ornamental dresses;

and form the large feathers into caps and plumes to decorate the heads of their warriors.

884. *The TAME SWAN* (*Cygnus olor*), *the largest of all British birds, is distinguished from the wild swan by its larger size, and by the cere or naked skin at the base of the bill being black and not yellow.*

It is an inhabitant both of Europe and Asia.

So highly were these beautiful and stately birds esteemed by our ancestors, that by an act of Edward the Fourth, no person who possessed a freehold of less yearly value than five marks was permitted to keep them. At this day the stealing of swans is considered a felonious act; and there is a penalty for stealing the eggs, of twenty shillings each.

Swans were formerly served up at almost every great feast. At Archbishop Neville's feast in the reign of Edward IV. there were no fewer than 400 of these birds. At present the *cygnets*, or young swans, only are eaten. Considerable numbers of these are annually fattened near Norwich, about Christmas, and chiefly for the table of the Corporation of that city.

The nest of the swan is formed, about the month of February, of grass, and generally among reeds near the water. The eggs are six or eight in number, of a large size and a white colour.

885. *The WILD GOOSE* (*Anser ferus*) *is distinguished by having a somewhat cylindrical bill, the body ash-coloured above and paler beneath, and the neck striate.*

Large flocks of wild geese frequent all the fenny districts of England, and are also found in the northern parts of the continents of Europe, Asia, and America.

These birds are killed on account of their *flesh*, which is an excellent and nutritive food; they are the stock from which our common or *tame geese* have been obtained.

Vast numbers of the latter are kept in the fens of Lincolnshire, and other parts of England, and chiefly for the sake of their quills and feathers. Of these they are unmercifully stripped, whilst alive, once every year for the former, and occasionally five times for the latter. The *quills*, or large feathers of the wings, are termed *firsts*, *seconds*, and *thirds*, from the order in which they grow. The last two kinds are those principally used in writing, on ac-

count of the larger size of their barrels. As the utility and value of quills in the making of pens greatly depend on their firmness and elasticity, different expedients have been contrived to harden them. The most simple of these is to thrust the barrels for a few moments into hot sand or ashes, afterwards to press them almost flat with a penknife, and then to restore their roundness by the fingers, with the assistance of a piece of leather or woollen cloth, removing at the same time their external roughness by friction. But when great numbers are to be prepared, other methods are adopted. Aqua-fortis is frequently employed in the preparation of quills, by which they are stained a yellow colour.

The best *feathers* used in this country for beds, bolsters, and pillows, are from geese; those obtained in the county of Somerset are generally esteemed the best. Great quantities of goose and other feathers are annually imported from the north of Europe; but these being insufficient for the demand, the feathers of cocks and hens, and also of ducks and turkeys, all of which are much inferior to those of geese, are frequently mixed with them. The best mode of preserving feathers is to expose them in a room to the rays of the sun, and as soon as they are thoroughly dried, to put them loosely into bags, in which they should be well beaten to cleanse them from dust and filth. Of late years feathers have been manufactured into hats.

The usual weight of a fine goose is fifteen or sixteen pounds, but it is scarcely credible how far this weight may be increased by cramming the birds with bean-meal, and other fattening diet. In some places it is customary to nail them to the floor by the webs of the feet, to prevent any possibility of action, and thus to fatten them the more readily. In Vienna, the *livers* of geese are esteemed a great delicacy. They are eaten stewed, and some of the German poulterers have a method of making them grow to an enormous size.

In the choosing of geese for the table, care should be taken that the feet and legs be yellow, which is an indication of the bird's being young: the legs of old geese are red. If recently killed, the legs will be pliable, but if stale, they will generally be found dry and stiff.

These birds are denominated *green geese* until they are

three or four months old ; and at this immature age they are held by many persons in great esteem for the table.

Besides the present, there are several other species of geese, which are useful on account of their quills and feathers, and likewise as supplying mankind with food.

886. *The WILD DUCK* (*Anas boschas*) is distinguished by the general cinereous colour of its plumage, by having a narrow white mark round the neck, the bill being straight, and the tail feathers of the male curved upward.

The male is called mallard or drake, the female has the name of duck.

Wild ducks are very common in most of the fenny parts of England ; they are also found on the continent of Europe, in Asia, and America.

One mode of catching wild ducks, in the fens of Lincolnshire and some other counties, is by what are called *decoys*. These are ponds, generally formed in marshy situations, and surrounded with wood or reeds, and if possible with both. The wild birds are attracted into nets placed in the ditches of the decoy, by ducks trained for the purpose, and called decoy-birds. The latter fly abroad, but regularly return for food to the pond of the decoy, where they mix with tame ducks, which never quit the place. When it is required to catch the wild birds, a quantity of hemp-seed is thrown into the ditches. The decoy and tame ducks lead them in search of this, along the ditches, which generally have reed skreens at certain intervals on each side, to prevent the decoy-man from being seen. As soon as they have advanced to the part of the ditch over which the net is extended, the man appears behind. Fearful of returning past him, and unable to escape by flight, they proceed onward to the end of the net, which terminates on the land, and are there caught by a man stationed for the purpose. The trained birds return back past the decoy-man into the pond again. The general season for catching wild ducks is from the latter end of October until the beginning of February ; we are informed that in ten decoys which are near Wainfleet, as many as 31,200 wild ducks, wigeon, teal, and other water fowl, were caught in a single season.

These birds are the original to which we are indebted for our valuable breed, the common or *tame duck*.

887. The *TEAL* and *WIGEON* (*Querquedula crecca* and *Mareca penelope*) are two small species of duck, of which the former has a green spot on each wing, and a white line about and beneath the eyes; and the latter has the tail somewhat pointed, the under part near the tail black, the head brown, the front white, and the back waved with ash-coloured and blackish marks.

Both these species are common in England, and are killed for the table.

888. The *EIDER DUCK* (*Somateria mollissima*) is about twice the size of the common duck, and known by its bill being cylindrical, and the cere or naked skin at the base being divided into two parts at the back, and wrinkled.

These birds inhabit the northern parts of Europe, Asia, and America, and generally form their nests on small islands not far from the sea-shore.

The nests of eider ducks are constructed externally of marine plants, and lined with white down, which the birds pluck from their own breasts. This is the substance called *eider down*. It is collected from the nests by the bird-catchers, who for that purpose carefully remove the females, and then take away a certain portion both of down and eggs from each. More down is plucked from their breasts, and more eggs are laid to supply the place of those that have been taken. The nests are plundered in the same manner as before; and when the young ones are fledged, the whole of the down that remains is collected. It is generally reckoned that the down of one nest, after it has been picked and cleansed, will weigh about a quarter of a pound; the bulk of the whole quantity may easily be imagined, when it is stated that three quarters of an ounce of eider down is more than sufficient to fill the crown of a large hat. The use of this down is for making beds, but particularly for making what are called down quilts, a kind of covering almost like a feather bed, which is used in the northern countries of Europe as a protection against cold, instead of a common quilt or blanket.

The *flesh* and the *eggs* of these birds are used for food, and their *skins* are sewed together and made into under garments by the inhabitants of Greenland.

Class III.

REPTILIA, or Reptiles.



Frilled Lizard of New Holland.
(CHLAMYDOSAURUS KINGII.)

ORDER I.—CHELONIA, or Tortoises.

These animals have a heart with two auricles, and may be known at first sight by the two shields in which their body is inclosed, which shields are formed of the ribs and sternum. They have four feet. They have no teeth; are very retentive of life, and require but little nourishment. Many of them are used as food by man.

889. *The GREEK TORTOISE* (*Testudo Græca*) is of a dirty yellow and black colour; with four feet, and a somewhat hemispherical shell, consisting of thirteen middle convex pieces, and about twenty-five marginal ones.

These animals are about eight inches long, and three or four pounds in weight. They are found in woods of many of the countries of the Continent, and in most of the islands of the Mediterranean.

In nearly all countries where these tortoises abound, they are considered valuable as food, and are cooked in various ways, but are chiefly used for soup. By some people the *blood* is eaten without any culinary preparation.

Each tortoise, towards the end of June, lays in the sand from thirty to forty *eggs*, of a round shape, and about the

size of those of a pigeon. These eggs, when boiled, are in particular esteem for the table. In some parts of Italy it is customary to collect and bury them in places dug in the earth; when the young ones appear, they are fed and taken care of until they are in a fit state to be killed for the table.

In their habits the animals are mild and peaceable; being furnished with a house which they continually carry about with them, and into which they can in an instant withdraw their head, legs, and tail, they have no danger to fear from their enemies. So great is the strength of their shell, that instances have occurred of their having been run over, even by waggons, without injury. Tortoises have been known to live to the age of more than one hundred years.

890. Several other kinds of tortoises serve for food as well as the present, particularly the *ROUND TORTOISE* (*Emys orbicularis*), which is in great request for the tables of the opulent inhabitants of Germany and Hungary. With this view it is fed on bread and tender herbage, its natural food being insects, slugs, and small fish.

891. The *HAWK'S-BILL TURTLE* (*Chelonia imbricata*) is a marine tortoise, of a yellowish and brown colour, which has fin-shaped feet, each with two claws, thirteen plates in the middle of the shell, and twenty-one round the margin, lying somewhat loosely over each other at the edges.

This animal, which is from two to three feet in length, is a native of the American and Asiatic seas; and is also sometimes found in the Mediterranean.

The plates or scales of the hawk's-bill turtle constitute that beautifully variegated and semi-transparent substance called *tortoiseshell*. This, after having been softened by means of boiling water, is capable of being moulded into almost any form; and is in request by opticians and other artists for many purposes both useful and ornamental. The ancient Greeks and Romans were so partial to the use of tortoiseshell that they decorated with it their doors, the pillars of their houses, and even their beds; the great consumption of it at Rome may be imagined by the relation of Velleius Paterculus, who informs us, that when the city of Alexandria was taken by Julius Cæsar, the magazines or

warehouses were so full of this article, that he proposed to have made it the principal ornament of his triumph.

The *flesh* of the hawk's-bill turtle is not only of a bad flavour, but is said to be even in some degree poisonous; persons who have partaken of it having been seized with vomiting and other unpleasant symptoms. The *eggs*, however, are esteemed peculiarly delicious.

892. *The COMMON, or GREEN TURTLE* (*Chelonia midas*), is a marine tortoise, distinguished by its oval shape; by the fore feet only having two claws, the greenish-coloured scales neither folding upon each other nor having any ridge, and the middle scales being thirteen in number.

These, which are the largest kind of tortoise that is known, are sometimes six feet and upwards in length, and from five to eight hundred pounds in weight.

They are found, and generally in great numbers, on the unfrequented sea-shores of most countries within the torrid zone.

This species of turtle is one of the most valuable gifts of Providence to the inhabitants of tropical climates, and to mariners frequenting those parts. It affords them an abundant supply of agreeable and nutritive food. So numerous are they in some places, that instances have occurred of forty or fifty having been obtained in the course of three hours. They are generally caught whilst asleep on the shore: the seamen go gently to the places where they are found, and turn them on their backs. From this position they are unable to recover their feet, and thus are perfectly secured until a sufficient number can be collected for conveyance on ship-board. Turtles are sometimes killed with spears whilst lying at the bottom of the sea in shallow water, or whilst swimming on the surface.

The females dig hollow places in the sand of the sea-shore, a little above high water mark; and in these they deposit sometimes more than a hundred *eggs*, carefully concealing them from observation by scratching over them a thin layer of sand. These eggs, which are wholesome food, are nearly globular, each two or three inches in diameter, and covered with a strong membrane, somewhat like wet parchment. They consist of a yolk, which by boiling hardens like that of other eggs, and of a white that is incapable of being hardened by heat.

The parts of the turtle most in esteem are those about

the belly, which are of a delicate white colour, somewhat resembling veal; and the green fat, which possesses a very peculiar odour. The whole is extremely nutritious, and of a soft gelatinous nature; but as it contains a large proportion of strong fat, it should not be eaten without salt and pepper, or other spice: and should be carefully avoided in every form by invalids, and persons whose digestive powers are impaired. The flesh of the turtle is sometimes cut into pieces and salted, and in this state forms an article of traffic in the West Indies. Not only the flesh, but even the intestines and eggs are salted. The *fat* yields a greenish yellow oil, which is used in lamps for burning, and when fresh, with food. The inhabitants of some countries convert the upper *shells* of turtles into canoes, troughs, bucklers, and other useful articles; and sometimes adopt them as a covering for houses.

The turtle, as a luxury for the table in this country, was introduced some time in the early part of the last century. We import these animals chiefly from the West Indies.

ORDER II.—SAURIA, or Lizards,

Have a heart with two auricles, and the body covered with scales. Their ribs are moveable, their tail is more or less lengthened, most of them have four legs, in some, however, there are but two.

893. *The CROCODILE and ALLIGATOR* (*Crocodilus vulgaris* and *Alligator*) are two immense animals of the lizard tribe, the principal distinction between which is founded on the head and part of the neck of the former being more smooth than those of the latter; and in the snout being proportionally more wide and flat, as well as more rounded at the extremity.

The length of the crocodile, when full grown, is from eighteen to about twenty-five feet; and that of the alligator somewhat less. Crocodiles are chiefly found in the river Nile; and alligators in rivers and lakes of some parts of America.

The *flesh* of both these animals has a strong, unpleasant, and somewhat musky flavour; yet it is eaten by the natives of most of the countries in which they are found. It is white and juicy; the parts that are preferred are those about the belly and tail. The flesh of the young ones is,

however, said to be devoid of any unpleasant taste, and to be sufficiently palatable even to Europeans. The *eggs* also are eaten. Of the *teeth* of the alligator, which are as white as ivory, the Americans make snuff-boxes, charges for guns, and several kinds of toys.

There is an unfounded opinion that the upper jaws of these animals are moveable ; and that they have no tongue. They swim with great velocity, and sometimes float asleep on the rivers, like immense logs of wood. Their voracity is excessive ; springing in a very surprising manner upon animals on which they prey, they instantly drag them into the water, sink to the bottom, and there devour them. The females deposit their eggs, from eighty to a hundred in number, in the sand, and leave them to be hatched by the heat of the sun.

894. The GUANA (*Iguana tuberculata*) is a species of lizard, four or five feet in length, which has a round and long tail ; the back with an elevated ridge of scales ; and the throat with a pouch that is capable of being inflated to a large size.

These animals are found among rocks, or in woods, in several parts of India and America. In Surinam, Guiana, and Cayenne, they are very numerous ; and they are occasionally caught in the West Indian islands.

Scarcely any species of animal food is so much admired by epicures in hot climates as the *flesh* of the guana. It is preferred even to that of the turtle, and is cooked in various ways, being roasted, boiled, or converted into soup. The fat of these animals, after having been melted and clarified, is applicable to many uses. The flesh is sometimes salted, and exported for sale to distant countries.

There are several modes of catching guanas. In many parts of America they are chased by dogs, which are trained purposely to this pursuit. Frequently they are caught with snares placed near their haunts, and sometimes by a noose of cord affixed to the end of a long rod.

The *eggs* of the guana, which are generally found in the sand near the sea-shore, are said to be preferable for sauces and other purposes of cookery to the eggs of poultry ; but, when eaten alone, they are viscid in the mouth, and to an European palate have at first a very disagreeable taste.

ORDER III.—OPHIDIA, or Serpents,

Have no feet, and their long body moves by means of folds pressed against the ground. Several kinds of serpents are used as food by the inhabitants of countries in which they are found. The American Indians often regale themselves on *RATTLE-SNAKES* (*Crotalus horridus*), skinning and eating them as we do eels. The *GREAT BOA* (*Boa constrictor*), which sometimes measures more than thirty feet in length, is a favourite food with the negroes of some countries; its skin also when tanned is used by the Indians for making shoes and other articles. The flesh of the *COMMON VIPER*, or *ADDER* (*Vipera berus*), has been strongly recommended as a medicine in several complaints, such as leprosy, scurvy, rheumatism, and consumptions, but its virtues have been much exaggerated. Its fat also, collected in the month of March, when the viper is said to be in best condition, is considered by the country people to be one of the most efficacious cures for the relief of those afflicted with the bites of the adder, and venomous reptiles generally.

ORDER IV.—BATRACHIA, or Frogs,

Are said to have but one auricle and ventricle to the heart, have a naked body, which in the greater number has at first the appearance of a fish, breathing by means of gills, and from this state assumes four feet, and breathes by lungs.

895. The *EDIBLE FROG* (*Rana esculenta*) is distinguished by its back being angular, and by having three yellowish stripes, which extend from the muzzle almost to the hind legs.

These animals are not only common in England, but are found in ponds, ditches, and fens, in nearly all the temperate parts of Europe.

As an article of luxury for the table the edible frogs are in great request in France, Germany, and other countries of the Continent. They are generally caught in the autumn, by rakes with long close-set teeth, by nets, and in numerous other ways. Some persons amuse themselves by catching them with lines and hooks baited with insects or worms. At this season they are collected in thousands, and sold to the wholesale dealers, who have large conservatories

for them. These are holes dug in the ground, to the depth of four or five feet, covered at the mouth with a board, and over this, in winter, with straw. We are informed, by Dr. Townson, that at Vienna, in the year 1793, there were only three great dealers in frogs; by whom most of those persons were supplied who carried them to the markets for sale.

The parts that are eaten are chiefly the hind quarters.

896. In America the species called *BULL-FROGS*, which sometimes measure eighteen inches and upwards in length, from the nose to the hind feet, are not unfrequently used as food.

897. M. Rossillon has obtained oil from the *WATER-EFT* (*Triton palustris*) at the rate of thirty centigrammes from each individual of ordinary size; it was extracted by simple pressure. The oil was very good for burning, and gave less smoke than fish oil; and it is also applicable, from its great fluidity, to fine machinery. *Athenæum*, 1841, p. 901.

Class IV.

FISHES (PISCES).



OREOSOMA ATLANTICUM.

Fishes are divided into two sections, Bony (or osseous) Fishes, and Cartilaginous (or chondropterygious) Fishes. To the former belong all the fishes properly so called, which have a distinct bony skeleton; while the skeleton in the second is cartilaginous, the calcareous portion not being disposed into a fibrous structure, but being placed in grains in a distinctly gelatinous substance.

BONY FISHES.

ORDER I.—SPINY-FINNED FISH (Acanthopterygi).

In these, the first part of the dorsal fin, or the whole of the anterior dorsal when there are two, is supported by spines; sometimes instead of a first dorsal there are a few free spines. The first rays of the anal fin have also spines, and each of the ventrals has also in most cases a similar bony ray.

Cuvier has divided this large and important order into fifteen families, of some of which examples are now to be given.

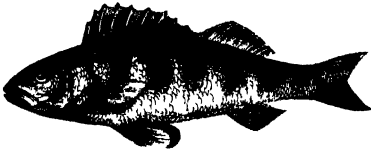
The first family (*Percidæ*), of which the common perch is a familiar example, and from which indeed it derives its name, has the body of an oblong form, covered with hard scales, and having the operculum, or gill-cover, toothed or spiny on the margin. There are many species, especially in the tropical seas; their flesh is generally wholesome and much relished; one of them, the celebrated "Mango fish" (*Polynemus paradiseus*), being regarded as the most delicious fish found in India. It receives its English name from its fine yellow colour.

898. *The COMMON PERCH* (*Perca fluviatilis*, Fig. 96) is a fresh-water fish, distinguished by having sixteen soft rays to the second dorsal fin, fourteen spiny ones to the first dorsal fin, the upper gill-covers serrated at the edges, and the sides marked by five broad and upright bars of black.

This fish seldom exceeds the weight of four or five pounds.

It is found in the rivers and lakes both in Europe and Siberia.

Fig. 96.



The common Perch (Perca fluviatilis).

With the ancient Romans, the perch was a very favourite dish. Though somewhat bony, it is white, firm, and well flavoured, and is considered an excellent food for persons in a weak state of health. Perch are generally found in rapid streams where the water is somewhat deep. They are caught both with nets and with hooks and lines, and are in greatest perfection from January to March, and again in October and November. In Lapland and Siberia they are sometimes found of an enormous size. The Laplanders in one of their churches have the dried head of a perch which is nearly a foot in length. The Dutch are particularly fond of perch when made into a dish called *water souchy*.

From the *skins* of perch a kind of isinglass is made, which surpasses that made from any other fish. The Laplanders use it to stiffen their bows and make them durable. It is made thus: the skins are first dried, and afterwards softened in cold water to rid them of the scales. The Laplanders generally take four or five of the skins at a time, put them into a rein-deer's bladder, or wrap them in pieces

of the bark of the birch-tree, so that they may not come in contact with the water. They place these in a pot of boiling water, putting on them a stone to keep them at the bottom of the pot; and in this situation they are boiled for an hour. When they have become soft and glutinous, they are taken out, and are then in a state fit for use.

Perch may be bred and fattened in ponds; but care should be taken not to put them with other fish, as their voracity renders them extremely destructive to any that are weaker than themselves; or they should be accompanied by such only as are intended to furnish them with food. A pond may be stocked with perch by putting only the eggs or spawn into it; and if the situation and circumstances be favourable, the increase in a few years will be extremely great.

These fish are so tenacious of life, that instances have occurred of their being packed in wet straw and carried alive to a distance of fifty miles and upwards.

899. *The BASSE (Labrax lupus) somewhat resembles a perch; it has a short and sharp spine on the posterior plate of the gill-cover, fourteen rays to the second dorsal fin, the back dusky, tinged with blue, and the belly white.*

This fish sometimes attains the weight of twenty and even thirty pounds.

It is found in the Mediterranean, the British Channel, the Northern Ocean, and the Baltic.

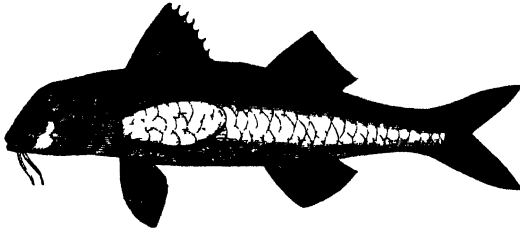
These voracious fish are caught during nearly all the year; but the months of August, September, and October, are considered most favourable for taking them. They not only approach the shores, but even ascend the rivers to great distances. Though their flesh is in general woolly and insipid, the Romans preferred them to many other kinds of fish, and sometimes paid high prices for them. Those which they chiefly esteemed were caught in the Tiber, betwixt the bridges of Rome.

The eggs or roes of the basse have sometimes been used in France and Italy to make what is called *Boutargue* or *Botargo*.

900. *The RED SURMULLET (Mullus barbatus, Fig. 97.) is known by its large and loose scales, the general red colour of its body, and its having two fleshy beards on the under jaw.*

It frequents the European seas, and seldom exceeds the length of eight or ten inches.

Fig. 97.



The Red Surmullet (Mullus barbatus).

901. *The STRIPED MULLET, or SURMULLET (Mullus surmuletus), has large and long scales, is of a red colour, with four yellowish stripes along its sides, and two beards on the under jaw.*

This fish inhabits both the European and the American seas, and is from ten or twelve inches to two feet in length.

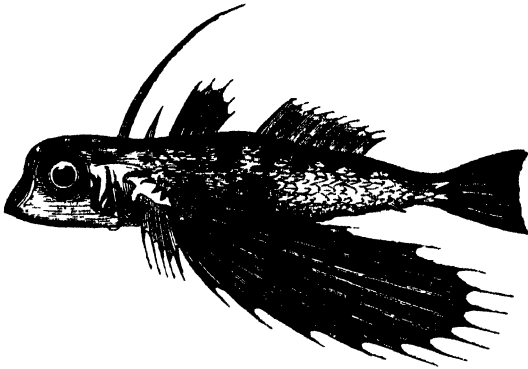
The prices at which the surmullet was sometimes purchased by the Romans were enormously great. We read of a Roman consul having given at the rate of more than 64*l.* of our money for one of them; and of one of the Roman emperors having paid upwards of 240*l.* for another—to such an absurdity of extravagance did this people arrive before the dissolution of their empire. But it went further: they are said to have considered even the surmullet of little value unless it died in the very hands of their guests. Some of the most luxurious of the Romans had stews formed even in their eating-rooms, so that the fish could at once be brought from under the table and placed upon it. Here they were put into transparent vases, that the guests might be entertained with their various changes of colour, from red to violet and blue, as they expired. The parts chiefly admired for the table were the head and the liver.

Both of the above species of mullet occasionally visit our coasts during the summer season, the latter being the more common. Their flesh is white, firm, and well-tasted; but they cannot long be kept without becoming putrid.

The second family (*Loricatæ*), containing the gurnards,

and many other genera, is distinguished by the head being variously armed, so as to give the fish comprised in it a very peculiar physiognomy; the suborbital bone in all of them is more or less extended over the cheek, whence they derived their name of *mailed cheeks*.

Fig. 98.

*Dactylopterus orientalis.*

Many of them have most singular forms, as in a small fish found in the Atlantic Ocean (*Oreosoma Atlanticum*), figured on page 414, in which the body is covered with scaled cones. The flying-fish of the Mediterranean (*Dactylopterus volitans*), a beautiful species of the same genus with which is here figured (Fig. 98.), may also be particularly mentioned. In this the subpectoral rays are numerous, and united by a membrane so as to form an additional fin longer than the fish itself, and which supports it when it vaults into the air to escape its enemies, the dolphins and bonitocs. The true flying-fishes are very different from this. (See 923.)

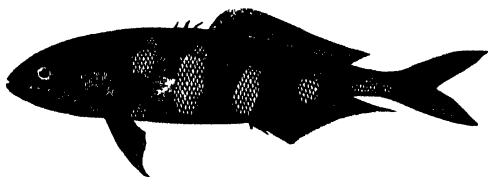
902. **GURNARDS** (*Triglæ*) are fishes with a large angular and bony head; and two or more distinct appendages near the pectoral fins.

Of about fifteen known species of gurnards, five are caught near the British coasts. These are the **GREY GURNARD**, **RED GURNARD**, **PIPER**, **TUB-FISH**, and **STREAKED GURNARD**. of which the two former are considered best for the table. Their flesh is white, firm, and good, though

somewhat insipid ; and they are thought to be in greatest perfection from about the beginning of May to the end of July.

903. The next family we shall give examples of is the Mackerel tribe (*Scomberidæ*), of which the common mackerel may be taken as a good example. It is one of the most useful tribes of fish to man, whether their agreeable flavour, large size, or inexhaustible profusion, be taken into account.

Fig. 99.



The Pilot-fish (Naucrates ductor).

In general the scales are very small, giving the skin the appearance of being entirely smooth. As an example, the famous *Pilot-fish* of navigators (*Naucrates ductor*, Fig. 99.) is here figured. This fish is so named from its habit of following ships ; it is also said to act as a guide to the shark ; by the ancients it was regarded as a sacred fish, as they believed it pointed out the way to sailors, and announced to them their approach to land.

904. The **COMMON MACKEREL** (*Scomber scombrus*) is known from other fish by having five small and distinct or spurious fins betwixt the dorsal fin and the tail.

Its usual length is from a foot to eighteen inches, and its weight seldom exceeds two or three pounds.

The mackerel fishery is an object of great commercial importance to the inhabitants of most of the countries on the shores of which these fish abound. During the summer season they approach our coasts in immense shoals, and are generally caught in seine nets. From June to August many of our markets are supplied with them ; but as mackerel become putrid sooner than most other fish, they cannot be carried to any great distance, nor be kept long. On this account it is that they are allowed to be sold in the streets

of London on Sundays, and in Catholic countries on Sundays and festivals.

When quite fresh, mackerel are an excellent food, and are in best season from May to July. Both in Italy and England they are often pickled with vinegar and spices, and sometimes with bay leaves intermixed. By the inhabitants of many parts of the North of Europe they are salted; in this state they constitute a cheap and very important article of subsistence. In Scotland they are frequently cured in the same manner as herrings. It was with these fish chiefly that the ancient Romans formed their celebrated pickle called *garum*. This in the ancient world constituted a very considerable branch of commerce, not only from its being used as a highly esteemed sauce, but also as it was considered a remedy for various diseases. In the Mediterranean the *roes* of mackerel are salted, and used for *caviar*.

905 *The THUNNY, or ALBICORE (Thynnus vulgaris), is of a steel-blue colour above, and silvery white beneath; particularly known by having from eight to eleven distinct small or spurious fins, betwixt the dorsal fin and the tail.*

These fish measure from two to ten feet in length, and frequently weigh from 400 to 1200 pounds.

They are chiefly caught in the Mediterranean.

We are acquainted with no fish, of a size equal to the thunny, which supplies mankind with so palatable a food. The thunny fishery is pursued with great ardour by the inhabitants of nearly all the shores of the Mediterranean; but particularly by those of Spain and Sardinia. It constitutes one of the principal objects of diversion to the inhabitants of Sardinia: for the purpose of attending it, many persons of distinction come even from distant countries. The nets, which are of great size and value, are prepared in April, and are consecrated by the priests previously to being thrown into the sea. On the preceding evening the persons employed draw lots for the name of the saint who is to be considered the patron of the fishing for the ensuing day; and this saint, whoever he may be, is alone invoked to promote the success of the undertaking.

Notwithstanding their great size, these fish swim in shoals of sometimes more than one thousand together. Pliny asserts that the fleet of Alexander the Great attempted in vain to pass through a shoal of them in any other manner

than closely arranged in order of battle. Of the immense number of thunnies some idea may be formed, when it is stated that three or four hundred thousand of them are supposed every year to pass through the Straits of Gibraltar. These fish are not uncommon on the western shores of Scotland, but not in shoals as in the Mediterranean.

The flesh of the thunny varies much in its quality, depending upon the season, and the place where it is taken; hence in Sardinia it is called by different names according with this difference. When raw it is in general red like beef, but on being boiled, it assumes a pale colour; and when in perfection its taste somewhat resembles that of salmon. These fish are salted, and sent in great quantity to Constantinople and the Greek islands. The thunny was so much esteemed by the ancient Greeks that they consecrated it to Diana.

906. *The BONITO* (*Thynnus pelamis*) is a large species of a thick form, with seven small distinct fins betwixt the dorsal fin and the tail, and several large scales below the pectoral fin.

This fish measures eighteen inches or two feet in length, and is ten pounds and upwards in weight.

It is principally found in the seas of tropical climates.

Sometimes these fish approach the European shores; one of them was caught a few years ago at Christchurch, in Hampshire. To mariners in hot climates they often afford an important supply of food. Their flesh is fat and white, but inferior in excellence to that of the thunny, except when salted. A very lucrative fishery of bonitos is carried on at Cadiz. The fishing commences about the end of April, and continues until the beginning of July; and in general affords occupation for about a hundred persons.

907. *The EUROPEAN SWORD-FISH* (*Xiphias gladius*) is known by having its upper jaw lengthened into a hard and sword-shaped blade; and its dorsal fin long, and lowest in the middle.

These fish are of a steel-blue colour, and measure from fifteen to twenty feet in length.

They are found in most parts of the European seas.

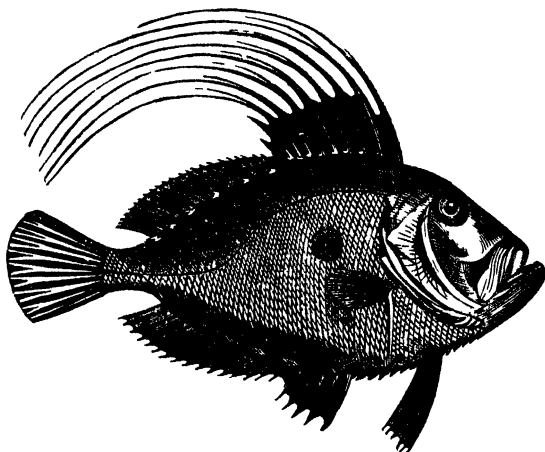
By the ancient Romans sword-fish were highly esteemed as food; and were killed with harpoons by persons stationed in boats for that purpose. They were not only eaten fresh, but were also cut into pieces and salted. The in-

habitants of Sicily are at this day extremely partial to them, and purchase them, particularly the smaller ones, at very high prices. The parts chiefly in request are those about the belly and tail. In several places near the Mediterranean the fins are salted, and sold under the name of *callo*.

908. The *JOHN DORY* (*Zeus faber*, Fig. 100) is very much compressed at the sides, with a large head, wide mouth, long filaments to the rays of the first dorsal fin, the tail rounded, and a roundish black spot on each side of the body

This species is an inhabitant of most seas, and is usually about a foot and a half in length ; but it is sometimes known to weigh as much as ten or twelve pounds.

Fig. 100.



John Dory (Zeus faber).

It has only been within about the last half century that this delicious, though hideous-looking fish, has had a place at our tables ; the first person who brought it into notice was the well-known actor and bon-vivant, Quin.

Near the coasts of Devonshire and Cornwall, dories are caught in great number both in nets and with lines ; and they are principally in season during the months of October, November, and December. The name is a corruption from

the French *jaune dorée*, golden yellow, this being their colour when first taken out of the water.

This fish is sometimes called the "fish of St. Peter," from an ancient tradition that it was from its mouth that the apostle drew the tribute-money, and the black spots on each side of the body are supposed to be the marks of his thumb and fingers; a similar honour is given to the haddock, with just as much reason. Its name of *Zeus*, or *Jupiter*, was given it by the ancients from its pre-eminence as an article of food.

909. *DOLPHINS* (*Coryphæna*). The famous dolphin of the Mediterranean (*C. hippurus*) was one of these. They may be regarded as the most brilliantly coloured of fish, and were believed to display these colours more particularly

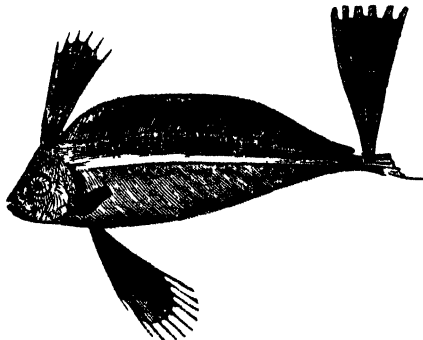
Fig. 101.



The Dolphin (Coryphæna equisetis).

when they were dying. They are remarkable for their eager pursuit of the flying fish, which they force to leave the water, and catch the instant they dip again, exhausted with their flight. The true dolphin of the ancients was a cetaceous animal, before alluded to.

Fig. 102.



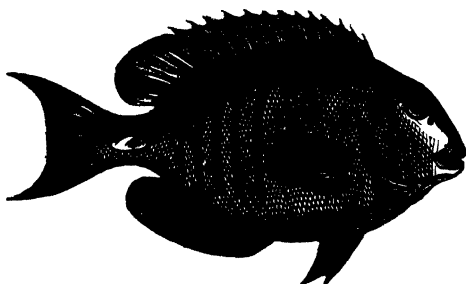
Trachypterus Spinolæ.

910. The next family of which we give an example contains several very curious fish, some of which are met with in the British seas. In general they are long, and flattened on the side, whence they are named Ribbon-shaped (*Ternioidæ*). Some of the Indian species are said to have electric properties, but Cuvier believes that this is not the fact. From the extreme delicacy of the flesh, when caught, they are easily mutilated.

A species of the genus *Gymnetrus* is called by the Norwegians "king of the herrings." It is said to have been met with in Britain. The example here figured is the *Trachypterus Spinolæ*.

911. The next family, of which the Lancet fish may be taken as an example, is named *Theutidæ*. In most of these the sides of the tail are armed with a strong spine; with this spine, which is moveable, they can, when seized incautiously, inflict a severe wound; one of these here figured (Fig. 103.), which is much esteemed as an article of food in the West Indies, is named "the Surgeon" (*Acanthurus chirurgus*) from this circumstance.

Fig. 103.



Lancet Fish, or Surgeon (Acanthurus Chirurgus).

912. In the next family, which contains the singular climbing Perch of India (*Anabas scandens*), many of the cells near the gills the fish can at pleasure fill with water, which flows upon the gills, and moistens them, long after it has left the water. Most of the species possess the faculty of quitting the streams in which they live, and

creeping to some distance from them, so that the people in India believe that they have fallen from heaven. The one above alluded to is said to have the power of climbing trees, but this power has been denied it by other observers. One species of this family, the *Gourami* (*Osphronemus olfax*), which grows as large as the turbot, is famed as among the most deliciously flavoured of all the Eastern fish. The Indian jugglers frequently carry about with them specimens of *Ophicephali*, as well as of the climbing Perch, and exhibit their powers of crawling on the ground.

913. The Mullet family (*Mugilidæ*) has the body nearly cylindrical, the muzzle very short, and the scales with which the species are covered large. They must not be confounded with the surmulletts (900) already alluded to.

914. The *WHITE*, or *COMMON MULLET* (*Mugil cephalus*) is distinguished by having the lower jaw angular, several narrow and dark-coloured stripes on each side of the body, a toothed process betwixt the eye and the opening of the mouth, and the gill-covers angular behind and covered with scales.

The weight of this fish is four or five pounds and upward.

They inhabit the seas of nearly all the southern parts of Europe, and annually enter the mouths of almost all the great rivers.

Vast shoals of mullets are frequently observed, about the months of May, June, and July, swimming near the surface of the water, in harbours, and in rivers adjacent to the sea. They are caught with nets, but are so cunning, that, even when entirely surrounded, they will sometimes nearly all escape, either by leaping over or by diving under the nets.

These fish are in considerable request for the table, and are in best season about the month of August. Their flesh, however, is, in many instances, woolly and bad; and the great quantity of oil which is found beneath the skin renders them to some persons very unpleasant. In several places on the coast of the Mediterranean mullets are dried and smoked for exportation.

Of the roes of mullets is sometimes made the kind of caviar called *botargue* or *botargo*. For this purpose they are taken out and covered with salt for four or five hours.

Afterwards they are gently pressed between two boards or stones, to squeeze the water out of them. They are then washed in a weak brine, and lastly exposed to the sun for twelve or fifteen days to be dried. This substance is said to quicken a decayed appetite, and to give a relish to wine. It is much in request in Greece, as food on the numerous fast-days of the Greek church.

915. The Goby family (*Gobioidæ*) containing the gobies and blennies, have the dorsal spines slender and flexible; one of these, the *VIVIPAROUS BLENNY* (*Blennius viviparus*) has been long well known for a peculiarity, chiefly observed amongst cartilaginous fishes, that of producing its young alive. In this division also comes the *SEA-WOLF* (*Anarrichas lupus*, Fig. 104.), a fish fre-

Fig. 104.



Sea-wolf (*Anarrichas lupus*).

quently met with on our coasts, sometimes attaining the length of six or seven feet; by the Icelanders it is much sought after, as they salt its flesh, make a shagreen of its skin, and use its gall as soap; it often enters fishermen's nets to plunder them; it can bite very severely, as may be inferred when it has been known to leave the marks of its teeth on a bar of iron.

916. The next family, which contains several most singularly formed fish, is distinguished by having the pectoral fins furnished with a wrist at the base, which arises from the prolongation of the carpal bones. Many of them, such as the Anglers (*Lophius*), and Hand-fish (*Chironectes*) are said to conceal themselves in the sand or mud, and by putting in motion the filaments and other appendages about their heads, to attract small fishes, which mistake them for worms, whence one species was named by Linnæus Lo-

phius piscatorius ; this, which at times measures from four to five feet in length, with its prodigious gape, depressed head, rough tongue, and well armed mouth, has a most disagreeable appearance ; it is found in the European seas.

Fig. 105.



Harlequin Hand-fish (Chironectes hystrio).

The *Chironectes* have the power of inflating themselves with air, and they can creep about on land, and it is said can live without entering the water for two or three days. They are found in the tropical seas. The example here figured (Fig. 105.), is, from its variegated coat, named the Harlequin Hand-fish (*Chironectes hystrio*).

The second division of bony fishes contains within itself, so to speak, three subordinate orders, distinguished by the position of the ventral fins, or by their absence.

MALACOPTERYGII ABDOMINALES, have the ventral fins suspended to the under side of the body, *behind* the pectorals, as in the singular four-eyed anableps of the rivers of Guiana (*Anableps tetraophthalmus*, Fig. 106).

The first family, (*Cyprinidæ*) have a slightly cleft mouth and weak jaws, the body is scaly, and they want the adipose dorsal fin, found in the salmon tribe ; they are perhaps the

least carnivorous of fishes, living principally on grains, grass, and even on mud. They are very productive. In this

Fig. 106.



Four-eyed Loach (Anableps tetraophthalmus.)

family come the beautiful gold fish (*Cyprinus auratus*), originally from China, and the little minnow, (*Leuciscus phoxinus*) so common in every shallow stream.

917. *The Common CARP (Cyprinus carpio) is a freshwater fish, known by having one dorsal fin, three bony rays to the gill membrane, the mouth with four fleshy beards, the second ray of the dorsal fin serrated behind, and the body covered with large scales.*

These fish sometimes grow to a very large size.

They inhabit slow and stagnating waters in various parts of Europe and Persia, and were first introduced into England about the year 1514.

Carp are useful for the stocking of ponds, and for the table. In Polish Prussia they are an important article of commerce; being sent alive in well boats to Sweden, Russia, and other parts. They are bred by the principal land-holders of the country, to whom, in many instances, they yield a very important revenue. If the rearing of carp were better understood and practised in the marshy parts of England than it now is, they would amply repay every expense and trouble that might be bestowed upon them. The increase of these fish is very great: we are informed by Bloch that four male and three female carp, put into a large pond, produced in one year an offspring of no fewer than 110,000 fish. They are also extremely long lived, instances having occurred of carp living to the age of considerably more than 100 years. To fatten carp and increase their size, the growth of vegetation in the ponds where they are kept should be particularly attended to, as, during the summer-time, they principally feed upon this. In winter, when the ponds are frozen over, care must be taken to

break the ice, that they may have access to the atmospheric air, without which, if they are in great numbers, they will die.

Carp are much esteemed as food ; but a principal part of their excellence depends on the mode in which they are cooked. They are best in season during the autumnal and winter months. The usual mode of catching them is with nets, and the most proper time is at day-break. These fish, if kept in a cellar, in wet hay or moss, and fed with bread and milk, will live many days out of the water, and even become fat.

With the roes of carp, in the eastern parts of Europe a kind of *caviar* is made, which is sold in considerable quantity to the Jews, who hold that of the sturgeon in abhorrence. The *sounds*, or air-bladders, of carp are converted into a species of isinglass, and their *gall* is in much repute with the Turks for staining paper, and for making a green paint.

918. *The TENCH (Cyprinus tinca) belongs to the carp tribe ; it is distinguished by its mouth having only two beards, the scales being small, the fins thick, and the whole body covered with a slimy matter.*

The weight of these fishes seldom exceeds four or five pounds, but instances have occurred of their weighing more than eleven pounds.

They are found in stagnant waters in nearly all the temperate parts of the globe.

There are not many fresh-water fish that are more excellent for the table than these ; yet the ancient Romans so much despised them, that they were eaten by none but the lowest classes of the people. In the kingdom of Congo, on the contrary, they were formerly so much esteemed, that they were allowed only to be eaten at court, and any person was liable to the punishment of death who caught a tench and did not carry it to the royal cook. The tench caught in clear waters are much superior to those which inhabit muddy places. They thrive best in still waters, where there are weeds at the bottom ; they are in season from the beginning of October until the end of May.

919. *The GUDGEON (Cyprinus gobio) is also of the carp tribe ; it has a thick and round body, two fleshy beards near the mouth, and the dorsal and caudal fins spotted with black.*

Its length is usually about six inches, and its weight seldom more than three or four ounces.

This fish is an inhabitant of gentle streams, with gravelly or sandy bottoms, in most of the northern parts of Europe.

The flesh of the gudgeon is white, firm, and of an excellent flavour; but their small size prevents their being much in demand. They are found in small shoals near the bottom of the water; and are caught both with nets and lines. The bait used is generally a small earth-worm, which they seize with great eagerness. They are in the greatest perfection from September till the end of the year.

Gudgeon thrive well in ponds, if these be fed by brooks running through them. Under favourable circumstances they have sometimes attained an unusually large size. They feed on aquatic plants, worms, water insects, and the spawn of fish.

920. *The BLEAK (Leuciscus alburnus) is of the carp tribe; it has a somewhat pointed muzzle, and no beard; the scales thin, shining, and slightly attached.*

It seldom exceeds the length of five or six inches.

These fishes inhabit fresh-water rivers, in nearly all the temperate parts of Europe, and are extremely common in many of those of our own country.

There is in Paris a great consumption of bleaks, on account of the *nacre* on their scales, which is used in the manufacture of *artificial pearls* thus: the scales are scraped off into clear water, and beaten to an extremely fine pulp. After this the water is several times changed, until they are entirely free from colour. The silvery matter that is left precipitates to the bottom, and the water is carefully poured off from it. This substance, mixed with a little size, is introduced, in small quantity, into thin glass bubbles, by a slender pipe, and moved about until their whole interior surface is covered. The remaining part of the bubble is then generally filled with wax.

In some countries bleaks are pickled in the manner of anchovies. When of a large size they are well flavoured, but they are too bony to be in much request as food even by the poor. They are in the greatest perfection in the autumn.

The family of Pikes (*Esocidæ*) have no adipose dorsal fin,

and are all provided with a swimming bladder. They are a very voracious tribe of fishes.

921. The *PIKE*, or *JACK* (*Esox lucius*), is a voracious fresh-water fish, with large teeth, a compressed head and muzzle, the part of the head betwixt the nape and the eyes elevated and rounded; the dorsal, anal, and caudal fins marked with black spots.

These fish sometimes attain so large a size as to weigh upwards of thirty pounds.

They are found in deep rivers, and in the lakes of nearly all parts of Europe, in some of the northern districts of Persia, and in North America.

Fig. 107.



Pike (Esox lucius).

Common as pike now are in our fresh-water rivers, it has been asserted that they were originally introduced from the Continent in the reign of Henry VIII. This, however, cannot be the fact, as they were known in England long before that period. Mr. Pennant speaks of these fish being formerly so rare in this country, that a pike, in the month of February, was sold for double the price of a house-lamb. If caught in clear and tolerably rapid waters, these fish, though bony and dry, are not bad eating. In some parts of Germany they are salted, smoked, and barrelled for exportation to other countries.

The modes of catching pike are very various: by nets, with lines, and snares of different kinds. Their voracity is so great that they not only eagerly seize a bait, but one pike has been known to choke itself while swallowing another of its own species, which proved too large a morsel; and this when opened was found to have swallowed a water rat.

These fish are chiefly partial to still and shady waters, where the bottom is of sand, clay, or chalk. They spawn in March or April. When in high season, their colours are green spotted with yellow; but when out of season, the green changes to grey, and the yellow spots turn pale.

The age to which they live has not been ascertained, though there appears sufficient evidence of their existing for more than a century. As to their size, we are informed that in the river Shannon, in Ireland, they have been found nearly seventy pounds in weight; and in some of the continental lakes, they are said to be more than eight feet long, and from eighty to a hundred pounds in weight.

922. The *SEA-PIKE*, or *GAR-FISH* (*Scomberesox belone*), is of a green colour on the upper part, of a serpentine shape, with long and narrow jaws, the lower being considerably shorter than the upper. The bones are of a green colour when they have been exposed to strong heat.

These fish are generally about a foot and a half in length, and weigh from one to three pounds. The late Sir William Hamilton, however, mentioned one caught near Naples which weighed fourteen pounds, and was sent to the King as a great curiosity.

They are found in the ocean in nearly all parts of Europe.

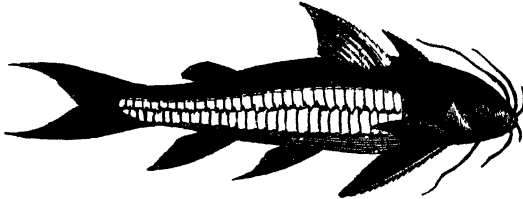
The gar-fish begin to approach our coasts, in considerable shoals, about the month of March, shortly after which they deposit their eggs in smooth and shallow water. Their flavour is not much unlike that of the mackerel, though many persons have a great antipathy to them, in consequence of the green colour of the bones.

923. *FLYING FISH* (*Exocetus volitans*). The fishes known by this name are distinguished by the great size of their pectoral fins, by means of which they possess the power of leaping out of the water, and supporting themselves in the air for thirty seconds, till such time as their fins get dry, when they descend. To observe their endeavours to avoid the voracious fishes which would seize them in the water, and the long-winged sea birds that are ready to pounce on them when in the air, is the great amusement of all voyagers in the tropical seas or the Mediterranean. Their flesh also is very delicate, and much sought after.

924. The next family, the *Siluridæ*, of which the singularly armed *Doras costatus* (Fig. 108.) may be taken as an example, is distinguished by the want of true scales, their skin being either naked, or having large bony plates. The flesh of some of them is much prized as a rich food, while the

lard in some places has been substituted for that of the hog.

Fig. 108.



The ribbed Doras (Doras costatus).

The next family, the *Salmonidæ*, or Salmon tribe, is distinguished by having a small adipose fin between the tail and the dorsal fin. The fishes composing it are voracious; the flesh is well flavoured and wholesome.

925. The COMMON SALMON (*Salmo Salar*, Fig. 109) is a fish known by its forked tail, the upper jaw being somewhat longer than the lower, and by the extremity of the under jaw, in the male, being hooked and bent upward.

Found in the temperate and northern parts of the old and new worlds.

At an early season of the year salmon begin to leave their winter haunts in the ocean, and to pass up the fresh water rivers, sometimes to vast distances, to deposit their spawn: it is in these peregrinations that they are chiefly caught. The British rivers that are most celebrated for the salmon are the Tweed, Tyne, the Trent, the Severn, and the Thames. Sometimes they are taken in nets, sometimes in traps or engines, and sometimes by harpoons. They have been known to ascend rivers to the distance of more than 200 miles. Notwithstanding this, the salmon is an ocean fish, and only found in rivers and lakes which communicate with the sea.



Common Salmon (Salmo Salar).

Fig. 109.

Vast numbers of salmon are annually pickled at Berwick and Aberdeen for the London market, and for sale on the Continent. These are packed in small tubs, and are usually sold under the name of Newcastle salmon.

The season for catching salmon commences towards the end of the year, but the principal capture is in the month of July; and instances have occurred in which more than 1000 fish have been caught at one haul of a net. Fresh salmon are frequently sent to London from the northern rivers packed in ice. The Severn salmon are earlier in season than those of any other river in England, though not so early as what are caught in some parts of Scotland and Ireland. The Thames salmon are principally taken near Isleworth, and are sold at a most extravagant rate in London. In Ireland the most considerable salmon fishery is at Cranna, on the river Ban, about a mile and a half from Coleraine. At a single haul of one of the nets, about the year 1776, there were taken as many as 1356 fish; this circumstance was so extraordinary as to be recorded in the town books of Coleraine.

In the Severn, Trent, and some other northern rivers of England, no salmon measuring less than eighteen inches from the eye to the middle of the tail is, it is said, allowed to be caught; nor any whatever betwixt the eighth of September and the eleventh of November (except in the Ribble, where they may be caught betwixt the first of January and fifteenth of September), under the penalty of 5*l.* and forfeiture of the fish.

When these fish, about the beginning of May, are five or six inches in length, they are called *salmon smelts*, and when they have attained the weight of from about six to nine pounds, they have the name of *gilse*, or *grilse*.

Salmon are a very general and favourite food. When eaten fresh, they are tender, flaky, and nutritive; but from their oleous qualities they disagree with many stomachs. The flesh of the salmon is of a red colour; the beauty of its appearance is increased by soaking slices of it in fresh water before they are cooked. Immediately after the salmon have deposited their spawn they are unfit for food. Raw salmon is a favourite dish with even the first nobility of Stockholm, insomuch that they seldom give a great dinner in which this food is not presented on the table. It

is prepared by merely cutting the fish into slices, putting these into salt, and when salted, leaving them for three days in a wooden dish, with a little water. In this state it is said to be very delicious eating.

The modes of curing salmon are various, but these are chiefly by *drying, smoking, salting, and pickling*. Near the bay of Castries (in the Strait of Sughalier) the Tartars tan the *skins* of large salmon, and convert them into a very supple kind of clothing.

926. *SALMON TROUT, SEA TROUT, or BUDGE* (*Salmo trutta*), is chiefly characterized by the tail being hollowed, by having seven rays to the anal fin, black spots encircled with ash-colour, on the head, back, and sides; and the jaws of equal length.

It inhabits the sea, and rivers adjacent to the sea; and sometimes weighs eight or ten pounds, or more.

The flesh of the salmon trout is red and good, but not so highly flavoured as that of the salmon; and it varies much, according to the quality of the water in which the fish are taken. Salmon trout are caught chiefly with nets; the fishing for them generally commences about the beginning of May, and continues till after Michaelmas.

In some of the northern countries of Europe, where these fish are very numerous, they are cured by *salting, pickling, and smoking*; in these different states they are articles of some commercial importance. The smoking of these and other fish is performed in a tub without a bottom, which is pierced at the top and round the sides with holes. This tub is raised on three stones; and the fish being suspended within it, they are exposed for three days to the smoke of burning oak-branches and juniper-berries, which are lighted beneath.

927. *The FRESH-WATER TROUT* (*Salmo fario*) has its tail somewhat hollowed, eleven rays to the anal fin, the upper parts of the body and the sides marked with red spots encircled with brown, and the lower jaw somewhat longer than the upper. The spots of the trout vary in their colours in different waters. Two or three varieties.

These fish inhabit fresh-water rivers, streams, and lakes, but particularly those of mountainous countries; their weight is seldom more than four or five pounds.

In clear and cold streams the fresh-water trout multiplies

very fast, and chiefly because such streams do not contain any voracious fish of greater power than themselves. Such is the excellence of these fish, that it has frequently been considered desirable to keep them in ponds or preserves. These should have the water clear and cold, a gravelly or sandy bottom, and be constantly supplied by a stream. The ponds should, if possible, be shaded with trees; and should have, at the bottom, roots of trees, or large stones, amongst which the fish may find shelter, and deposit their spawn. They should also be supplied with gudgeons, loaches, roach, minnows, and other small fish. To stock these ponds it is recommended to place in them the spawn of the trout, and not the fish themselves, as the former will bear carriage much better than the latter.

Trout are chiefly caught with lines. Their flesh is red, tender, and of an excellent flavour; the colder and more pure the water is the better they are. The best season for trout is from April to June: during the winter their flesh is white and ill-tasted. In many countries the nobility reserve these fish for their own use, and the capture of them is forbidden under very severe penalties.

So numerous are trout in some of the mountainous parts of the Continent, that having little or no sale for them, the inhabitants *salt* and *dry* them for their winter's food.

In certain lakes of the province of Galway, and other districts of Ireland, there is a kind of trout called *Gillaroo trout*, which are remarkable for the great thickness of their *stomachs*. These, from their resemblance to the organs of digestion in birds, are sometimes called gizzards; in the largest fish they are equal in bulk to the gizzard of a turkey. The trout themselves are bad eating; but the stomachs are much esteemed for their fine flavour, and are in great request for the table.

928. The CHARR (*Salmo alpinus*) inhabits the lakes of mountainous countries. There are three varieties, the gilt charr, red charr, and case charr. Their bodies are spotted; those of the first are of a golden colour, of the second full red, and of the case charr pale red. Their tails are forked. When full grown these fish are about ten inches in length.

They are found in Ullswater, Winandermere, and some other lakes in the north of England, in a lake near Snowdon in North Wales, and in lakes of several parts of the Continent.

There is no fish of the salmon tribe more esteemed for

the table than these. *Gilt charr* are considered in highest perfection, and are caught in greatest numbers, from the end of September until the end of November; the *case charr* about the month of May. During the summer-time all the kinds of charr sink to the bottoms of the lakes far out of the reach of the fishermen. They are usually caught with nets called breast-nets, which are about twenty-five fathoms long and five in depth.

Their flesh is of a red colour, and their flavour peculiarly delicate. Great numbers of charr are potted every year and sent to London. But of the fish which are sold under the name of potted charr many are trout; and even in the pots which contain charr, trout are frequently to be found. In the river Petteril, which runs near Carlisle, there is a kind of trout which, both in size and colour is so like charr, that it can scarcely be distinguished from that fish. Von Baer informs us, that in autumn this species ascends into the mountain lakes of Nova Zembla, and in many years is caught in immense quantities, and exported to distant countries.

929. *The SMELT, or SPARKLING* (*Osmerus eperlanus*), is known by its silvery and semi-transparent appearance. the first dorsal fin being further from the head than the ventral fins, the under jaw longer than the upper, and curved, and the tail forked.

Its length seldom exceeds seven or eight inches.

These fish abound on the shores of most of the countries of Europe; during their spawning season they ascend the rivers, sometimes in immense shoals.

About the month of November smelts begin to leave the deep water, and approach the coasts, for the purpose of depositing their spawn in the rivers. This they do in the ensuing months of March and April; during this time they are caught in vast abundance in the Thames. When in perfection they are not only a delicious, but are considered a nutritious fish, and easy of digestion. Their name is derived from their very singular smell, and is nothing more than a contraction of "smell it." These fish are sometimes split, salted, and dried; and sold under the name of *dried sparklings*.

930. *UMBER, or GRAYLING* (*Thymallus thymus*), is distinguished by having several longitudinal streaks upon its body, the

first dorsal fin nearer the head than the ventral fins, the upper jaw longer than the lower one, the side line nearly straight, and the tail forked.

A fish of this species, which weighed five pounds, was caught some years ago in the river Severn.

The umber inhabits the clear and rapid streams of Europe and Siberia. The specific name is given to it from its scent or flavour being thought to resemble thyme.

These fish are so much esteemed in some parts of the Continent, that they are exclusively reserved for the tables of the nobility. They are fattest in the autumn, but are best in season during the winter, particularly when the weather is cold; they cannot be dressed too soon after they are caught. Many of the old medical writers strongly recommended umber as a wholesome fish for sick persons: they also stated that an oil prepared from its fat would obliterate freckles and other spots on the skin. By the Laplanders the intestines are frequently employed as a substitute for rennet, to coagulate the milk of the rein-deer, when used for the making of cheese.

These fish are in great esteem by anglers, on account of their vivacity, the eagerness with which they rise at a bait, and their rapid motions in the water. They lurk close all the winter, and begin to be very active in April and May, about which time they deposit their spawn.

931. The *ARGENTINE* (*Argentina sphyrcena*), a species found in the Mediterranean; the thickened coats of the swimming bladder, as well as the scales, are plentifully supplied with a silvery secretion used in the formation and lustre of false pearls; it is mixed up with other ingredients, and forms the "essence d'orient." The fish is four or five inches long, grey above and silvery on the sides and under parts.

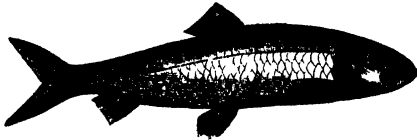
The family of Herrings (*Clupeidæ*) have no adipose fin; the body is very scaly; but few ascend rivers. The branchial openings are much cleft, so that these fishes, when taken out of the water, speedily die.

932. The *HERRING* (*Clupea harengus*, Fig. 110) is distinguished by its sharp and serrated belly, the body being without spots, the lower jaw longer than the upper, and the dorsal fins so

exactly situated above the centre of gravity, that when taken up by it, the fish will hang in equilibrio.

These fish, which are in general from eight to ten inches in length, are migratory, and found, at particular periods, in immense shoals, in nearly all parts of the Northern Ocean.

Fig. 110.



The Herring (Clupea harengus).

So great is the supply of herrings, and such is the general esteem in which they are held, that they have almost equal ad-

mission to the tables of the poor and the rich. They have been known and admired from the remotest periods of antiquity; but as our ancestors were ignorant of the means by which they could be preserved from corruption, they were not so profitable to them as they are to us.

The herring fishery in different parts of the world affords occupation and support to a great number of people. In Holland it has been calculated that formerly more than 150,000 persons were employed in catching, pickling, drying, and trading in herrings. On the different coasts of our own country many thousands of families are entirely supported by this fishery. The principal of the British herring fisheries are off the coasts of Scotland and Norfolk; the implements used in catching the fish are nets stretched in the water, one side of which is kept from sinking by buoys fixed to them at proper distances, and the other hangs down by the weight of lead which is placed along its bottom. The herrings are caught in the meshes of the nets as they endeavour to pass through, and unable to liberate themselves, they continue there until the nets are hauled in and they are taken out.

Herrings are in full roe about the month of June, and continue in perfection until the commencement of winter, when they begin to deposit their spawn.

The art of pickling these fish is said to have been first discovered towards the end of the fourteenth century, by Guillaume Beuchel, a native of Brabant. The Emperor Charles V., about 150 years afterwards, honoured this be-

nefactor of the human race by visiting the place of his interment, and eating a herring on his grave.

Yarmouth, in Norfolk, is the great and ancient mart of herrings in this country. The season for catching them commences about Michaelmas, and lasts during the whole month of October; and generally more than 60,000 barrels are every year cured in the neighbourhood of that town. Some of these are *pickled*, and others are dried. In the preparation of the latter (which have the name of *red herrings*) the fish are soaked for twenty-four hours in brine, and then taken out, strung by the head on little wooden spits, and hung in a chimney formed to receive them. After this a fire of brush-wood, which yields much smoke but no flame, is kindled beneath, and they are suffered to remain until they are sufficiently dried, when they are packed in barrels for exportation and sale.

It will afford some idea of the astonishing supply of these invaluable fish, when it is stated that about seventy years ago, near 400,000 barrels of herrings were annually exported from different parts of the coast of Norway: that previously to the late war, about 300,000 barrels were annually cured by the Dutch fishermen; and that a considerably greater quantity than this is every year obtained on the coasts of Great Britain and Ireland. The name, "herring," is said to signify *multitude*.

Various methods have been adopted for *curing* herrings; that by Mr. Donovan, described in the 37th volume of the Transactions of the Society of Arts, is probably the best, but too long to be here described.

There is in some countries a considerable trade in the *oil* that is obtained from herrings during the process of curing them. The average annual quantity of this oil exported from Sweden is about 60,000 barrels.

933. *The PILCHARD* (*Clupea pilcardus*) so nearly resembles the common herring, that the best mode of distinguishing the one from the other appears to be by the situation of the dorsal fin. If the pilchard be held by this fin, the head will dip downward; the herring held in a similar manner continues in equilibrio.

The length of the pilchard is from eight to about ten inches.

These fish annually appear in vast shoals off the coast of Cornwall, and some other south-western parts of England. Their utmost

range seems to be the Isle of Wight in the British, and Ilfracombe in the Bristol, Channel.

To the inhabitants of Devonshire and Cornwall the pilchard fishery is of as much importance as that of herrings to the people on the eastern and northern coasts of Britain. Many hundred families are almost wholly supported by it. The first appearance of the fish is generally about the middle of July, and they usually continue until the latter end of October.

As soon as the pilchards are caught they are conveyed to a warehouse, where they are covered with bay-salt, and suffered to lie for three weeks or a month. After this they are washed in sea-water and dried. As soon as they are dry the fish are closely pressed into barrels to extract the oily particles from them, which drain through holes that are made in the bottom. Thus prepared they become fit for use, and when properly dressed they are considered preferable to herrings.

Pilchards are generally caught in nets. These are sometimes two hundred fathoms in length, and about eighteen fathoms deep. The approach of the shoals is known by the great numbers of sea-birds which accompany and prey upon them; the progress of the shoals is marked by persons who are stationed on the cliffs to point them out to the fishermen, and who are called *huers*, from their setting up a hue for this purpose.

The principal towns in the neighbourhood of which pilchards are caught are, Fowey, Falmouth, Penzance, and St. Ives: the annual average quantity that is sent to market is about 30,000 hogsheads.

934. *The SPRAT (Clupea sprattus) is of the herring tribe, and distinguished by its belly being strongly serrated, the dorsal fin having seventeen rays, the anal fin nineteen, and the ventral fins each six.*

It seldom exceeds the length of about five inches, and is generally much smaller.

These fish are caught on most of the British shores; they ascend the river Thames nearly as high as London Bridge, in the beginning of November, and leave it in the month of March. Those caught in the Bristol Channel are superior to those brought to the London market.

To the lower classes of the inhabitants of London, during

the winter, sprats afford a cheap and very acceptable supply of food. They are caught in nets, and in some instances as many have been taken at a single haul as would have filled thirty barrels. Sprats are generally eaten fresh, though both at Gravesend and Yarmouth they are cured in the manner of red herrings. In some countries they are pickled, and in this state they are little inferior to anchovies, though the bones will not dissolve like those of anchovies.

935. *SARDINE* (*Clupea Sardina*). Immense numbers of sprats, larger in size than ours, are every year caught on the coast of Sardinia and Brittany. These are salted, packed in barrels, and exported to various parts of the world under the name of *Sardines*.

“The whole population, and the existence of Douarneney in Brittany, depend on the sardine fishery. This delicious little fish is still more exquisite when eaten fresh on the shores which it frequents, than when preserved in oil and packed in tin boxes. They are caught in immense quantities along the whole of the south-eastern coast of Brittany, and on the western shore of Finisterre, as far to the northward as Brest, which I believe is the most northern place at which the sardine fishery exists. They come into season about the middle of June, and are then sold in great quantities in all the markets of Southern Brittany, at two, three, or four sous a dozen, according to the abundance of the fishery and the distance of the market from the coast. The preserving and boxing for Paris is almost all done at Nantes, whither the fish are carried for the purpose. A large quantity are also salted at the ports where they are caught, for provincial consumption. I was told that the commerce in sardines, along the coast from L’Orient to Brest, amounted to three millions of francs annually. The nets employed by the fishermen are about twelve or fifteen feet wide, and four or five hundred feet long.”—*Mrs. Trollope’s Summer in Brittany*, vol. ii. p. 355.

936. *The SHAD* (*Alosa vulgaris*) is known by the belly being serrated and covered with large transverse scales, the sides being marked with round black spots placed longitudinally, and the under jaw sloping upward.

These fish weigh from half a pound to four or five pounds and upwards.

They are found on the shores of all the temperate and warm countries of Europe, and at certain seasons of the year they ascend the rivers to considerable distances, in order to deposit their spawn.

In the Thames and Severn these fish are generally found in the months of April, May, and June. Those that are caught in the Thames are coarse and insipid; whilst such as are caught in the Severn, especially that part of it which flows by Gloucester, are sold, it is said, at a higher price than salmon. Shad that are taken in the sea are thin and of a bad flavour; the longer they continue in the rivers the fatter and more eatable they become. They are generally caught in nets, but sometimes with lines having an earth-worm for a bait. The London fishmongers are frequently supplied with shads from the Severn. These are distinguished by the name of *allis* or *alose*, the French name for shad. The flesh of the shad obtained at various places in the Bristol Channel, except in its paler colour and being less oleous than that of the salmon, is in other respects scarcely distinguishable from it; the shad is, however, a very bony fish, and on this account will scarcely ever be preferred to the salmon.

937. *WHITE BAIT* (*Clupea latulus*), a very small white fish, obtained in considerable numbers in the Thames, and well known to the epicures of the metropolis, was, till lately, considered by most naturalists as the young of the shad; but the researches of Mr. Yarrell, in 1828, prove white bait to be a distinct species, and not the young of any kind of fish, it having been found full of spawn in the spring.

938. *The ANCHOVY* (*Engraulis encrasicolus*) is known from all others of the herring tribe by its upper jaw being considerably longer than the under jaw.

These fish seldom exceed the length of four or five inches.

They are chiefly caught in the Mediterranean; the principal fishery for them is on the shores of Gorgona, a small island west of Leghorn. They are also caught off the coast of France, and occasionally off our own shores.

There are few persons fond of good eating to whom the anchovy, either in the form of sauce or as an article of food, is unknown. With us, however, it is seldom eaten in a

recent state, the greater proportion of the anchovies consumed in this country being brought in pickle from the Mediterranean.

They are generally caught in nets during the night, being attracted together by fires lighted on the shore, or by torches fixed to the boats which are engaged in the fishery. As soon as they are caught the heads are cut off, and the entrails taken out; after this they are salted, or pickled, and packed in barrels for exportation.

In the choice of anchovies such should be selected as are small, round-backed, fresh pickled, whitish on the outside, and red within. *Essence of anchovies* is made by reducing the fleshy part to a soft pulp, and boiling it gently, for a few minutes, with a certain proportion of water and spices.

939. *GIGANTIC SUDIS* (*Sudis gigas*). This is the largest fresh-water fish known, and is abundant in some of the rivers of South America. In the Negro, Amazon, and Branco, there are extensive fisheries for supplying the different towns, and great quantities are sent to Para, where it is preferred to the fish salted on the North American coast, and commands a higher price. When fresh it is excellent, and the belly nearly all fat. Mr. Schomburgk heard of some individuals being 15 feet long and 410 pounds in weight. The specimen now in the British Museum is upwards of eight feet long, and three feet and a half in girth.

The third sub-order (*malacopterygii sub-brachiati*) of the soft finned osseous fishes is marked by the attachment of the ventral fins *beneath* the pectorals.

The first family (*Gadidæ*) containing the well known haddock and cod, is distinguished by having the ventral fins under the throat and pointed; most of the species have two or three dorsal fins.

The fishes of this family generally live in the seas of cold or temperate climates, and form a most important article of fishery.

The greater number of them are regarded as wholesome, the flesh is white, and separates readily by boiling into white flakes, and is easy of digestion.

Fig. 111.

*Common Cod (Morrhua vulgaris).*

940. The COMMON COD (*Morrhua vulgaris* Fig. 111) is distinguished by having three fins upon its back, a small fleshy beard on the under jaw, the tail fin nearly even at the extremity, and the first ray of the anal fin spinous.

The average weight of these fish is from ten to twenty, or thirty pounds, occasionally, but rarely, sixty pounds.

To the inhabitants of many countries, but more especially to those of our own, the cod fishery is a very essential source of wealth. It affords occupation to many thousand persons, and employment for several hundred sail of shipping. The fishery on the great bank near Newfoundland is by far the most important of any that has hitherto been discovered in the world, and the resort of fish to this spot is beyond all imagination numerous. In the year 1791 there were caught more than 750,000,000 pounds weight.

This immense bank is a vast mountain in the sea, more than 400 miles long, 150 miles broad, and in depth of water, from twenty to sixty fathoms. It was first discovered in the reign of Henry VII.; and in 1548 an act of parliament was passed, by which all Englishmen were permitted to traffic and fish on the coasts of Newfoundland and the adjacent banks, without payment of any duty. In 1583 Sir Humphrey Gilbert took possession of the island of Newfoundland in the name of Queen Elizabeth. The first English company that associated to settle a colony there was incorporated by a patent of King James the First, in 1609.

The Newfoundland fishery at present gives freight to about 300 vessels, from 100 to 200 tons' burden each. These are chiefly fitted out from the islands of Guernsey and Jersey, from Ireland, and some ports of the English Channel, as Pool, Dartmouth, &c. When these vessels arrive at the fishery, a kind of gallery is formed, which reaches from the main-mast to the poop, and sometimes

even from one end of the ship to the other. The mode of fishing is by hook and line only; the baits are herrings, a small fish called capelans (944), shell fish, or pieces of sea fowl. Each man can catch only one fish at a time, yet an expert fisherman has sometimes been known to take 400 in a day. As soon as the fish are caught, the tongues are cut out, the heads are cut off, and the liver, entrails, and spine, are all taken out. After this they are salted and piled, for some time, in the holds of the vessels, and then packed in barrels for sale, under the name of *green* or *wet cod*. When the fish are to be dried, they are conveyed in boats to the shore, where they are headed, cleansed, and salted, upon stages erected for that purpose. They are subsequently spread on the shore to dry; these are called *dry cod*, and constitute the principal object of the Newfoundland trade. The chief markets to which the fish are conveyed are those of Spain, Portugal, Italy, and the Levant.

The most important fishing banks of Europe are in the neighbourhood of Iceland, Norway, and the Orkney Islands; and the Dogger-bank and Well-bank, betwixt this country and Holland. It is calculated that upwards of 6000 European vessels are employed in these fisheries.

As the air-bladders of cod are thick, and of a gelatinous nature, the Icelanders frequently make *isinglass* of them, similar to that which we usually import from Russia. By the Newfoundland fishermen the air-bladders are generally salted, and packed in barrels under the name of *sounds*; and these when good are considered a great delicacy for the table. The *tongues* are prepared in the same manner and for the same purpose. From the *livers*, after they have become in a certain degree putrid, an *oil* is obtained, superior to whale oil, because it preserves leather longer flexible, and when clarified, yields less vapour in burning than that. It is much used by curriers. The *roes* are collected by the Icelanders, salted, packed in barrels, and sold to the Dutch, French, and Spaniards, as bait for anchovies and other fish. Before the commencement of the French revolution, from 20,000 to 30,000 barrels of these roes were annually exported from Bergen. The inhabitants of some parts of Norway, when forage is scarce, dry the *heads* of cod, and mixing them with some species of sea-weeds, give them as food to their cattle.

The London markets are abundantly supplied with fresh cod from the fishing banks adjacent to our own country. These fish are in season from the beginning of December till about the end of April; and are brought alive to the Thames in well-boats, the air-bladders being previously perforated with a pointed instrument, to prevent the fish from rising in the water. Cod should be chosen for the table of a middling size, plump about the shoulders and near the tail, the hollow behind the head deep, and with a regular undulated appearance on the sides, as if they were ribbed. The gills should be very red, the eyes fresh, and the flesh white and firm.

It is generally considered that the shoals of cod confine themselves between the latitudes 66° and 50° north. Those which are caught to the north or south of these degrees are both few in quantity and bad in quality.

There can be no doubt that from the heads of the cod, which are usually thrown away on the banks of Newfoundland, a valuable isinglass might be obtained.

941. *The HADDOCK (Morhua arglefinus) is a fish of the cod tribe, which has three fins upon its back, a small fleshy beard on the under jaw, the upper jaw the longer, and the tail somewhat forked. There is a dark oval spot on each side of the body a little below the gills, which tradition, as in the case of the John Dory, assigns to the mark of St. Peter's thumb and finger when he took the tribute money out of the mouth of a fish.*

These fish seldom exceed the weight of seven or eight pounds.

Our markets are principally supplied with haddocks from the coasts of Yorkshire and other eastern parts of England. They are in season betwixt the months of July and January, after which they deposit their spawn, and for many weeks are scarcely eatable; but those which have not begun to breed may be admitted to the table after this period. Their flesh, which in a degree resembles that of the common cod, is white, firm, well-tasted, and easy of digestion. Those that are best for the table do not usually exceed the weight of two or three pounds.

Though haddocks are sometimes caught with nets, they are much more frequently taken by lines. Each of these has a great number of hooks, and is placed in the sea at the ebb of the tide, and taken up at the ensuing tide. The numbers thus caught have, in some instances, been almost

beyond belief. Some idea may however be formed respecting them, when it is stated that shoals of haddocks have not unfrequently been known to extend four or five miles in length, and nearly a mile in width.

These fish are sometimes salted and packed in barrels like cod. And if this be skilfully done, they are excellent eating, and may be kept good for a great length of time.

942. *The TORSK* (*Morrhua callarias*), is a species of cod which has three fins upon its back, a small fleshy beard on the under jaw, the upper jaw longer than the lower, and the tail fin nearly even at the extremity.

Its usual weight is from two to seven or eight pounds.

As food, the torsk is said to be superior to every fish of its tribe. It is chiefly found in the Baltic Sea and the Northern Ocean, and has not hitherto been known to frequent the English shores. The most favourable seasons for catching these fish, in Greenland, are the spring and autumn; the general mode is by lines made of pieces of whalebone, or thongs of seal-skin, the hooks being baited with fish.

The Icelanders frequently salt and dry them as one of their articles of subsistence for the winter.

943. *The WHITING POUT* (*Gadus barbatus*) is a small fish of the cod kind, distinguishable by the great depth of its body, which is usually about one-third of its length; by having three dorsal fins, a small fleshy beard on the chin, and seven punctures on each side of the lower jaw.

Its weight seldom exceeds a pound and half or two pounds.

These delicate fish are found in shoals, near several of the shores of Europe. They are usually caught about the month of August; and are so plentiful on some parts of the French coast, that fishermen have been known to take two or three hundred of them at a single haul of their nets.

The French consider them to be dry and insipid eating; but in England they are often more esteemed than whittings. The inhabitants of Greenland frequently salt them; they also salt and dry the *roes*; and are particularly partial to the *livers*, which they dress and serve to table with crowberries (*Empetrum nigrum*).

944. *The CAPELAN, or POOR (Gadus minutus), belongs also to the cod tribe; it seldom exceeds the length of six or seven inches, and differs from all others of the same genus by being black in the interior of the abdomen.*

It has three dorsal fins, a small beard on the chin, and nine punctures on each side of the lower jaw.

In the Newfoundland fishery these fish are of importance as bait for the taking of cod. They are also found in considerable numbers in the Mediterranean, the Baltic, and the North Sea; wherever they appear they are a source of great joy to the fishermen, since they are believed to announce an abundant supply of valuable fish, which pursue and prey upon them.

In the year 1545, the French coasts in the Mediterranean were visited by such myriads of capelans, that the inhabitants were obliged to collect together and bury those that were thrown ashore, to prevent any evil consequence that might occur from the corruption of so great a mass of animal matter. These fish are sometimes caught on the coast of Cornwall.

They are considered very delicate food; and when salted are peculiarly excellent. A few barrels of salted capelans are occasionally sent from Newfoundland, as presents to the friends of the merchants in England, but the fish are too small to be salted there as an article of profit. They are caught both with lines and nets.

945. *The WHITING (Merlangus vulgaris) is distinguished from others of the cod tribe by having three fins on its back, no beard on the chin, its upper jaw longer than the lower, the tail-fin somewhat hollowed, the back dusky, and the rest of the body silvery white.*

Its weight seldom exceeds two pounds.

The chief season for whiting is during the first three months of the year, though they are frequently brought to market after Midsummer. They are sometimes caught with nets, but the hook and line are generally preferred, on account of the depth of the water at which they are usually found. The baits are lugworms, and muscles, whelks, or other shell-fish. The shoals of whiting, which approach within two or three miles of our shores, are sometimes extremely numerous. The Dutch fishermen use lines for catching them of immense length, and each containing

about 250 hooks. These are laid near the bottom of the water ; and when taken up have, in many instances, a fish at each hook.

The flesh of the whiting is usually considered very delicate eating ; but it varies much with the season and the kind of shore where the fish are caught. Those which frequent sandy flats, at a little distance from the shores, are smaller and much better flavoured than others that are taken on banks distant from the sea-coasts. They should be chosen for the table by the redness of their gills, the brightness of the eyes, and the general firmness of the body and fins.

In the neighbourhood of Bruges and Ostend whittings are frequently salted, and conveyed for sale into the interior of France and Germany, where, in general, they are considered preferable to salted cod.

946. *COAL-FISH, or PILTOCKS* (*Merlangus carbonarius*), has three dorsal fins, no beard on the under jaw ; the under jaw longer than the upper, the side line straight, and the mouth black within.

They are frequently two or three feet long, and twenty pounds and upwards in weight.

These fish are indebted for their name to the dark colour which their body generally assumes when they have attained their full growth. To the inhabitants of the Orkney Islands, and of the northern parts of Scotland, they afford a most important supply of food, at a season of the year when the poor are deprived of almost every other means of subsistence. At the approach of winter, when the seas are stormy, myriads of these fish run into the bays ; and they continue in the immediate neighbourhood of the same coasts till the months of February and March. They are nearly as important an object of pursuit on account of their *livers* as for their *flesh*. From these is obtained a considerable quantity of oil, which is used for burning in lamps, and for numerous other purposes. Miss Sinclair, in her "Shetland and the Shetlanders," p. 134. informs us that the youngest children there can make 20*l.* a year, by catching the "sillocks or par" as they are named there when very young ; they owe their value to the oil extracted from them, 2000 barrels of which she tells us were manufactured in one year from the diminutive fry, not measuring above

four or five inches long. The young coal-fish approach the Yorkshire coasts in the months of July and August ; when four or five inches in length they are much esteemed as food ; but the older fish are so coarse and bad, that where other food is to be obtained, few people will eat them. By being salted and dried, however, they are rendered firm and palatable.

Coal-fish are usually caught with lines. The best bait for them is a sprat or a limpet parboiled. The Shetlanders use the latter ; and seated on the rocks projecting over the water, or in boats, they are very expert in catching them. A man, holding a rod in each hand, will frequently draw them up as fast as he can put down his lines. He keeps a few limpets in his mouth, and baits his hook at a single motion with one hand, assisted by his lips, and with the greatest ease and certainty. The fish thus caught are generally those of the second year's growth, and are not much larger than herrings.

947. *POLLACK* (*Merlangus pollachius*) belongs to the cod tribe ; it has three dorsal fins, no beard to the under jaw, the under jaw longer than the upper, the tail-fin forked, and the side line much curved.

The usual weight of the pollack is six or seven pounds, but it sometimes much exceeds this.

In the Baltic Sea and the Northern Ocean, particularly in those parts where the bottom is rocky, and the sea much agitated, these fish appear, at stated seasons, in great shoals, playing about on the surface in all directions, and in the most sportive and agile manner. Near Lubec and Heligoland they are sometimes caught, in immense numbers, in nets, or with lines and hooks baited with a feather, a small fish, or a bit of the skin of an eel. They frequent some of the southern parts of our coasts in the summer, and the eastern shores of Yorkshire in winter.

As an article of food, pollacks are usually considered inferior to whiting, but in some places they are much esteemed. On the Continent they are sometimes salted, and eaten during Lent by the inferior classes of people.

948. *The COMMON LING* (*Lota molva*) is a species of cod which has two dorsal fins, a small beard on the under jaw, the under jaw longer than the upper, and the tail fin rounded.

They are caught in great numbers in the Northern Ocean, and about the northern coasts of Great Britain and Ireland; and when full grown are three or four feet in length.

The importance of these fish, in a commercial view, is very great. Their size, the numbers in which they are caught, the excellence of their flesh when salted, and the value of the oil that they yield, all contribute to render them an object of eager pursuit by fishermen in those countries on the coasts of which they are found. More than 900,000 pounds' weight of ling are annually exported from the coasts of Norway. In England they are fished for and cured in the same manner as cod (940): and it is said that they bear carriage to great distances much better than cod.

Ling are in season from February until about the end of May. Vast numbers of these fish are salted in the northern parts of England, for exportation as well as for home consumption. When they are in season the *liver* is white, and yields a great quantity of fine and well-flavoured oil. This is extracted by placing it over a slow fire; but if a sudden heat be applied, very little oil can be obtained. As soon as the fish are out of season, the liver becomes red, and affords no oil. A kind of isinglass is made from the *air-bladders*. The *tongues* are eaten either fresh, dried, or salted.

949. *The RIVER LING, or BURBOT (Lota fluviatilis) is a somewhat eel-shaped species of cod, with two dorsal fins, a single fleshy beard on the under jaw, the jaws nearly equal in length, and the tail rounded.*

This fish is found in some rivers of England, and in rivers and lakes of the Continent; when full grown it weighs two or three

Although the burbot is esteemed a very delicate fish for the table, it is so common in the Oder, and in some other rivers of Germany, that the fishermen, unable otherwise to dispose of all they catch, not unfrequently cut the fattest parts of the fish into slips, and after drying them, burn them instead of candles. The *livers* are large and of a peculiarly excellent flavour. It is related of a Countess de Beuchlingen, in Thuringia, that she was so partial to the livers of burbots as to expend a great portion of her income in the purchase of them. If suspended in a glass and

placed near a hot stove, or in the heat of the sun, they yield an oil which was formerly in great repute as an external application for the removal of swellings. The *air-bladders*, which are so large as often to be nearly one-third of the whole length of the fish, are employed in some countries for making isinglass.

The second family, or *Pleuronectida*, contains all those fish which are commonly called *flat-fish*, and is distinguished by the want of symmetry in the head. These fishes have both eyes placed on the same side, and that side always remains uppermost, and is of a dark colour, while the side in which the eyes are not placed is toward the ground, and is either white or very pale. They have no swimming bladder, and seldom quit the bottom. They all furnish an agreeable and nutritious food.

950. The *HOLIBUT* (*Hippoglossus vulgaris*) is a flat fish of a considerably lengthened shape, of an olive or blackish colour above, with a smooth body, and the tail hollowed at the extremity. The eyes (as viewed from the head toward the tail) are on the right side.

These, the largest of all the European species of flat fish, inhabit both the European and American seas, and frequently weigh from 100 to 300, or 400 pounds each.

As the holibut is found only at the bottom of the water, the usual mode of catching it is with hooks and lines: its size is so great that for sale in the markets, it is customary to cut it into pieces. The season in which it is most esteemed is during the months of October, November, and December.

Though, in general, a coarse food, the parts which are near the side fins are fat and delicious, but too rich for any one to eat much of them. The inhabitants of Greenland eat these fish both fresh and dried. They also eat the *skin* and the *liver*; the *membrane of the stomach* serves instead of glass for windows. The Swedes and Icelanders make of holibut a food called *raff* and *ræchel*; the former consisting of the fins with the fat skin to which they are attached; and the latter of pieces of the flesh cut into strips, salted, and dried on sticks in the air. Holibuts are also salted in the same manner as herrings, which is said to

be the best mode of curing them ; but in this state, they are a coarse food. The flesh of the young is often sold for turbot, to which it is inferior in every way.

951. *The PLAISE* (*Platessa vulgaris*) is a flat fish, easily known by a row of six bony protuberances behind the left eye, and its upper side being marbled with olive and brown, and marked with orange spots.

Though usually of a small size, it sometimes grows to the weight of twelve or fourteen pounds, and is found on the shores of almost all the countries of Europe.

The best and largest plaice are said to be caught on some parts of the coast of Sussex. They are in greatest perfection from December to March, and in July, August, and September. Those that are of a tolerably large size are firm and well-flavoured, but the small and thin fish become gluey by boiling. The flesh of the former is bluish, and of the latter reddish white. Plaice are generally caught with nets called seine nets, which are hauled upon the shores.

In some countries these fish are salted and dried as articles of commerce ; and in others the best of them are skinned, dried, and pressed into particular forms, and when eaten, are cut like cheese.

952. *The DAB* (*Platessa limanda*) is a flat fish, of a yellowish brown colour, with the eyes on the right side of the body, the scales hard and toothed, and the lateral line, at its commencement, curved round the pectoral fin.

It is in general much smaller than the plaice.

Although very common on the shores of the Baltic and the Mediterranean seas, the dab is much more scarce on the British shores than the plaice. When in best season, during the months of February, March, and April, it is considered preferable to that fish. In the summer-time its flesh is soft and of a bad flavour. The Dutch and Scotch fishermen sometimes salt and dry these fish.

953. *The FLOUNDER* (*Platessa flesus*) differs from the plaice (951) principally in wanting the six protuberances behind the left eye, in having the lateral line rough, short spines at the base of the upper side of the fins, and a great number of rough points on almost the whole upper surface of the body.

Its weight seldom exceeds two or three pounds.

Few fish are so common on the flat and somewhat muddy

shores of this country as the flounder. It enters the harbours, and ascends the rivers to a considerable distance from their mouths. It is even caught in places where the water is perfectly fresh; and it is said to be much sweeter and better for the table when taken at a distance from the sea than in salt-water. On this account chiefly it is that the flounders caught in the river Thames have obtained great celebrity. They are in best season from January to March, and from July to September.

Flounders are generally caught with nets in the same way as other flat fish. But sometimes the fishermen catch them by walking gently into the shallow waters where they abound, and stabbing an iron prong or fork through their bodies, as they lie in the mud. The places where they lie are known by the exposure only of their eyes and mouth, all the other parts of their body being concealed. Small flounders are frequently used by fishermen as bait for crabs and lobsters.

954. The *SOLE* (*Solea vulgaris*, Fig. 112) is a flat fish, the body of which is oblong and rough, and the upper jaw longer than the lower.

It is found off the sandy shores of nearly all parts of the world; and though in England it does not often exceed the weight of three or four pounds, in hot climates it frequently weighs as much as seven or eight pounds.

The sole is a fish in great request for the table, and except the turbot, is usually considered the most firm and delicate fish of its tribe. Though exposed for sale during nearly the whole year, it is in highest perfection about Midsummer.

Fig. 112.



The Sole (Solea vulgaris).

By the ancient laws of the Cinque Ports no person was allowed to catch soles from the first of November to the fifteenth of March; nor was any one permitted to use nets betwixt sun-setting and sun-rising, that the fish might not be disturbed in their feeding. Soles when good are of a thick form; their under parts are cream-coloured; if the latter are bluish, the fish are flabby and bad. These, unlike most other fish, may be kept several days, even in hot weather, without becoming putrid; they are always

skinned before they are eaten. The *skins* are sometimes dried, and used for the clarifying of coffee, and for other purposes.

955. The *BRILL* (*Rhombus rhombus*) is a flat fish somewhat like the turbot, but with its eyes on the right side of the body, the whole surface of the body smooth, and a laceration at the beginning of the dorsal fin.

These fish are not uncommon, in somewhat deeper water than the plaice, and the flounder, along the coasts of Dorsetshire, Hampshire, and some of the eastern parts of England. They are very common at Billingsgate, and in other markets; are considered an excellent fish for the table, being white, firm, and well-flavoured; and are chiefly in season in the months of October and November.

956. The *TURBOT* (*Rhombus maximus*), is a flat fish, distinguished by its eyes being on the left side, the body being broad, marbled with brown and yellow above, and rough with bony protuberances.

The weight of these fish is from four or five to betwixt twenty and thirty pounds.

They are chiefly caught in the European and Mediterranean seas

It has been calculated that more than 10,000 pounds' weight of turbot are annually consumed in London. These are chiefly caught off the northern coasts of England, and off the coast of Holland. Notwithstanding the high repute of turbot for the tables of the most wealthy and luxurious inhabitants of this country, it has only of late been relished in Scotland, and many persons there still prefer the holibut (950) to it. There are now, or were very lately, living in one of the coast-towns of Scotland several poor people who were accustomed to derive a great part of their subsistence from the turbot which the fishermen threw away upon the beach as of no value. A general officer in the English army first taught the inhabitants of Fifeshire that these fish were eatable; and astonished the fishermen of that country by offering so great a sum as a shilling a piece for the largest of them.

Many of the vessels which carry fish to the Thames, are employed in fishing for turbot even so far north as the Frith of Forth; in the wells of these vessels they are

brought alive to the London markets. Turbots are caught off the Yorkshire coast with hooks and lines. At Scarborough each fisherman takes in his boat three lines, coiled upon flat oblong pieces of wicker-work, the hooks being baited and placed in the centre of the coils. The lines are usually furnished with 280 hooks, placed at the distance of six feet two inches from each other. In this fishing there are always three men in each boat; nine of the lines are fastened together, extending in length nearly three miles, and furnished with 2520 hooks. They are placed in the sea, across the current, and secured by anchors or large stones at the end of every three lines. Their situation is marked by floats made of leather or cork. The lines are always placed at the turn of the tide, and they are suffered to continue until the next tide, and consequently remain upon the ground about six hours. The best bait for turbot is a fresh herring, though the Dutch fishermen prefer the lesser lampreys (968) to them, and have been known to purchase of the English fishermen for this purpose more than 700*l.* worth of these lampreys per annum. Small pieces of haddock, sand-worms, and some kinds of shell-fish, are also occasionally used; when none of these are to be had bullock's liver is employed.

Turbots are in season during nearly the whole summer. When in perfection, they are thick, the under part of the body being of a yellowish white colour. If they are thin, or this part has a bluish tinge, they are bad. These fish are generally considered better if kept in a cool place for a few days before they are eaten. This fish, by the common people of France, is on account of its fine flavour called the water or sea-pheasant.

The next Order of which we give examples has no ventral fins, and is named *Malacopterygii apodes*. It contains all the eels.

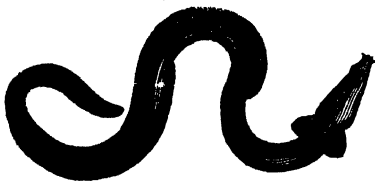
957. *The COMMON EEL* (*Anguilla vulgaris*, Fig. 113.) is distinguishable by its lower jaw being somewhat longer than the upper, and the body being of an uniform colour.

It is an inhabitant of rivers and ponds in almost every country of Europe; and sometimes grows to the weight of fifteen or twenty pounds.

Mr. Yarrell recognises three British species; the Sharp-nosed

Eel (*A. acutirostris*), *Broad-nosed Eel* (*A. latirostris*), and the *Snigg* (*A. mediirostris*).

Fig. 113.



Common Eel (*Anguilla vulgaris*).

The *flesh* of the eel affords a very rich and delicious food; and were it not for groundless prejudices, arising from its serpent-like shape, this fish would be in much greater request for the table

than it now is.

So abundant are eels in many of the rivers adjacent to the sea, that in the first autumnal floods several tons' weight have sometimes been caught in a day; and in the river Ban, near Coleraine, in Ireland, there is an eel-fishery of such extent as to be let for one thousand pounds per annum. The modes of taking eels are various; but these are chiefly by traps or engines of different kinds, so contrived as to admit of their entering, but to prevent their return.

In the river Nyne, Northamptonshire, a small kind of eels are caught, with small head and narrow mouths, called *bed-eels*. What are called in the south of England *grigs*, *gluts*, or *sniggs*, are a variety of the common eel with larger head, blunter nose, and thicker skin. *Silver eels* probably owe their distinction of colour to the clear and gravelly streams in which they feed.

Young eels are in the West of England called *Elvers*; they are there caught and eaten in great numbers in the spring.

Eels are considered in highest perfection for the table from the commencement of spring till about the end of July; yet they continue good till the end of September. The modes of cooking them are numerous and well known. In some parts of the Continent the *skins* are made into a kind of ropes, which have great strength and durability. The inhabitants of several of the districts of Tartary use them in place of glass for windows; in the Orkney Islands they are worn as a remedy for the cramp. Bits of eel-skin are not unfrequently put into coffee to clarify it. In many parts of the North of Europe the *scales*, which are extremely minute,

are mixed with cement to give a silvery lustre to the houses.

958. *The CONGER, or SEA EEL* (*Anguilla conger*), is chiefly distinguished from the common eel by the lower jaw being shorter than the upper, and the lateral or side line being white.

It is found in all the European seas; and when at its full growth measures from six to twelve feet in length, and from twelve to twenty inches in circumference.

So numerous are congers on some of the British shores, that from Mount's Bay, in Cornwall, there have in some years been more than ten tons' weight of dried congers exported to different parts of Spain and Portugal. These fish are also peculiarly abundant in the neighbourhood of the Orkneys and Hebrides. They are chiefly caught with strong lines, each about five hundred feet in length, and having sixty hooks placed about eight feet asunder. The lines are sunk in the sea, and sometimes so many of them are fastened together that they extend nearly a mile in length.

The *flesh* of the conger is white, but coarse and greasy; and though frequently eaten, is to some persons extremely disgusting. In the salting and drying of these fish they shrink to less than one-fourth part of their original weight; the process is attended by the most nauseous stench. By the Spaniards and Portuguese dried congers are ground or beaten into powder, to thicken and give a relish to soups.

959. *The ROMAN EEL* (*Muraena helena*) is a long and slimy fish, of a serpentine form, variously marked and spotted, and destitute of pectoral fins.

It is an inhabitant both of fresh and salt water, and is chiefly found in the Mediterranean Sea, and the rivers that run into that sea.

By the Romans this fish was regarded as a great delicacy: instances have been recorded of wealthy persons (such as Vædus Pollio, as related by Pliny) having even fed them with the flesh of slaves that had been condemned to die, believing that they were thereby rendered still more delicious.

On many parts of the coast of Italy reservoirs were made in the sea for storing and fattening these fish; and the luxurious Sybarites exempted from every kind of tribute the

persons who sold them. Representations of them were made into ear-rings, and into other ornaments for female attire. Pliny tells us, that one of the Roman punishments for youths under the age of seventeen years, was to flog them with whips made of eel-skin.

960. The *GYMNOTUS*, or *ELECTRIC EEL* (*Gymnotus electricus*, Fig. 14.), so well known by the descriptions of Garden, Hunter, and Humboldt, is found in the rivers and stagnant pools of tropical America, and attains the length

Fig. 114.



Electric Eel (Gymnotus electricus).

of five or six feet. It has the power of communicating such powerful shocks by means of an electrical apparatus situated in the posterior part of the body of the fish, that men and horses are stunned by them, and in some parts of South America, much-frequented routes have been entirely abandoned from the necessity of crossing streams frequented by the gymnotus. By means of its apparatus, the electric eel can send this power at will, even through the water.

961. *SAND-LAUNCE*, *SAND-EEL*, or *WRECKLE* (*Ammodytes tobianus*), is a small fish, distinguished by its eel-shape, its head being narrower than the body, the lower jaw much longer than the upper, and the upper lip being doubled.

There is only one ascertained species of launce: this is found on sandy sea-shores in the Northern Ocean, and seldom exceeds the length of six or eight inches.

From about the end of June to the middle of October, these brilliant little fish are caught in great numbers on the southern coasts of England. They are sometimes fished for with seine nets, which have small meshes, and sometimes are dug out of the sand, at low water, with a kind of fork, that has three or four short and flat prongs.

When eaten perfectly fresh, these are among the richest and most delicious fish that are known. But to have them in perfection they should be cooked almost immediately after they are caught. They so soon become putrid, that it would be impossible to convey them to any distant market. The inhabitants of some parts of the Continent salt and dry them, and in this state they are considered a great delicacy.

The fifth order of Bony Fishes have the branchiæ, or gills, divided into little rounded tufts, whence their name of *Lophobranchii*. The gills are also entirely enclosed under a large operculum, which admits of the water escaping only through a small hole. The fish, as in the examples here given (Figs. 115, 116.) may be at once known by their bodies being encased, as it were, in armour formed of strong angular plates, frequently furnished with spines. They are of small size, and have a most extraordinary aspect. The eggs slip into a pouch formed by an inflation of the skin; in due time this opens for the escape of the young, so that these fish may be said to connect the osseous and cartilaginous divisions.

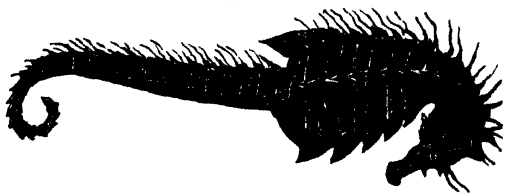
Fig. 115.



Short-nosed Pipe-fish (Hippocampus brevisrostris). The species of the genus *Hippocampus*, when dried, have the head bent at right angles with the body, and the tail bent inwards. From the peculiar appearance they present in this condition, they have received the name of *sea-horses*.

The foliated Pipe-fish here figured is found in the Southern Ocean.

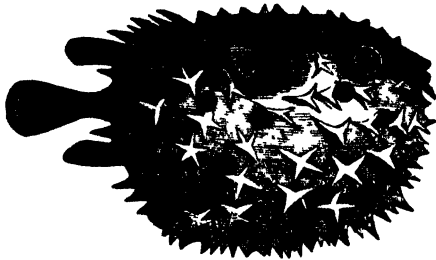
Fig. 116.

*Foliated Pipe-fish (Hippocampus foliatus).*

The sixth Order, or Fishes with soldered Jaws (*Plectognathi*), resemble the cartilaginous fish in the imperfect structure of their jaws, and the slowness with which their skeleton hardens. The flesh of few of them is esteemed, and at times it is said to become dangerous as food; the liver in some species (*Ostracion*) is large, and is said to yield an abundant supply of oil.

As an example, the Tigrine Balloon-fish is here given. (Fig. 117.)

Fig. 117.



Tigrine Balloon-fish (Diodon tigrinus).

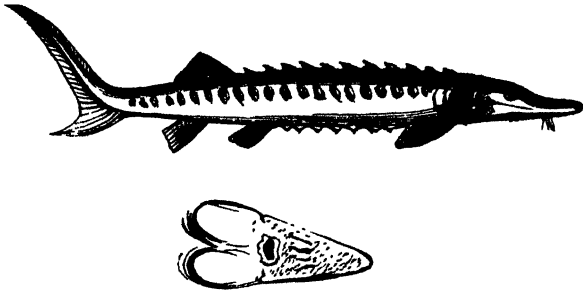
962. The DIODON (Fig. 117.) possesses the power of distending itself at pleasure into a nearly spherical form; the skin about the abdomen was observed by Darwin to be much looser than that of the back, so that when inflation takes place, the lower surface becomes far more distended than the upper, and the fish floats with its back downwards. Cuvier doubts whether the fish can swim when in this position, but Darwin, who observed the habits of one near Bahia, in Brazil, tells us that it can thus not only move forward in a straight line, but can likewise turn round to either side; it uses its pectoral fins in effecting this latter movement, its tail being collapsed. The Diodon could give a severe bite.—*Voyage of the Beagle.*

DIVISION II.—CHONDROPTERYGII, or Cartilaginous Fishes.

This division, distinguished from the Bony Fishes by the skeleton (so to speak) being devoid of true bony matter, is divided into two orders, in the first of which, represented by

the sturgeon, the gills are free, as in other fishes, while in the second, represented by the sharks and rays, the gills are fixed.

Fig. 118.



Common Sturgeon (Acipenser sturio).

963. The **COMMON STURGEON** (*Acipenser sturio*, Fig. 118.) is a large sea-fish, with five rows of bony tubercles along the body; the mouth beneath the head, and four fleshy beards betwixt the mouth and the extremity of the muzzle.

This fish sometimes grows to the length of sixteen feet and upwards.

It inhabits the European and American seas, and annually ascends the rivers in the early part of the year.

It is to this, and to a still larger species of sturgeon, called the **BELUGA** (*Acipenser huso*), which is found in the river Wolga, that we are indebted for much of the well-known substance called *isinglass*, the annual imports of which into this country vary from 1800 to 2000 cwt. The mode of making isinglass was long kept a secret by the Russians, and has only of late years been made public. This article consists of certain membranous parts of fishes. The sounds, or air-bladders, are those of which it is chiefly made. They are taken out, while sweet and fresh, slit open, washed from their slime, divested of a very thin membrane which envelopes them, and then left to stiffen in the air. After this they are formed into rolls, each about the thickness of the finger, and put into the shape in which we see them, by small wooden pegs, and left to dry. The

from Constantinople. This is of a brownish colour, and very hard; but when immersed in water it becomes soft and pliable, and may be dyed of any colour. Shagreen is often counterfeited by preparing morocco leather in the same manner as the skins of the dog-fish. Such fraud may, however, easily be detected by the surface of the spurious manufacture peeling or scaling off, whilst that of the genuine article remains perfectly sound. Shagreen is employed principally to cover cases for mathematical instruments, and was formerly used for watch-cases and the covers of books. *Sharks' fins* are an article of trade from the Arabian and Persian Gulfs to India, and thence to China. No less than 5000 cwt. of sharks' fins and fish maws were exported to China in 1837-8. Fish maws are supposed by Dr. Royle to be a coarse sort of isinglass.

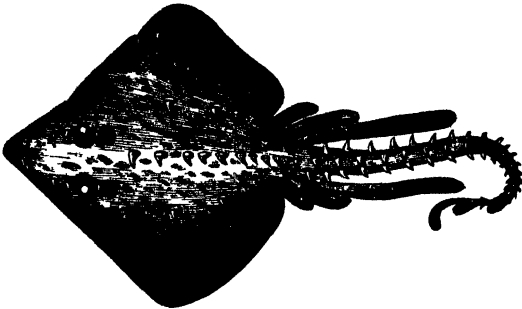
The *flesh* of all the species of sharks is hard, and in general unpleasant both to the smell and the taste; yet it is sometimes eaten by seamen, after having been macerated for a while in water to soften it. In the Hebrides, however, Dr. Fleming informs us, in his "British Animals," the flesh of the Smooth-hound (*Mustelus lævis*) is used as food, and esteemed a very delicate fish. The *eggs* of sharks are also eaten. The *livers* of all the species yield a considerable quantity of oil, which is useful for burning and for other purposes.

965. The SKATE (*Raia hatis*) is a species of ray of a large size, with a flat and somewhat diamond-shaped body, and the mouth on the under side: the teeth sharp, and a single row of spines in the tail.

It is found in almost every part of the European ocean.

No fish of its tribe is so excellent for the table as the skate, particularly when it is young and has not fed in a muddy part of the sea. The flesh is white and of a good flavour, but is usually crimped before it is cooked. The best season for skate is from January to March; and from July to September. So great is the size which these fish sometimes attain, that Willoughby mentions one that would have served 120 men for dinner. In several parts of the Continent skate are salted and dried for sale. The fishermen also sometimes dry the *stomach* as an article of food; and extract from the *liver* a white and valuable kind of oil.

Fig. 122.

*The Thornback (Raia clavata).*

966. The **THORNBAC** (*Raia clavata*, Fig. 122.) is a species of ray, which differs from the skate chiefly in having blunt teeth, and a row of curved spines along the middle of the body and on the tail.

This is a very common fish near all the coasts of Britain.

The flesh of the thornback is much inferior to that of the skate, yet it is sometimes eaten. That of the young ones, which have the denomination of *maids*, is, however, peculiarly excellent. The Norwegian fishermen catch thornbacks chiefly on account of their *livers*; from these they extract a considerable quantity of oil, which they sell with great advantage to strangers who frequent their harbours.

967. The **TRUE LAMPREY** (*Petromyzon marinus*) is an eel-shaped fish, having seven breathing-holes on each side of the neck, and a somewhat oblong mouth with many rows of yellowish pointed teeth disposed in a circular form.

These fish are of a dusky colour, irregularly marked with dirty yellow; they sometimes weigh four or five pounds each.

They are sea-fish, but at certain seasons they ascend the rivers to deposit their eggs.

Lampreys are celebrated as an excellent dish for the table; they have at all times been held in great esteem by epicures, particularly when potted or stewed. The death of one of our monarchs, Henry I., has been attributed to a too plentiful repast off these fish. Lampreys are in best season during the months of March, April, and May; at which

time they are caught in the rivers. The Severn is peculiarly celebrated for them ; the city of Gloucester, which is situated on that river, is required by ancient custom to present annually to the Sovereign, at Christmas, a lamprey pie, with a raised crust. And as at that early season lampreys are very scarce, it is not without difficulty that the corporation is able to supply the proper quantity.

These fish are caught in various ways, but particularly in osier pots or baskets formed to entrap them, and also in nets. In some parts of the country they are boiled, and afterwards packed in barrels with vinegar and spices.

968. *The LESSER LAMPREY (Petromyzon fluviatilis) is a fresh-water fish, distinguished from the true lamprey by its much smaller size, the second dorsal fin being angular, and connected with the caudal fin, and having a single row of teeth placed circularly in the mouth.*

This fish seldom exceeds the length of eight or ten inches.

It is found in the rivers of most parts of Europe, America, and Asia ; and particularly in those of Brandenburg, Pomerania, Silesia, and Prussia.

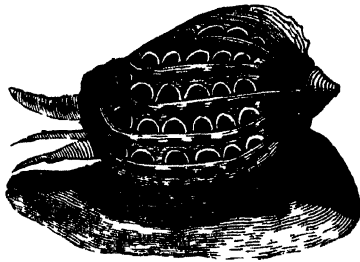
In the spring of the year these fish are frequently seen sticking by their mouths to stones in shallow water, from which they may easily be taken with the hand. They are considered a very delicious fish for the table, in whatever way they are cooked. The best season for them is betwixt the months of December and April.

Great numbers of Lesser Lampreys are caught in the Severn, the Dee, and the Thames ; but particularly in the latter, near Mortlake, in Surrey. Anterior to the late war more than four hundred thousand of them were annually sold to the Dutch as bait for cod, turbot, and other large fish.

SECOND DIVISION
OF THE
ANIMAL KINGDOM.

MOLLUSCA.

Fig. 123.



Ventrivose Harp.
(HARPA VENTRICOSA.)

The Mollusca are divided by Cuvier into six classes.

969. *Cephalopoda*, containing the cuttle-fish, in which the body has the form of a sack, inclosing the gills, and open at top, whence there protrudes a large well-developed head, with two powerful horny jaws, like the beak of a parrot, and two large eyes. The head is crowned with fleshy elongated tentacles, by means of which the animals walk and seize on their prey. They are all marine animals, swimming with the head backwards, and crawling about in all directions with the head beneath and the body above, whence the name *Cephalopoda* is derived. They have a peculiar secretion of a deep-black colour, with which

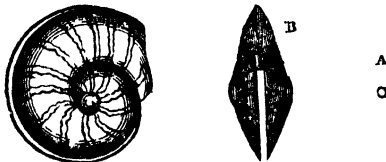
they tinge the water around them when concealment is necessary: their skin also changes with great rapidity. They are very voracious, destroying fish and crustaceous animals, which form their principal food. The animal of the argonaut is by some naturalists supposed to form a shell, while others believe that it is merely a parasite, like the hermit-crab (*Pagurus*). Many genera, such as the *Belemnites* (Fig. 124.), are only found in a fossil state. These are believed to have been internal shells, though there are not wanting naturalists who have regarded them as the cutaneous appendages of some sea-animal allied to the Sea Urchins. In some parts of this country they are found in the fields, being ploughed up from the beds of chalk, in which they often abound. The country people believe them to be of aerial origin, and call them *thunderbolts*.



Belemnites acutus.

Passing by the Nautili and Ammonites, or Snakestones, many beautiful species of which are found as fossils in this and other countries, we come to the Moneystones (*Nummulites*, Fig. 125), so called from their lenticular shape, resembling a piece of money. These are also only found in a fossil state; many of them, though exceedingly

Fig. 125.



Nummulites disroidalis.

A, nat. size; C, magnified, B, viewed edgewise.

small, yet abounding to such an extent in some localities as to form entire chains of calcareous hills. Cuvier informs us, that it is upon such rocks as these that the Pyramids of Egypt are founded, and that it is of stones almost entirely composed of nummulites that these same pyramids are built. As an example of a recent species of the class *Cephalopoda*, may be given the Official Cuttlefish.

970. The *OFFICINAL CUTTLE-FISH* (*Sepia officinalis*) is a marine animal, with a somewhat oval body nearly surrounded by a margin, eight short and pointed arms, and two tentacula four times as long as the arms, all furnished with numerous small cup-shaped suckers. The skin is smooth, whitish, and dotted with red

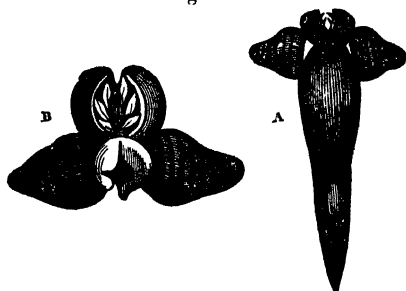
These animals are found in considerable numbers in the European seas.

By the ancients cuttle-fish were in great esteem as a delicacy for the table ; and even at the present day they are frequently eaten by the Italians, and by the inhabitants of other countries on the shores of the Mediterranean.

There is in the middle of their body an oval bone, thick in the middle, and thin and sharp at the edges, light, spongy, and of a whitish colour. These bones were formerly employed in medicine, and are still kept in the druggists' shops. When dried and pulverized, they are used by silversmiths as moulds, in which they cast spoons, rings, and other small work. When burnt or calcined they become lime ; and are useful for the cleaning and polishing of silver and other hard substances, and sometimes for correcting the acidity of wines.

The body of the cuttle-fish is furnished with a vessel that contains a considerable quantity of dark-coloured or inky fluid, which the animal emits into the water to conceal its retreat when alarmed by the approach of its enemies. This colour, or an imitation of it, is occasionally used by water-colour painters under the name of *sepia*, and it was at one time supposed that "China ink" was manufactured from the ink-bags of some other species.

Fig. 126.



Clio borealis.

971. Cuvier's second class of Mollusca has no feet, so that they cannot fix themselves or creep about. Their organs for swimming consist of two fins, placed on the sides of the neck. The appendages on the head are either very minute, or

wanting; from their swimming organs they derive their name of *Pteropoda*. Some of the animals of this class, though very small, swarm in some parts of the ocean; one of these, already alluded to (*Clio borealis*, Fig. 126.), forms a principal food of the whale, though none of the individuals are above an inch in length. Another animal of the class, no less abundant in the northern seas (*Limacina helicina*), forms, we are told, likewise a principal food of the whale.

972. The next class, like the two preceding, is furnished with a distinct head. The animals composing it crawl on a broad, flat, fleshy disk, under the stomach, whence is derived the name of the class, *Gasteropoda*. The common snail may be given as a familiar illustration of this. Several are entirely naked; others have only an inner shell, as in the *Dolabella Rumphii*; while the greater number are covered with a single large conical shell, which contains the soft body and protects it. "The shell being formed, the bag which contains the digestive organs agrees with it in shape; if the bag is only a little prominent, the shell is simply conical; but if it is very long, it is then generally, for the purpose of being out of the animal's way when it walks, coiled up, and then the shell which covers it is spiral or discoidal, according as the body is coiled up on itself, or in a more or less oblique manner on a central axis."—*Mr. Gray, Synopsis of British Museum*, 43rd ed. p. 82.

By Cuvier this extensive class is divided into several orders, the first of which he names *Pulmonea*.

Fig. 127.



Slug (Limax).

973. These, of which the different species of slugs (Fig. 127.) and snails may be taken as examples, breathe

the atmosphere through a hole opening under the margin of their cloak, which they can dilate or contract at will.

The *Limax rufus*, or *RED SLUG*, which is at times almost wholly black, has been frequently collected, and a broth made from it is said to be good in some diseases of the chest.

974. The *HOUSE*, or *EDIBLE SNAIL* (*Helix pomatia*), is of a brownish white colour, with usually three reddish horizontal bands, somewhat striated longitudinally; and having a large and rounded aperture with a thickened and reflected margin.

It is sometimes more than two inches in diameter, and is of a globular shape; found in woods and hedges in several parts of Europe; and occurs in most of the southern counties of England.

By the Romans, towards the close of the republic, when the luxury of the table was carried to the greatest height of absurdity and extravagance, these snails were fattened as food, in a kind of stews constructed for the purpose, and were sometimes purchased at enormous prices. The places for feeding them were usually formed under rocks or eminences; and if these were not otherwise sufficiently moist, water was conveyed into them through pipes bored full of holes like those of a watering-pot. They were fattened with bran and the sodden lees of wine.

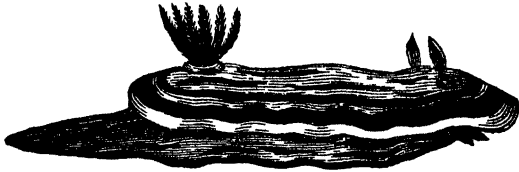
In France, Germany, and other countries of the Continent, they are at this day in great request for the table, and are chiefly in season during winter and the early months of the year. They are boiled in their shells, and then taken out, washed, seasoned, and otherwise cooked according to particular palates.

They are also frequently used by females in France as a cosmetic, to preserve the skin of the face soft and delicate. They were formerly considered useful in consumptions; but modern medical practice takes no notice of them.

975. The second order of the *Gasteropoda* have neither a shell nor a cavity for the lungs, but have their branchiæ exposed upon some part of the back. They are all marine, and one species at least (the *Tritonia arborescens*), found on our coasts, when confined in a glass vessel, was observed to possess the power of emitting distinctly audible sounds. Many of the species are extremely curious, and some of

them finely coloured. As an example of this order we subjoin a cut of the *Doris magnifica*.

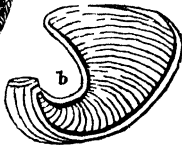
Fig. 128.



Doris magnifica.

976. The *Tectibranchiata*, another order of the same class, have the branchiæ differently placed, in different genera, in the form of more or less divided leaflets, which are more or less covered by the mantle in which a small shell is generally contained. As an example, the *Dolabella Rumphii* is here given. Fig. 129. *a*

Fig. 129.



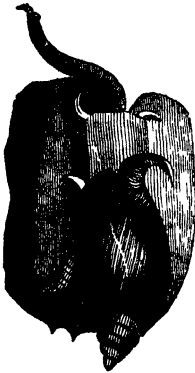
Dolabella Rumphii.

a shows the whole animal, and *b* the internal shell. Some of the genera of this order, for example, the *Aplysia*, or Sea-hare, as it has been called, have the edges of the mantle supplied with an abundance of a deep purple fluid, with which, like the cuttlefish, the animal discolours the water around it when danger is at hand. Sow-

erby put some of this fluid on a piece of paper, and it remained nearly as brilliant for two or three years afterwards. Some naturalists have even thought it to be the true Tyrian dye of the ancients. (See 977.)

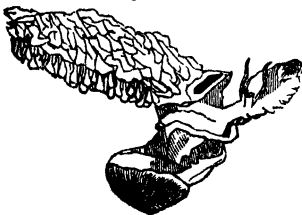
977. The *Pectinibranchiata* is the most numerous order of its class, as it contains nearly all the univalve spiral shells, and many which are simply conical. As an example, as well of the class, as of this order in particular, the *Buccinum lævissimum* here figured (Fig. 130.) may be taken. The branchiæ, as the name implies, have the numerous leaflets of which they are composed ranged parallel to each

Fig. 130.



Buccinum lævissimum. other, like the teeth of a comb, and fixed to the floor of the pulmonary cavity. They are nearly all aquatic animals, there being but two or three genera in which water is not the medium of respiration. Many of them abound on our coasts, and are eaten: perhaps the most extensively used of these is the Periwinkle (*Littorina littorea*), while others, from their beauty or rarity, are much prized by collectors, and for some of them formerly very large prices have been given, more especially the Wendletrap (*Scalaria pretiosa*). Dr. Fleming, speaking of the *Fusus antiquus*, a common species on our coasts, tells us it is used as a bait for cod, and sometimes as food, while the shell, suspended horizontally, is employed in the Zetland cottage as a lamp, the cavity containing the oil, and the canal the wick (*Brit. Animals*, p. 348). Mr. Gray informs us that in India and China the different species of *Turbinellus* are used to contain the oil to anoint the priests; the animal of *Purpura Lapillus*, which is very destructive to muscle beds, by perforating the shell, in order to feed on the muscle within, yields a beautiful purple colour, which has been considered as the Tyrian dye of the ancients; but there is little doubt that this celebrated colour was obtained from various species, the *Murex trunculus* being that from which the true Tyrian dye was most probably derived.—*Synopsis of Brit. Mus.* p. 84.

Fig. 131.

*Jantlina.*

A fine deep-blue secretion abounds in the violet shells (*Jantlina*, Fig. 131.), which are frequently found in great abundance on the ocean, where they float about, supported by means of a vesicular organ, like a mass of foam-bubbles, attached under its foot, as shown in the wood-cut,

Fig. 132. where the animal is represented with its float, &c. stretched out of the shell. It is to this order that the needle-shells (*Terebra*, Fig. 132.); cowries (*Cypræa*), used in some parts of the world as money; and the beautifully coloured cones and olives (*Conus*, *Oliva*) belong. The money formerly used by the Indians of North America was composed of two species of periwinkles, and a bivalve shell, as may be gathered from the following note in the "Life of Eliot," by Francis, in Sparks's American Biography, v. p. 15.



Terebra. "Wampampeag, commonly called Wampum, was the money made by the Indians, and made a lawful tender by the Whites. It was white and black; the white was formed of the periwinkle (*Buccinum Lapillus et undatum*); the black of the *Venus mercenaria*. Much of it, and indeed most of it, was made on Block Island. It was reckoned by fathoms, and parts of a fathom, being worth from five to ten shillings the fathom."

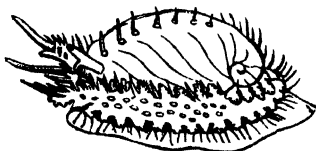
Fig. 133.



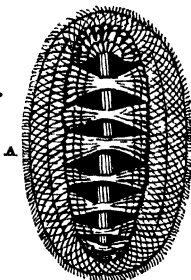
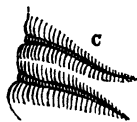
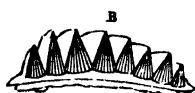
978. The next order of the *Gasteropoda*, exemplified by the worm-shell (*Vermetus lumbricalis*, Fig. 133.), differs from the preceding in having the shell (which is a more or less regular tube, and only spiral at the apex), permanently fixed to other bodies. The *Magilus antiquus*, a common species in the coral rocks of the Isle of France, has the tube sometimes three feet long; the animal in its young state taking up its station in some hollow part of the coral, and keeping the aperture even with the outer surface of the coral as it increases around it.

979. The next order contains animals whose shells are very open, the greater number not in the least spiral, so that the fleshy parts, and particularly the gills, are covered as by a shield. The ear-shell (*Haliotis*, Fig. 134.) the animal of which is one of the most richly adorned of the class, belongs to this order. In some parts these shell fish are eaten, and

134.



Ear-shell (*Haliotis*) and animal. examples, it has the branchiæ in the form of little leaflets or pyramids (Fig. c), attached in a circle under the margins of the cloak. ^{v: g. 135.}



Chiton squamosus.

Indies, who have the folly to call them *beef*; the thick fleshy foot is cut away from the living animal and swallowed raw, while the viscera are rejected.”—*Zool. Journ.* v. p. 30.

981. The fourth class of *Mollusca* have no apparent head, whence their name *ACEPHALA* is derived. They have a mouth only, concealed in the bottom or between the folds of their mantle, which is generally provided with a

Fig. 136.



Unio pictorum.

calcareous bivalve, as in the oyster or muscle (Fig. 136.), or even multivalve shell, as in the Rock-borer. They are all aquatic, and many of them are exceedingly useful to man. In the “*Zoology of Beechey’s Voyage*,” p. 160, we are informed that “the natives of the

resemble our limpets, to which they are nearly related.

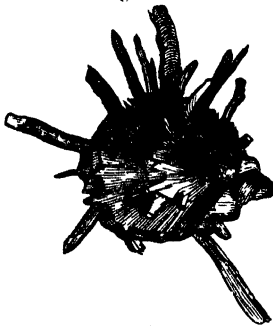
980. Of the next order (*Cyclobranchiata*), the limpets (*Patella*), and seaweedlice (*Chiton*, Fig.

135.) may be taken as examples, it has the branchiæ in the form of little leaflets or pyramids (Fig. c), attached in a circle under the margins of the cloak. The limpets are of great value as a *bait* in our fisheries, and even as an article of food (*Fleming, Brit. Anim.* p. 287); while Guilding informs us that “some of the larger kinds of *Chitons* are eagerly devoured by the lower orders in the West

country near Conception live almost entirely upon shell-fish, of which there is an inexhaustible supply: they carry them to great distances, fifty or sixty miles into the interior. They have been in the habit of doing this for ages, and along the coast are vast piles of shells, thus accumulated by the agency of man. English vessels lay in stores of these testacea, and take them an eight or ten days' voyage from Conception, as far as Valparaiso."

982. The examples of *Acephala* which follow, belong to the first and most important order, the *Testacea*, so named because they are furnished with shells (Fig. 137.):

Fig. 137.



Spondylus Americanus.

while some of them form pearls, and afford shells which, when burned, produce excellent lime.

983. The OYSTER (*Ostrea edulis*) has the valves of the shell simple or undulated, and not plaited.

It is found affixed to rocks, or in large beds, both in the European and Indian seas.

The use of oysters as food has rendered them celebrated in all ages. The ancient Roman writers speak of them as in great request by that luxurious people. (Juvenal, Sat. IV. l. 141, 2.) Pliny relates, that in his time they were considered so exquisite, as when in perfection to have been sold for enormous prices; and that Apicius, the notorious epicure, invented a peculiar method of preparing and fattening them.

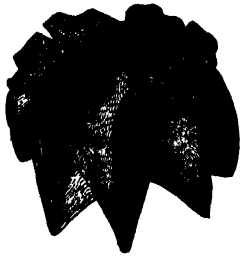
Of all the European oysters, the largest are those that are caught off the coast of Normandy, and with which Paris is principally supplied. But the best are of a middle or somewhat small size, and are caught in the waters of Malden and Colne, in Essex, or near the mouth of the Thames. They are dredged up by a net having an iron scraper at the mouth, which is dragged by a rope from a boat over the beds, and then stored in large pits formed for the purpose, and furnished with sluices through which, at spring tides, the salt water is suffered to flow. In these pits they acquire their full quality, and become fit for the table in six or eight weeks. The most delicious oysters are considered to be those which are fattened in the salt-water creeks near Milton in Kent, and Colchester in Essex. At least two hundred vessels, employing from four to five hundred men and boys, are engaged in dredging for oysters on our coast.

Oysters are out of season during the months of May, June, and July, the period at which they deposit their spawn, and which commences in the month of April. Each spawn has the appearance of a drop of candle-grease, and adheres to rocks, stones, or other substances on which it happens to be deposited. In some oyster-beds, old shells, pieces of wood, &c. under the denomination of *cultch*, are purposely thrown in to receive the spawn. From these, in the month of May, the oyster-fishers are allowed to separate the spawn for the purpose of transferring it to other beds; but they are required, under certain penalties, to throw the cultch in again, that the beds may be preserved for the future; unless the spawn should be so small as not with safety to be separable from the cultch.

Oysters are considered to be first fit for the table when about a year and a half old; and they are among the few animals which in Europe are not merely eaten raw, but even in a living state. Oysters are also eaten cooked in various ways, as sauce to different kinds of fish, and pickled.

The *shells*, like those of other testaceous animals, consist of calcareous earth in combination with animal matter, chiefly albumen; by calcination they yield a pure quick-lime. They are also sometimes employed in powder by

Fig. 138.

*Ostrea cristata.*

stationers and attorneys as pounce for rubbing upon parchment previously to its being written upon.

There are many other species of oyster, in which the shell is distinctly plaited. Some of these species are also eaten, but are not in such request as the species just referred to. As an example, the *Ostrea cristata* is here given. (Fig. 138.)

984. The **GREAT SCALLOP** (*Pecten maximus*) has a double shell, flat on one side, and convex on the other; having about fourteen rounded ribs, which are longitudinally grooved, and a projection or ear on each side of the hinge.

The shells, when full grown, are about five inches long, and six inches broad.

By some persons scallops are thought better eating than oysters, and on the southern coasts are so esteemed by some persons as, when prepared, to be named "Quins." The ancients held them in great esteem. In several parts of France *Pecten*s of an allied species (*P. Jacobæus*) have the name of "Coquilles de Saint Jacques," from the Catholics who annually visited the shrine of St. James of Compostella, in Spain, placing the shells in their hats as a testimony of this pilgrimage. These shells are also worn by pilgrims to the Holy Land.

985. The **PEARL MUSCLE**, or **PEARL OYSTER** (*Avicula margaritifera*), to which we are indebted for nearly all the pearls of commerce, has a flattened and somewhat circular shell, about eight inches in diameter; the part near the hinge bent, or transverse, and imbricated (or covered like slates on a house) with several coats which are toothed at the edges.

Some of the shells are externally of a green colour, others are chesnut, or reddish with white stripes or marks; and others whitish with green marks.

These shells are found both in the American and Indian seas.

The principal pearl fisheries are off the coasts of Hindostan and Ceylon. The fishing is admirably described by Percival, and usually commences in February, and ends

about the beginning of April. It occupies many boats and a great number of hands. Each boat has generally twenty-one men, of whom one is the captain, who acts as pilot; ten row and assist the divers, and the remainder are divers. The latter go down into the sea alternately by five at a time. To accelerate their descent they have a perforated stone of eighteen or twenty pounds weight, fastened by a cord to their great toe, or to some other part of their body. The depth of water through which they pass is from four to ten fathoms; they collect the muscles into a bag of network which they hang about their necks. When desirous of ascending, they pull a rope as a signal to their companions in the boat to draw them up. They are often known to descend as many as forty or fifty times in a day, and at each plunge to return with more than a hundred shells. The usual time for the divers to remain under water does not much exceed two minutes, though some are able to continue immersed more than five minutes.

When the muscles are taken out of the boats, they are placed in heaps on the shore, where they continue about ten days, till the animals become quite putrid. They are then opened and searched for the pearls. One muscle sometimes contains many pearls, a hundred and upwards, large and small; and sometimes a hundred muscles have been opened without yielding a single pearl large enough to be of any value.

The pearls are sorted according to their size, by being passed through large brass sieves, or through saucers with round holes in the bottom. After having been sorted, they are drilled; and then washed in salt water to prevent any stains which might be left by the drilling. The arranging of them on strings is considered the most difficult task of a pearl merchant, in consequence of the correctness of judgment which is requisite in classing them according to their value.

The value of pearls is estimated by their size, roundness, colour, and brightness. A handsome necklace of pearls, smaller than large peas, is worth from 170*l.* to 300*l.*, whilst one of pearls not larger than pepper-corns may not be worth more than 20*l.* The King of Persia has a pear-shaped pearl so large and pure, as to have been valued at 110,000*l.* sterling. The largest round pearl that has been

known belonged to the Great Mogul, and was about two-thirds of an inch in diameter. Pearls from the fishery of Ceylon are considered more valuable in England than those from any other part of the world. The smaller kinds are called *seed* or *dust pearls*, and are of comparatively small value, being sold by the ounce to be converted into powder.

Nacre, or *mother-of-pearl*, is the inner part of the shell of the pearl muscle. This is of a brilliant and beautifully white colour, and is usually separated from the external part by aqua-fortis, or the lapidary's mill. Pearl muscle shells are on this account an important article of traffic to China and many parts of India, as well as to the different countries of Europe. They are manufactured into beads, snuff-boxes, buttons, spoons, fish and counters for card-players, and innumerable other articles.

Pearl muscles are not considered good food; though, after having been dried in the sun, they are sometimes eaten by the lower classes of people in the countries near which they are found.

It ought to be here observed, that although the finest pearls are obtained from the pearl oyster, they are likewise obtained not only from the *Pearl-bearing* and *Common muscles*, as mentioned in this work, but also occasionally from many other shell-fish, among which the *common oyster* may be named.

986. *The COMMON SALT-WATER, or EDIBLE MUSCLE* (*Mytilus edulis*), has a smooth double or bivalve shell, of an oblong oval form, pointed, and slightly keel-shaped at the beak, flattened and somewhat curved on one side.

The colour is generally blackish, and the length about three inches.

This species of muscle is found adhering to sub-marine rocks by certain silky threads, which grow from its own body; it is common both in the Indian and European seas.

In many parts of Europe muscles are nearly as much in request for the table as oysters; at Rochelle, and some other places, modes are adopted for increasing their excellence, by placing them, after they are taken from the sea, in pools or ditches where the sea-water is stagnant, and introduced only at particular periods as it is wanted. Muscles are caught nearly through the whole year, though

they are considered best in the autumn ; and some persons reckon it prudent to use them only in the winter months.

To some constitutions they are an unwholesome food, producing inflammation, eruptions on the skin, and an intolerable itching over the whole body ; the best remedies for which are emetics, promoted by draughts of warm water ; afterwards a purgative should be given.

Pearls are obtained from this muscle in considerable quantities in the river Conway, and in the Menai, near Bangor.

987. *The GREAT PINNA, or SEA-WING (Pinna nobilis), has its shell of nearly a triangular shape, open at the broader end, longitudinally striated, the scales channelled and tubular, and somewhat imbricated.*

Its length is sometimes more than fourteen inches, and its greatest breadth six or seven inches.

These animals are found in great abundance in the Mediterranean; and in the sea near some parts of the coast of America.

From the earliest times the *byssus*, or silky thread by which these animals affix their shells to rocks or stones at the bottom of the sea, has been spun and woven into different articles of dress. For this purpose the shells are dragged up by a kind of iron rake, having a handle proportionate to the depth of water in which the shells are found. The *byssus* being cleansed from its impurities, is dried in the shade, and straightened with a large comb ; the hard part from which it springs is cut off, and the remainder is properly carded. By these different processes it is said that a pound of *byssus*, as taken from the sea, is reduced to about three ounces. This substance is naturally of a brilliant golden brown ; it is manufactured in Sicily and Calabria (with the aid of a little silk to strengthen it) into stockings, gloves, caps, waistcoats, and other articles, of an extremely fine texture. All these, however, are to be considered rather as curious than useful. The manufacture of them is every day declining.

988. *The PEARL-BEARING MUSCLE (Unio margaritifera) has an oblong, double or bivalve shell, of a somewhat oval shape, but narrower towards the middle than at the ends, and covered externally with a dark-coloured rough epidermis or skin, except on the protuberant parts near the hinge: one of the shells at the hinge has a*

single tooth or prominent part, which fits into a forked one in the other.

The general depth of the shells is two inches, and breadth about five inches.

Pearl-bearing muscles are found in fresh-water rivers in many parts of Britain, and in those of most other countries within the Arctic Circle. The rivers Tay in Scotland, and the Conway in Wales, are particularly noted for them.

In the river Tay some of these shells are found to contain good pearls; but fine ones are very scarce, and the greater part are of little or no value. They are of various shapes, round, oval, or elongated, and cylindrical, hemispherical, and resembling buttons. Several of the oblong ones have a contraction towards the middle, which gives them the appearance of two pearls joined together.

It has been for a long time a received opinion that the pearl is a morbid concretion, formed in consequence of some external injury which the shell receives, particularly from the operations of certain minute worms which occasionally bore even quite through to the animal. Hence it is said that it is easy to ascertain, by the inspection of the outside only, whether a shell is likely to contain pearls. If it be quite smooth, without cavity, perforation, or callosity, it may with certainty be pronounced to contain none. If, on the contrary, the shell be pierced or indented by worms, there will always be found either pearls or the embryos of pearls. It is said, too, that it is possible by artificial perforations of the shells, to cause the formation of these substances. The process which has been chiefly recommended is to drill a small hole through the shell, and to fill this hole with a piece of brass wire, rivetting it on the outside like the head of a nail; the part of the wire which pierces the interior shining coat of the shell will, it is said, become covered with a pearl. But Mr. Murray (*Mag. Nat. Hist.*, vol. iii. p. 452) thinks it demonstrable that the pearl is not the product of disease, but an excretion formed by the animal to stop up the holes made in its shell.

As to the value of British pearls, some have been found of a size so large as to be sold for 20*l.* each and upwards: 80*l.* was once offered and refused for one of them. It is reported in Wales, that a pearl from the river Conway, which was presented to the queen of Charles II., was afterwards placed in the regal crown.

989. Many of the shells of the testaceous acephalous Mollusca, as well as the examples already given, are subject to a disease which, as Mr. Gray informs us, "causes them to form calcareous pearly secretions either in the substance of their bodies or on the surface of their shells; these secretions always agree in colour with that of the inner surface of the shell to which the animal belongs. Thus those of the *Pinnæ* (987) are pale brown and transparent; those of the oyster are white and opaque; and those of the muscles are either white or purple; while those of the shells which have a pearly lustre, as the *Aviculæ* (985), *Unio*, and *Anodon*, partake of the same mild brilliancy. As the peculiar lustre of pearls greatly depends on their more or less globular form, the Chinese have attempted, not very honestly, to make the pearly inside coat of some of the pond-muscles assume that shape, by placing hemispherical pieces of mother-of-pearl between the animal and the shell, which it eventually covers with a pearly coat. In other countries, spurious pearls have been produced, for an equally laudable object, by placing pointed pieces of wire in a similar situation. Syn. Brit. Mus. p. 100.

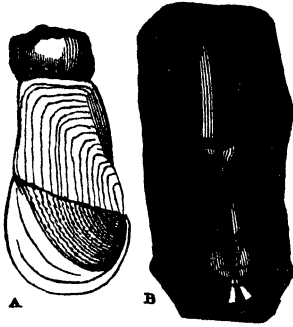
990. *The COCKLE (Cardium edule) is a small and well-known testaceous animal, with a double convex shell, somewhat deeper on one side than the other; and marked by twenty-eight depressed ribs, which are streaked or slightly furrowed across.*

Cockles are perhaps more generally eaten in England than in any other country. They are a wholesome, and to many persons an agreeable food; but if eaten raw they are supposed to produce poisonous effects. Cockles are generally found on the sea-coasts, immersed at the depth of two or three inches in the sand. They are dug up at low water: the places where they are concealed are known by small, circular, depressed spots in the sand. Cockles are chiefly in request during the winter months. They are sometimes pickled, and sometimes converted into ketchup.

991. To the testaceous acephala, also belong the rock-boring shells (*Pholas*, Fig. 139.) and wood-borers (*Teredo*). The former inhabit cells which they make in rock, and sometimes in mud. The foot is truncated in front, the object of which, according to Mr. Gray, is to enable them to retain their position while they rotate their shell to form the holes,

the substance in which they burrow being partially softened beforehand by the juices of the animal. Some of them have a pleasant taste, and in some countries are sought after as food. One of the genera at least of the Pholadæ burrows in decayed wood. The most destructive of all animals to submerged wood, and one which has more than once, according to Cuvier, threatened Holland with ruin, by damaging its dikes, is the *SHIP-WORM* (*Teredo navalis*).

Fig. 139.



Striated Rock-borer (Pholas striata).

This, when young, penetrates into ships' bottoms, and the piles of piers, jetties, &c. perforating them in every direction by means of its valves; as it proceeds, it lines the gallery it forms with a calcareous crust, which protects its body.

ARTICULATED ANIMALS.

ARTICULATA.

Fig. 140.



The Vapourer moth (Orgyia antiqua) male, B. larva, C. female, D. egg, E. cocoon.

992. Articulated animals are divided into four classes, Annelides, Crustacea, Arachnida, and Insecta.

The first of these are the only invertebrated animals with red blood ; nearly all of them, except the earthworms, live in water ; many of them are most beautiful objects : few if any of them seem to be used as food by man, though several of them are used as bait, and some of them, as the leech and earthworm, are exceedingly useful to us. As an example the sea-mouse (*Aphrodita aculeata*) which is often found on

our sea coasts, is here given (Fig. 141). The flexible bristles on its sides are very brilliant, and change to all the hues of the rainbow.

Fig. 141.

Sea Mouse (*Aphrodita aculeata*).

993. The common earth worm (*Lumbricus terrestris*) is much used as a bait by anglers; and though its casts are so troublesome to the gardener on his well-kept grass-plots, to the farmer they are of great importance, as it loosens the earth, and allows the air and water to improve it; Mr. Darwin has also lately shown, that by means of this much despised yet active agent, comparatively barren tracts of ground have been covered with a layer of good mould.

Mr. Darwin has given several instances of this, one of the most remarkable of which was, that in the course of eighty years, a field manured with marl was by the agency of earth worms covered with a bed of earth, of the average thickness of thirteen inches.

994. The **MEDICINAL LEECH** (*Sanguisuga medicinalis*, Fig. 142), of an olive-black colour, with six yellowish lines on the upper part of the body, and spotted with yellow beneath.

When fully extended, the leech is generally two or three inches in length. It is found in stagnant and muddy waters.

Fig. 142.



Leech.

The use of leeches in medicine is to diminish the accumulation of blood in any particular part of the body. This they do by fixing themselves to the spot, forming a hole with the teeth in the three jaws which are situated triangularly in their mouth, and sucking the blood through the wound. When they have drawn sufficient, they are easily loosened by putting upon them a small quantity of salt, pepper, or vinegar.

Leeches are caught in various ways, but one of the best is to throw bundles of weeds into the water which they inhabit. These, if taken out a few hours afterwards, will generally be found to contain a considerable number. They

are caught in various ways, but one of the best is to throw bundles of weeds into the water which they inhabit. These, if taken out a few hours afterwards, will generally be found to contain a considerable number. They

are collected from several of the rivers in the south of England, and are kept for sale, sometimes many thousands together, in casks or tubs of spring water. This is frequently changed, and all the slime and filth which exude from their bodies is carefully washed away.

It is said that if leeches be kept in glass vessels they will indicate a change of weather, by becoming at such times peculiarly restless and active.

CRUSTACEA. (Crabs, Lobsters, &c.)

Of this extensive class there are many Orders. The species used as food by man belong principally to the Order Decapoda, their flesh is, however, difficult to digest.

995. *The COMMON or BLACK-CLAWED CRAB* (*Cancer pagurus*), has a smooth shell, of a somewhat oval shape, having a margin with nine folds on each side, and the great claws black at the tips.

These crabs inhabit the rocky parts of the sea both of Europe and India.

They are frequently caught at low water of the spring tides, under stones and in crevices of the rocks. But the usual mode is by sinking large wicker baskets made somewhat in the shape of wire mouse-traps, and baited with garbage or fish, to a considerable depth in the sea. When caught, the large claws are tied together, or (with great cruelty) pegged in the joints, to prevent the animals from destroying each other. They are then put into store baskets, which are placed in the sea, until the crabs are wanted for sale. In these they are kept sometimes for many weeks, without any other food than what they can collect from the sea-water.

The principal season for crabs is the spring of the year; those of a middle size which are the heaviest are best. When in perfection the joints of the legs are stiff, and the body has an agreeable smell. If the eyes look dead and flaccid, the crabs are not fresh.

Crabs' claws, which consisted of the black tips of the claws pounded, well washed in boiling water, and reduced to a fine powder, were formerly employed as a medicine, but are now expunged from the *Materia Medica*.

996. *The BLACK or LAND CRAB* (*Gegarcinus ruricola*) is common in some parts of America, the Bahamas, and other islands in the West Indies; it has a rounded shell without margin, the first joints of the legs spinous, the second and third furnished with tufts of hair.

The shells of the largest land crabs are about six inches in diameter, and of various colours.

These crabs inhabit the clefts of rocks, the hollows of trees, or holes which they form in the ground. In the early part of the year they descend in myriads to the sea-coast, to deposit their eggs in the sand. They chiefly travel by night, but in rainy weather they also proceed during the day. The inhabitants of the countries where they abound are always eagerly on the watch for their migrations towards the sea, and destroy immense numbers of them, disregarding, at this time, the bodies, and only taking out the spawn. It is on their return that the animals themselves are valuable as food, and they are then kept in cages expressly for the table.

997. *The SEA CRAW-FISH, or SPINY LOBSTER* (*Palınurus vulgaris*), is a crustaceous animal, distinguishable from the common lobster by its shell being covered with spines, and by each of the legs ending in a hairy claw, its lateral antennæ are large and spiny.

This species is of a large size, and is found in most of the European seas.

Sea craw-fish are very common in the London markets, where they are sold at a price inferior to that of the common lobsters. Their flesh is hard, and has a peculiar sweetness, which some persons dislike; they are nevertheless a wholesome food. At Marseilles, and on the coast of the Mediterranean, they are in considerable request on account of their eggs, which are esteemed a great delicacy. These begin to appear towards the end of May, and are cast about two months afterwards.

998. *The COMMON or FRESH WATER CRAY-FISH* (*Astacus fluviatilis*), is a small crustaceous animal, in shape somewhat resembling a lobster, and distinguished by having its large claws beset with numerous tubercles, the beak between its eyes being toothed on each side, and having a single tooth at the base.

It inhabits holes in the cloyey or stony banks of many of the

rivers of England, and is seldom known to exceed the length of three or four inches.

Cray fish are frequently used in cookery: their flesh is considered nutritive, but somewhat indigestible.

Crabs' eyes, formerly employed in medicine as absorbents, are concretions formed within the stomach of the craw-fish; but being expunged from the *Materia Medica*, they require no further notice here.

In England the usual mode of catching cray fish is by cleft sticks, baited with flesh or garbage, and stuck in the mud near their haunts at the distance of a few feet from each other. After being suffered to remain some time, these are gently drawn up, and a basket is put under them to receive the animals, which always drop off as soon as they are brought to the surface of the water.

999. *The LOBSTER (Homarus vulgaris), is distinguished by its long and jointed tail, its shell being smooth, and having betwixt the eyes a kind of beak toothed on each side, and with a double tooth at its base.*

These animals are of a bluish black colour when alive, but in boiling, this changes to a red. They sometimes grow to an immense size.

Lobsters are found among the marine rocks in nearly all parts of Europe.

They are caught much in the same manner as crabs (995). The London markets are supplied with great numbers of lobsters from the Orkney Islands and the eastern parts of Scotland, and even from the coast of Norway. It is said that in London, lobsters are sometimes boiled every day for a week or longer, to keep them sweet externally; but notwithstanding this precaution, their inner parts become putrid. An immoderate use both of lobsters and crabs is sometimes attended with eruptions in the face, or a species of nettle rash over the whole body; when eaten in a state approaching to putrescence, they are sometimes productive of still more disagreeable effects.

Good lobsters are heavy in proportion to their size, and have a hard and firm crust. During winter the male lobsters are generally preferred; they are distinguished by the narrowness of their tail, and by the first two fins beneath being large and hard. The females, on the con-

trary, are broader in the tail, and have these fins small and soft. The spawn is found under the tail of the females for some time after it has been protruded from the body; in this state the females are generally preferred to the males. When fresh, the tails of the lobsters are stiff, and pull open with a spring, but when they are stale the joints of the tail become flaccid.

1000. *The COMMON SHRIMP* (*Crangon vulgaris*) is a very small crustaceous animal, shaped somewhat like a lobster; having four antennæ, the two interior ones short and double, with two thin projecting laminæ beneath them, and on each of the large claws a single moveable fang.

Shrimps are common in shallow parts of the sea where the bottom is sandy.

1001. *The PRAWN* (*Palæmon squilla*), is a small crustaceous animal, which differs from the shrimp in having a projecting and sharply serrated horn in front of its head, four antennæ, of which the two interior ones are long, each in three divisions, and on each of the large claws two fangs.

It is found in many parts of the European ocean.

Both these species are in great demand for the table, the former chiefly as sauce, and the latter to be eaten as a relish at breakfast, or with the last courses at dinner. They are an agreeable repast, and more easily digestible than either crabs or lobsters.

The mode in which they are caught is generally by a kind of net called a putting net, which is fixed to the end of a long pole, and pushed along upon the sand in shallow water. Prawns in some places are caught in wicker baskets, similar in shape to those which are used for the catching of crabs (995).

1002. A large species of *Æga* (*Æ. Edwardsii*), a genus of the Order Isopoda, to which the woodlice (oniscus) belong, is found parasitic on the cod on the Newfoundland banks; the fishermen there call it the "fish-doctor," and according to Mr. St. John, they use the eggs, or some secretion on the under side of the body, as an ointment for wounds, in healing which it is said to be very efficacious.

ARACHNIDA (Spiders).

1003. Of this class, Labillardière found a species (*Epeira edulis*) in the woods of New Caledonia, which constructed a strong web, the resistance of which often proved very annoying to the French voyagers. The natives of the country collect these spiders as articles of food, and calling them Nougui; they enclose them in a large earthen jar, which they place over the fire; when they are dead, they roast them on the live embers, and eat them immediately.

INSECTS (Insecta).

A few examples are here given of the direct benefits derived from insects, from which it will be seen that it is to this class that we are indebted for silk, honey, wax, lac, our finest dyes, and cantharides, "an article than which almost any other could be better spared from the *Materia Medica*." The gall-nut, from which ink is made, is caused by a minute fly (*Cynips*). Many species of insects are used as food, and still more might be used were it not for our prejudices. Most of the examples here given are derived from the first volume of the "Introduction to Entomology," by Messrs. Kirby and Spence, to which the reader is referred for further instances.

Of the order *Coleoptera*, containing the beetles, the following may suffice.

1004. *COCKCHAFERS* (*Melolontha vulgaris*). A German paper speaks of a society formed at Quedlinbourg, which had collected nineteen millions of cockchafers for the purpose of extracting oil. In Hungary three measures of oil had been obtained from eight measures of the beetles. The oil, of course, is extracted by heat, and is more particularly adapted for greasing wheels.—*Ann. de la Soc. Ent.* v. p. 47.

1005. *The SPANISH, or BLISTERING FLY* (*Cantharis vesicatoria*), is scarcely an inch in length, of a shining blue-green colour, with black antennæ.

It is found in most parts of Europe, and of Asia ; it feeds on the leaves of the ash, poplar, elder, lilac, and other trees.

Spanish flies, known in the medical world under the name of *Cantharides*, are of incalculable importance to mankind, as the basis of blistering plasters, and also as an internal remedy against many diseases. We import them in a dried state from Sicily, but chiefly from Astrachan, where, as well as in the South of Europe, they abound. As they are generally in a torpid state during the day, they are easily collected, by shaking them from the trees upon a cloth spread on the ground to receive them. When a sufficient number has been collected they are tied in bags, and killed by being held over the fumes of hot vinegar. After this they are dried in the sun, and packed in boxes for sale. Their odour, when alive, is peculiarly nauseous, and so powerful, that great injury has sometimes been experienced by persons employed in picking them, and by those who have even fallen asleep under the trees where they abound.

Previously to being used they are powdered ; if in this state they be applied to the skin, they first cause inflammation, and afterwards raise a blister. A good *blistering plaster* may be thus formed : yellow wax $3\frac{1}{2}$ oz. ; yellow resin, and Burgundy pitch, of each 2 oz. ; horse turpentine, 5 oz. ; Spanish flies in powder, 4 oz. : melt first the yellow resin, next the wax, then add the other ingredients, and when all is melted and removed from the fire, mix in the Spanish flies.

The vesicating principle of this insect has been named Cantharidin, and is not confined to this species. The Potato Fly (*Cantharis vittata*) is used in North America, while other species are employed in other parts of the world. The *Mylabris Cichorei*, and various other species of Mylabris, as well as of Meloe and Cantharis, supply the place of the "Spanish fly" in China and other parts of Asia. In some places, a species of Lady-bird (*Coccinella*) is used as a vesicatory.

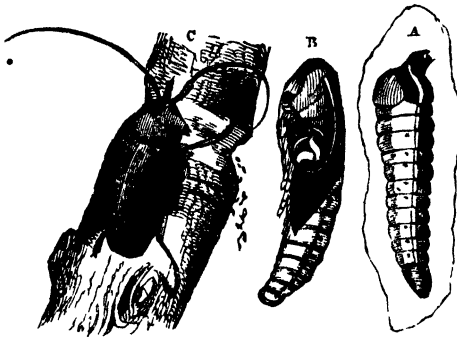
1006. *The PALM-TREE GRUB, or GRUGRU, is the larva or caterpillar of a coleopterous insect, the palm-tree weevil (Cordylia palmarum), which is about two inches in length, of a black colour, and has the elytra or wing cases shorter than the body, and streaked or marked with several longitudinal lines.*

This insect is found in Cayenne, Surinam, and other parts of South America.

It deposits its eggs on the summit of the palm-tree; the grubs that issue from these eggs subsist on the soft interior parts of the tree. They become about the size of the thumb, and are much sought after in many places for the table. They are generally eaten roasted, and are considered a peculiar delicacy. We are informed by Ælian of an Indian king, who for a dessert, instead of fruit, set before his Grecian guests a dish of roasted worms taken from a plant; these were probably the larvæ of a species nearly allied to the present.

1007. *LONGICORN BEETLES*; a very extensive family, the larvæ of which are eaten in many parts of the world; these live for the most part in the trunks of trees, in which they burrow; they are long, soft, and destitute of

Fig. 143.



Forester Beetle (Lamia amputator).

A Larva, or Grub. B Pupa. c Beetle.

feet (Fig. 143, A). As an example, the *Lamia amputator*, a destructive West Indian species, is here given (Fig. 143), our figure being derived from the Rev. Lansdown Guilding's paper in the Linnæan Transactions.

"In the old world, as well as in the new," says Mr. Hope, "the grubs of these beetles have afforded a rich repast to the civilized epicurean, and a no less dainty relish to the African Bushman; they are eaten also at the present

day by white and black people in various parts of the world. The grub of *Prionus coriarius* is generally believed to have been the *Cossus* of the Romans. The Makokko beetle is highly rated as a luxury in Surinam. The Moutac worm is a favourite at the Mauritius. In Africa, the larva of *Petrognatha gigas*, when roasted, forms an article of food, and in Asia various species of *Lamiadæ* are eaten by the natives of Travancore and Ceylon, while the Bardé forms a favourite food of the natives of some parts of New Holland. It is not by yielding food only that these insects are serviceable to man; they are in tropical countries extremely useful, as they tend to diminish the excess of luxuriant vegetation. As pioneers they perforate in all directions the monarchs of the forest; the rains, white ants, and other insects, follow in their track, and soon reduce them to an almost impalpable powder. (*Coleopt. Man.* part iii.)

Of the order *Orthoptera*, united by Linnæus with the *Hemiptera*, but distinguished from it by having jaws, longitudinally-folded wings, and other characters, we give as an example the locust.

1008. *The LOCUST* (*Acrydium migratorium*) is an insect not much unlike our large grasshoppers, that is too common in most eastern countries.

It is about two inches and a half in length, has a brownish body varied with darker spots, blue legs and jaws, the hind thighs yellowish, and the wings of a yellowish-brown colour spotted with black.

We are informed in the New Testament, that the food of John the Baptist in the wilderness was "locusts and wild honey." Some of the commentators have imagined the locusts here mentioned to have been a vegetable production—a species of pulse; but this opinion will scarcely be admitted when it is known that the insects of this name, even at the present day, serve as food to many of the eastern tribes. The Ethiopians and Parthians are recorded, from the earliest periods of antiquity, to have occasionally subsisted on this species of food. And the traveller Hasselquist, in reply to some inquiries which he made on this subject, was informed that at Mecca, when there was a scarcity of grain, the inhabitants, as a substitute for flour,

would grind locusts in their hand-mills, or pound them in stone mortars : that they mixed the substance thus formed with water, and made cakes of it ; and that they baked these cakes like their other bread. He adds, that it was not unusual for them to eat locusts when there was no famine ; but that in this case they boiled them first in water, and afterwards stewed them with butter into a kind of fricassee. The Hottentots delight in locusts as food, and even make their eggs into a kind of soup. Some of the African tribes pound and boil these insects with milk ; others eat them, after being merely broiled for a little while on the coals. Mr. Jackson says that when he was in Barbary, in 1799, dishes of locusts were frequently served at the principal tables, and were esteemed a great delicacy. These insects are preferred by the Moors to pigeons ; and it is stated that a person may eat two or three hundred of them without experiencing any ill effects.

Of the order *Hemiptera*, the insects producing lac and cochineal are here given as examples. They both belong to the third family of the second section of the order, of which the bug and froghopper may be taken as well-known examples.

1009. *LAC* is a resinous substance, the production of an hemipterous insect (*Coccus lacca*), which is found on three or four different kinds of trees in the East Indies.

The head and trunk of the lac insect seem to form one uniform, oval, and compressed red body, about the size of a flea. The antennæ are thread-shaped, and half the length of the body. The tail is a little white point, whence proceed two horizontal hairs as long as the body.

These insects pierce the small branches of the trees on which they feed : and the juice that exudes from the wounds is formed by them into a kind of cell, or nidus for their eggs. Lac is imported into this country adhering to the branches, in small transparent grains, or in semi-transparent flat cakes. Of these the first is called *stick lac*, the second *seed lac*, and the third *shell lac*.

On breaking a piece of stick lac it appears to be composed of regular honeycomb-like shells, with small red bodies lodged in them ; these are the young insects, and to them the lac owes its tincture ; for when freed from them its

colour is very faint. Seed lac is the same substance grossly pounded and deprived of its colouring matter, which is used in dyeing, and for other purposes : shell lac consists of the shells liquefied, strained, and formed into thin cakes.

This substance is principally found upon trees in the uncultivated mountains on both sides of the river Ganges ; it occurs in such abundance, that were the consumption ten times greater than it is, the markets might readily be supplied. The only trouble which attends the procuring of it is to break down the branches of the trees and carry them to market.

The uses of lac, in its different states, are various. It is employed in the East Indies for making rings, beads, chains, necklaces, and other ornaments for female attire. Mixed with sand, it is formed into grind-stones ; added to lamp-black or ivory-black, being first dissolved in water with the addition of a little borax, it composes an ink which, when dry, is not easily acted upon by moisture. Two articles called *Lac dye* and *Lac lake* are now regularly imported from the East Indies, and employed as originally suggested by Dr. Roxburgh, in place of cochineal for dyeing scarlet ; they are obtained from lac by a process not generally known. Shell lac is chiefly used in the composition of varnish, japan, and sealing-wax.

1010. *COCHINEAL* is a dyeing drug, chiefly imported from Mexico and New Spain, and is the female of a small hemipterous insect (*Coccus cacti*) found on the prickly pear, or Nopal, and some other plants of the *Cactus* tribe.

The male is winged, the female not. The latter is of an oval form, convex on the back, and covered with a white downy substance resembling the finest cotton. The antennæ are half as long as the body, and the legs are short and black.

Cochineal is one of the most valuable substances used in dyeing. As imported into this country it is in the form of a reddish shrivelled grain, covered with white bloom or powder.

The cochineal insects adhere in great numbers, and in an apparently torpid state, to the leaves of the prickly pear. At a certain period of the year they are carefully picked or brushed off : so tedious is the operation, that the persons employed in it are sometimes obliged to sit for hours together beside a single plant. They are usually killed by

being thrown into boiling water, by being placed in ovens, or being exposed in heaps to the sun.

The quantity of cochineal annually exported from South America is said to be worth more than 500,000*l.* sterling, a vast sum to arise from so minute an insect. The quantity of cochineal imported into England in the year 1835 was 418,320 lbs.

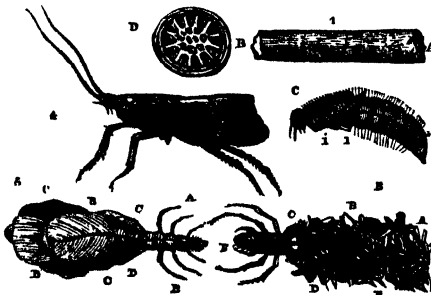
Cochineal is chiefly in demand for dyeing scarlet; but although a peculiarly brilliant dye is now obtained from it, this substance gave only a dull crimson colour until a chemist of the name of Kuster, who about the middle of the seventeenth century lived at Bow, near London, discovered the art of preparing it with a solution of tin. This fine scarlet colour is produced by means of muriate of tin, the "tin-spirits" of the dyer. Cochineal, if kept in a dry place, may be preserved without injury for a great length of time. An instance has been mentioned of some of this dye, 130 years old, having been found to produce the same effect as though it had been perfectly fresh.

The attention of the East India Company has for many years been directed to the production of cochineal in the East, but that which has been brought from India is very small, and greatly inferior to what is imported from New Spain.

An imitation of cochineal is made by a preparation of bullocks' blood, and some other ingredients.

1011. As an illustration of the Order *Neuroptera*, a species of *Phryganea* is here figured (Fig. 144). The larvæ

Fig. 144.



4 *Phryganea*. 1—5 Larvæ, or "Caddis worms."

of these insects are common at the bottom of clear and shallow streams of water, and are a favourite bait used by fishermen, who call them *Caddis-worms*. Of the larva itself, only the head and six legs are

to be seen, the other parts being concealedd in a case, which as in the three examples given in the cut, is sometimes a piece of straw, at others a mass of leaves united without any regularity, while some form it of pieces of wood all glued together, and mixed with small shells or stones; the construction of these cases, however, is very various; when about to assume the pupa state, the larva closes its case, which however rough outside, is always smooth and cylindrical inside, with an open grating, (Fig. D.) which is often singularly constructed. By some of the British Entomologists the Phryganea and the allied genera are regarded as forming a distinct Order, termed Trichoptera.

The Order *Hymenoptera*, here exemplified by the bee, contains the insects which produce the gall of commerce (Cynipes).

1012. *The HIVE-BEE* (*Apis mellifica*) is of a uniform brown colour, and with a somewhat hairy body.

Bees live in extremely numerous societies, either in decayed trees, or in habitations prepared for them by mankind, called hives. Each hive contains—1, a single female which has the name of queen-bee—2, about 1600 males, called drones—and, 3, about 20,000 individuals, females, non-breeders, and armed with a sting, called working-bees. It is upon these that the whole trouble devolves of constructing combs, or cells, for the honey and for the eggs deposited by the female; collecting and forming the honey, and feeding the grubs which proceed from the eggs, and which afterwards change into bees.

Bees' wax is the substance of the combs after the honey has been extracted from them. The best kind is hard, compact, of a clear yellow colour, and an agreeable odour, nearly similar to that of honey. It is melted, and cast in moulds of different sizes and shapes. *White wax* is prepared from common bees wax by melting it into water, and exposing it, for a considerable time, to the action of the sun, air, and water. When sufficiently bleached, it is cast into thin cakes. The purposes for which it is applicable are very numerous. Great quantities of white wax are annually consumed in the manufacture of candles; some in making cerates, and ointments; but yellow wax is chiefly employed in these.

Honey is a sweet and fluid substance, which is collected by the bees from flowers, and deposited in the combs for support of the bees and their offspring. The honey made by young bees is purer, and of a paler colour, than any other; it is called *virgin honey*. Before the discovery of sugar, honey was of much greater importance than it is at present; yet both as an article of food, and as the basis of a fermented liquor called *mead*, it is still of some importance; although its medicinal and other qualities have been, we believe, over-rated; but in many parts of the Continent, where sugar is much dearer than with us, few articles of rural economy, not of primary importance, would be dispensed with more reluctantly than honey. In the Ukraine some of the peasants have each 400 or 500 beehives, and make more profit of their bees than of corn. And in Spain the number of hives is almost incredible: a single parish priest is said to have possessed 5000.

Bee-hives that are made of straw, bent, or sedge, are usually preferred to any others; chiefly because they keep out the cold better than wood. The profit arising from bees, when properly attended to, is sometimes considerable; to obtain the greatest possible advantage from them, they should be supplied with every convenience for the support of themselves and their offspring. They should be kept in a good situation; that is, in a country abounding with flowers; at a distance from brew-houses, smelting works, &c. and in well-constructed hives. In France floating bee-hives are very common, and are alluded to by Rogers in "an epistle to a friend," "Through the vales of Loire the bee-hives glide," &c. One barge contains from sixty to a hundred hives well defended from the inclemency of the weather. With these the owners float gently down the stream, whilst the insects gather honey from the flowers along the banks.

Many of the bee-masters in France have an ingenious mode of transporting the loaded bee-hives from one part of the country to another. They are fastened together by laths placed on pack-cloth, which is drawn up on each side, and then tied by a piece of packthread several times round the top. In this state they are laid in a cart, and can be carried in safety to very considerable distances.

When the young bees begin to appear, the hives become

Fig. 145.



AB *Tortoiseshell Butterfly*.
 C *Egg magnified*.

so much crowded that they *swarm* or separate. This usually takes place in the month of May, if the season be warm, but more often in June.

In England it is customary, in taking the honey, to destroy the bees, by suffocating them with the fumes of brimstone; but there are modes which not only humanity, but even policy would recommend, of obtaining the honey without injuring the insects.

1013. The order *Lepidoptera* is divided into three great families, the *Diurna*, *Crepuscularia*, and *Nocturna*.

The first family contains all the butterflies (Fig. 145.) in most of which the wings, when in a state of repose, are raised perpendicularly. Sparrman tells us, that amongst the delicacies of the

Bushman's table, the caterpillars of these insects take a place. Of the second family, containing the Hawk-moths (*Sphingidæ*) the Chinese, according to Sir George Staunton, eat the larvæ; and Dr. Darwin says, that in his opinion some of this tribe are very delicious. Of the third family, exemplified by the Tiger-moth (Fig. 146.), the natives of New Holland eat the caterpillars of several species. Many of the



Tiger-moth.

A, *Larva*. C D, *Cocoon and Chrysalis*.

Indian moths are famed for the silk which is derived from their cocoons.

1014. The *SILK-WORM* is a smooth and somewhat lead-

coloured caterpillar, produced from the eggs of a moth (Bombyx mori) which is found in great abundance in China, on the leaves of the mulberry, its only natural and proper food, and also in the East Indies, the Levant, several parts of Italy, and the South of Spain.

So great is the importance of *silk* in a commercial view, that in most of the Eastern countries of the world a close attention is paid to the growth and cultivation of the insects by which it is produced. Each moth lays about two hundred small straw-coloured eggs. As soon as the worms are hatched they are fed with the tenderest leaves of the mulberry-tree, or with these leaves chopped very fine; when they have attained sufficient strength, they are removed into wicker-baskets, or placed upon shelves made of wicker-work. Here they feed for about thirty days, until they are full grown, when they are furnished with little bushes of heath or broom. On these they spin the nests in which they are about to change into chrysalids. These nests have the general name of cocoons, and consist of somewhat oval-shaped balls of silk, of a light yellow colour: the exterior of the cocoon is composed of rough and entangled fibres called *floss*. Within this is the thread, which is more distinct and even; and appears arranged in a very irregular manner, winding off first from one side of the cocoon, and then from the other. Previously to the silk being wound from the cocoons they are usually baked for about an hour to kill the chrysalids they contain. When the silk is to be wound off, the cocoons are put into small coppers or basins of water, each placed over a small fire. The ends of the thread are found by brushing the cocoons gently with a whisk made for the purpose; so fine are these threads, that eight or ten of them are generally rolled into one. In winding them they are each passed through a hole in a horizontal iron bar placed at the edge of the basin, which prevents them from being entangled.

The art of manufacturing silk was known to the ancients; but in Europe this commodity, long after its invention, was of very great value. We are informed that in the first century, the wife of the Roman Emperor Aurelian entreated him to give her a robe of purple silk, and that he refused this, under an allegation that he could not buy such a robe for its weight in gold.

It is not certain at what precise period the silk manu-

facture was first introduced into England. But in the year 1242, we are told that part of the streets of London were covered or shaded with silk, for the reception of Richard, the brother of Henry III., on his return from the Holy Land. In 1454, the silk manufactures of England are said to have been confined to ribbons, laces, and other trifling articles. Queen Elizabeth, in the third year of her reign, was furnished by her silk-woman with a pair of black knit silk stockings, which she is stated to have admired as "marvellous delicate wear," and after the using of which she no longer had cloth ones, as before. James I., whilst king of Scotland, requested of the Earl of Mar the loan of a pair of silk stockings to appear in before the English ambassador, enforcing his request with this cogent appeal, "For ye would not, sure, that your king should appear as a scrub before strangers."

China may be said to be the country of silk; indeed it furnishes large quantities of raw silk to all the neighbouring nations, and to Europe; and also for clothing the greatest part of its own inhabitants. There are in China very few, except the lowest orders, who are not clad in silk garments. The best Chinese silk is that which is imported from Nankin.

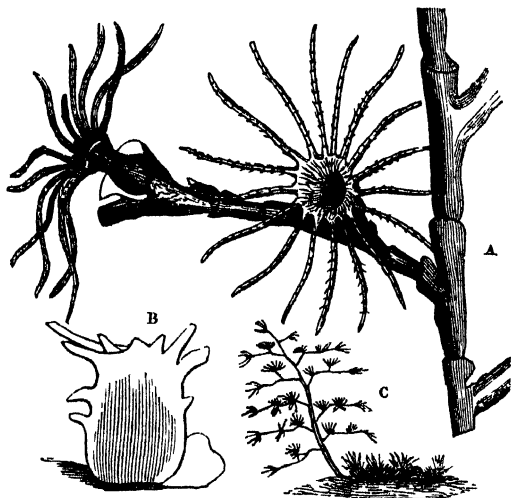
The principal silk manufacture in England is carried on in Spitalfields, London.

Although the whole of the silk which is produced in Europe, and the greatest proportion of that manufactured in China, is obtained from the common silk-worm, yet considerable quantities are procured in India from the caterpillars of other moths. Of these the most important are the TUSSEH and ARRINDY silk worms (*Attacus Paphia*, and *A. Cynthia*), both of which are natives of Bengal and the adjacent provinces. The silk from these kinds of worms has long been used by the natives. The former, which is commonly called tusseh silk, is woven into a coarse and dark-coloured kind of cloth, called *tusseh dooties*, much worn by the Brahmins and other sects of Hindoos. Of the arrindy silk is manufactured a coarse kind of white cloth, of seemingly loose texture, but of almost incredible durability. The importance of the silk trade in this country may be judged of by the fact that in the year 1828, 4,547,500 lbs. of the raw material were imported.

FOURTH AND LAST DIVISION
OF THE
ANIMAL KINGDOM.

RADIATA, or Radiated Animals.

Fig. 147.



SERTULARIA SETACEA.
(Copied from Lister.)

1015. The structure in the Radiated Animals, or Zoo-phytes, is more simple than in those divisions previously mentioned. In general, the different organs are placed round the axis of the body, so as to give it a radiated form,

whence the former of the names applied to them in scientific works. This symmetrical arrangement is sometimes so complete as to give to the animals the appearance of a star, or an expanded flower (Fig. 147.); in certain subdivisions or orders, where the animals are compound, or united together, their assemblages form trunks and expansions of the most varied shapes. The circumstance of these trunks being attached to rocks, or animal or vegetable substances in the sea, added to the simplicity of the structure of most of them, the bud-like excrescences, and the organs of the animals, when expanded, often closely resembling the petals of flowers, occasioned for a long time many of these animals to be regarded as marine plants; with "sea-weeds" they are confounded by many who see them on our coasts, and it was from their general resemblance that they have received the name of *Zoophytes*, or *animal-plants*. In all respects, however, they are animals, as they are possessed of sensibility, are capable of voluntary motion, and for the most part live on substances which they swallow or suck in, and digest in an internal cavity.

1016. By naturalists this important division of the animal kingdom has been divided into five or more classes. To one of these, containing the *Sea-stars* and *Sea-eggs*, the name *Echinodermata* has been applied, from the spines or other excrescences with which they are most generally covered. The "skin" is thick, and often supported by a sort of solid skeleton, the internal structure of which is highly complicated. They are organised for crawling at the bottom of the water, and are mostly furnished by their Creator with a great number of small retractile tentacula, each of which passes through one of the very regular series of pores with which the thick outer integument is abundantly furnished, and which act somewhat like a cupping-glass, as they terminate in a small disk.

The *Star-fishes* (*Asteriadae*), so abundant on our coasts, belong to this class.

1017. The *COMMON CROSS-1*
abounds on most parts of our shores. On some parts of the coast, this species is used abundantly for manure, and is

regarded as one of the richest kinds. This starfish is said to be very deleterious to oysters, inasmuch as it has been asserted that the reason why oysters are unwholesome in those months of the year, in which the letter *r* does not occur, is because the oysters feed in May, June, July and August on the spawn of this starfish. In former times they were used in medicine.

1018. Of the *SEA-URCHINS*, or sea eggs (Echinidæ) several species are eaten, and by the ancients some of them were regarded as forming a favourite dish, which Mr. Forbes informs us, was eaten both raw, and cooked in various ways. The late Williams, mentions in his interesting researches, that the spines of a species found among the Pacific ocean islands, are used as slate pencils by the children in the schools taught by the missionaries.

Fig. 148.

*Trepang (Holothuria edulis).*

1019. *TREPANG* or Sea-slug (Holothuria edulis, (Fig. 147.) There are several species of "sea slugs" which the Malays collect on the coast of New Holland, and New Guinea, for the supply of the China market, where when well preserved it fetches a good price. The Chinese use it, along with sharks' fins, edible birds' nests and other materials, in the preparation of nutritious soups. According to Jæger, the intestines are extracted, the animal is boiled in sea-water, and then dried in smoke.

1020. The Second class of radiata is named *entozoa*, and contains the intestinal worms; there is scarcely an animal, especially of the vertebrated classes, which is not infested by one or more kinds; when their numbers increase, the injury they occasion is very great; the best remedy for those infesting the human intestines, is said to be animal oil mixed with spirits of turpentine. •

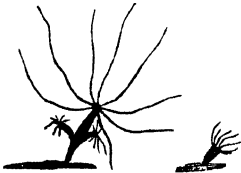
Fig. 149.



Portuguese man of war (*Physalia atlantica*).

like those medusæ, which are called "sea nettles," or "sea bubbles," and also belong to this class.

1022. The Fourth class of the radiata is named *polypi*,
Fig. 150.



Fresh water polypus (*Hydra viridis*).

of Geneva, discovered the reproduction of the polypi in the species figured, in June, 1740; it is common in ponds and still waters. Dr. Johnston of Berwick, has published an admirable "History of the British Zoophytes." (1838. 8vo).

The Anidiomena or Corsican moss, is much used as a vermifuge; near this comes a most singularly formed

1021. The Third class of radiata includes all those radiated animals which swim. They are soft, of a gelatinous consistency, while their organization is very simple; their internal organs being reduced to a stomach whence proceed vessels, branching off to all parts of the body. Many of them furnish food to fishes and cetaceous animals, as an example, the Portuguese man of war, (*Physalia atlantica*, Fig. 149.) as it is termed, is here figured. This floats on the surface of the sea, when smooth, the crest answering the purpose of a sail; when touched, it stings the skin,

Fig. 151.

*Acetabulum Mediterraneum.*

coralline, the *Acetabulum mediterraneum*, (Fig. 151.) consisting of a slender stem, supporting a round thin plate like a parasol. Many of the *Polyparia corticifera* contribute much to the formation of the coral islands of tropical climates, for information on which the reader is referred to the interesting works of Darwin and Williams, both before quoted.

One of the best known of the productions of the radiated class of animals is coral.

1023. *CORAL* (*Isis nobilis*) is a hard, stony, branched, and cylindrical substance, which is formed, at the bottom of the sea, by polypes, furnished with eight white, soft, semi-transparent, tentacula or feelers.

The general appearance of this coral is that of a shrub destitute of leaves; its height is usually from three to four feet

It is found in great abundance in the Mediterranean and the Red Sea.

To the inhabitants of Marseilles, Catalonia, and Corsica, the coral fishery is a very important pursuit; the principal parts of the Mediterranean from which coral is obtained are the coasts of Tunis and Sardinia, and the mouth of the Adriatic Sea. The British government has, within the last few years, concluded a treaty with the Barbary powers, for liberty to fish for coral in their waters. The coral thus obtained is conveyed chiefly to Malta and Sicily, is there wrought into beads and other ornamental forms, and thence is imported into this country. Previously to this arrangement the principal import of coral was from Leghorn.

The mode of obtaining coral is by a very simple machine, consisting of two strong bars of wood or iron tied across each other, with a weight suspended from their centre of union. Each of the arms is loosely surrounded, through its whole length, with twisted hemp; and at the extremity, there is a small open purse or net. This machine is suspended by a rope, and dragged along those rocks where the coral is most abundant: such as is broken off either becomes entangled in the hemp, or falls into the nets.

Coral is bought by weight, and its value increases in a certain ratio according to its size. Beads of a large size are worth about forty shillings an ounce, whilst small ones do not sell for more than four shillings.

Large pieces of coral are sometimes cut into balls, and exported to China, to be worn in the caps of certain persons, an insignia of office. These, if perfectly sound and of a good colour, and upwards of an inch in diameter, have been known to produce, in that market, as much as 300*l.* to 400*l.* sterling each. There are extant many beautiful pieces of sculpture in coral, as this substance has in all ages been considered an admirable material on which to exhibit the artist's taste and skill. Probably the finest specimens of sculptured coral that are known are a chess-board and men in the Tuilleries.

• The Chinese have, within the last three or four years, succeeded in cutting coral beads of a much smaller size than has hitherto been effected by an European artist. These, which are not larger than small pins' heads, are called *seed coral*, and are now imported from China into this country in very considerable quantity for necklaces. Nearly the whole of the coral that is used is of a *red* colour; *white coral* being considered of little value either as an article of commerce or decoration. There are modes of imitating coral so exactly, that, without a close inspection, it is sometimes impossible to discover the difference betwixt the real and the counterfeit article.

Amongst the radiated animals by Cuvier and others, were placed the sponges, but the researches of some modern naturalists seem to prove that these ought more properly to be referred to the vegetable kingdom.

1024. *SPONGE* (*Spongia officinalis*), which is of a soft, light, porous, and elastic nature, is found adhering to rocks at the bottom of the sea in several parts of the Mediterranean, and particularly near the islands of the Grecian Archipelago.

The general uses of sponge, arising from its ready absorption of fluids, and distension by moisture, are well known, and of great importance. It is collected from rocks, in water five or six fathoms deep, chiefly by divers, who, after

much practice, become extremely expert in obtaining it. When first taken from the sea, it has a strong and fishy smell, of which it is divested by being washed in clear water. No other preparation than this is requisite previously to its being packed up for exportation and sale. The growth of sponge is so rapid that it is frequently found in perfection on rocks from which only two years before it had been entirely cleared. It is principally imported into this country from the Levant.

Sponge is sometimes used by surgeons for the dilating of wounds; and as it adheres strongly to the mouths of wounded vessels, it is occasionally applied as a styptic to prevent their bleeding. Sponge burnt in a closed earthen or iron vessel, and then reduced to powder, is sometimes used as a medicine; it is considered particularly serviceable in bronchocele, or Derbyshire neck, which may be attributed to the iodine it contains.

1025. The Fifth class of the Radiata contains those beings which in general are so small, as not to be visible to the naked eye. From having been generally found in infusions, they have been named *infusoria*.

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