

by rapacious beasts and reptiles, of putrid swamps crowded by myriads of venomous insects, and of immense warrens burrowed by countless hordes of the hamster, the mole-rat, and the white ant. Even here, however, wherever life exists, it exists to those that possess it as an enjoyment; while these very scenes and these very animals only fill up what man has no occasion for, and equally and instantly disappear as soon as he presents himself, and exercises that industry and ingenuity which alone constitute his authority; and upon which alone his health and his happiness are made to depend.

But this is not all.—While in their different gradations these outcasts from man are thus enjoying life themselves, they are preparing, in the best manner possible, the various tracts they occupy for his future use and habitation. The soil that supports us, and gives us our daily bread, is nothing but a mixture of animal and vegetable materials; other substances, indeed, enter into it, but the great, the important, the active, and leavening constituent is of an organized origin. These materials, then, are perpetually forming and accumulating, and rising into an unbounded and inexhaustible storehouse of subsequent riches and plenty by the alternate generation and decomposition of the different kinds and orders of plants and animals which thus fill up, and, as we are apt to believe, encumber the regions we are contemplating; regions which, though in our own day unexplored or abandoned both by savage and civilized man, may, in that revolution of countries and of governments which is perpetually passing before our eyes, become, in some future period, the seat of universal dominion, the emporium of taste and elegance, of virtue and the sciences. So the fairest fields of Rome were formed out of the putrid Pontine marshes, and England has become what she is, from being a land of bogs and of blights, of wolves, wild boars and gloomy forests.

LECTURE II.

ON ZOOLOGICAL SYSTEMS, AND THE DISTINCTIVE CHARACTERS OF ANIMALS.

(The subject continued.)

In our last lecture we took a momentary glance at the history of zoology as a science, noticed the primary features of the best methodical arrangements to which it has given rise, and made some progress towards a brief delineation of that of Linnæus, which still takes the lead amid the writers of the present day, and is hence chiefly entitled to attention in a course of popular study, generally collating it, however, with that of M. Cuvier, as we proceeded.

We observed that the Linnæan system comprehends all animals of every description whatever, under the six classes of mammals, birds, amphibials, fishes, insects, and worms. We pursued this arrangement in an ascending scale, as most consistent with the plan adopted at the opening of the present course of instruction; and commencing with the class of worms, finished with that of insects. It remains for us to prosecute the same rapid outline of inquiry through the four unexamined classes of fishes, amphibials, birds, and mammals.

FISHES are classically characterized in the Linnæan system as being always inhabitants of the water; swift in their motion, and voracious in their appetite; breathing by means of gills, which are generally united by a bony arch; swimming by means of radiate fins, and for the most part covered over with cartilaginous scales.

The class is divided into six orders; the ordinal characters being taken from the position of the ventral or belly fins, or from the substance of the gills. The orders are, apodal, fishes containing no ventral or belly fins; jugular, having the ventral fins before the pectoral; thoracic, having the ventral fins under the pectoral; abdominal, having the ventral fins behind the pectoral. In all these four, the rays or divisions of the gills are bony. In the fifth order, which is called branchiostegous, the gills are destitute of bony rays; and in the sixth, or chondropterygious order, the gills are cartilaginous; all which will be easiest explained by a few familiar examples. Into the general divisions of this class M. Cuvier has introduced no change of any importance whatever, his own sections and names running parallel with those of Linnæus.

The kind best calculated to elucidate the FIRST OR APODAL ORDER, is the well known *muræna* or eel; since every one must have noticed, that this fish has no ventral or, indeed, under-fins of any kind. In many of its species, it has a very near approach to the serpent tribes; insomuch that several of them are called sea-serpents, and by some naturalists are described as branches of the serpent genus. Even our own common eel, *muræna Anguilla*, is often observed to quit its proper element during the night, and, like the snake, to wander over the meadows in search of snails and worms.

The next genus I shall mention is the *gymnotus*, of which one species, *gymnotus electricus*, is the electric eel, an inhabitant of the rivers of South America, from three to four feet long, and peculiarly distinguished by its power of inflicting an electrical shock, so severe as to benumb the limbs of those that are exposed to it. The shock is equally inflicted whether the fish be touched by the naked hand, or by a long stick. It is by this extraordinary power, which it employs alike defensively and offensively, that the electric eel escapes from the jaws of larger fishes, and is enabled to seize various smaller fishes as food for its own use. There are, however, a few other fishes, as we shall have occasion to notice in proceeding, that possess a similar power, as the torpedo of European seas, and especially of the Mediterranean, and the electric *silurus* of those of Africa.

The only other genus it will be necessary to glance at under this order, is the xiphias or sword-fish; so denominated from its long sword-like and serrated snout, with which it penetrates and destroys its prey. Its chief species is found in the Mediterranean and other European seas, sometimes not less than twenty feet long; is very active, and, in one instance, has been known to attack an East Indiaman with so prodigious a force, as to drive its sword or snout completely through the bottom of the ship, and must have destroyed it by the leak which would hereby have been occasioned, had not the animal been killed by the violence of its own exertion; in consequence of which, the snout remained imbedded in the ribs of the ship, and no leak of any extent was produced. A fragment of this vessel, with the sword imbedded in it, has been long lodged as a curiosity in the British Museum.

The JUGULAR ORDER of fishes, distinguished by the ventral or belly fins being placed before the pectoral or chest fins, is the next in succession, and contains only six separate kinds; of which the two most familiar to our own country are the gadus or codfish, including, among a variety of other species, the haddock, whiting, and ling; and the blennius or blenny, including several species of the hake. In these the ventral or belly fins are advanced so far forward, as to be immediately under the jole.

Of the THIRD OR THORACIC ORDER, in which the ventral fins lie somewhat backward, and directly under the pectoral or chest fins, I may instance, among those most familiar to us, the zeus or John dorée; the pleuronectes, including the numerous families of plaice, flat-fish, flounder, sole, turbot; the eyes of all which are situate on the same side of the head, in some species on the left side, in others on the right, but always on one side alone: the perca or perch, one species of which, *perca scandens*, has a power, like the eel, of quitting the water, and climbing up trees, which it effects by means of the spines on its gill-covers, and the spinous rays of its other fins; and the gasterosteus or stickle-back. Among the more remarkable or curious kinds, I may mention the echeneis, remora, or sucking-fish, which inhabits the Mediterranean and Pacific seas; and though only from twelve to eighteen inches long, adheres so firmly to the sides of vessels and of larger fishes, by its head, that it is often removed with great difficulty; and was, by the ancients, supposed to have the power of arresting the motion of the ship to which it adhered. I may also mention the chaetodon *rostratus*, beaked or rostrate chaetodon, an inhabitant of the Indian seas, which curiously catches for its food insects that are flying over the surface of the sea, by ejecting water from its tubular snout with so exact an aim as to strike and stun them with the greatest certainty, and hereby to bring them down into its jaws.

The FOURTH ORDER of the Linnæan class of FISHES, is called ABDOMINAL; in consequence of having the ventral or belly fins placed considerably more backward, and behind the pectoral or chest fins: and here, as in all the preceding, the gills are bony. The salmo or salmon, with its numerous families of trout, smelt, char, and grayling; the esox or pike, including the gar-fish; the clupea or herring, which, as a genus, comprises the pilchard, sprat, and anchovy; the cyprinus or carp, including the gold-fish, gudgeon, tench, and a variety of similar species; the mugil or mullet; are among the more familiar kinds of this extensive order.

Of these, the herring is one of the most remarkable, from its migratory habits; and the carp, from its great longevity, having in many instances been known to reach more than a hundred years of age, and from its facility of being tamed and made to approach the edge of a fish-pond on the sound of its dinner-bell, and to eat crumbs of bread out of a man's hand.

But amid the most singular of the kinds belonging to this order is the exocætus or flying-fish, which, though occasionally traced in other seas, is chiefly found between the tropics, and has a power, by means of its long pectoral fins, of raising itself out of the water and continuing suspended in the air till these fins become dry; by which means it effectually avoids the jaws of such predatory fishes as are in pursuit of it. But unhappily it is often seized at the same time by the talons of ospreys, sea-gulls, or some other

rapacious birds that are perpetually hovering over the water to take advantage of its ascent. There are, however, various other fishes that have a similar power of flight or suspension, and from a similar cause, but none in so complete a degree. It is to this curious power Dean Swift makes allusion in the following lines:—

“So fishes, rising from the main,
Can soar with moisten'd wings, on high:
The moisture dried, they sink again,
And dip their wings again to fly.”

The FIFTH ORDER OF FISHES is denominated BRANCHIOSTEGOUS, in consequence of its gills being destitute of bony rays; by which it is peculiarly distinguished from all the preceding orders, and obtains a mark which has been laid hold of by Linnæus as constituting its ordinal character. It consists, for the most part, of a group of sea-monsters, or natural deformities, if the term might be allowed; as the ostraceon or trunk-fish, the didon and tetradon, sun-fish, and lump-fish, many of which are so completely truncated at either end as to resemble the middle part of any common large fish with its head and tail lopped off; the syngnathus, pipe or needle-fish; and the lophius or frog-fish. In one of the species of this last kind we meet with a singular decoy for entrapping smaller fishes as its prey. This species, *l. piscatorius*, which is about seven feet long, and inhabits most European seas, lurks behind sand-hills or heaps of stone, and throwing over them the slender appendages on his head, which have the appearance of worms, entices the smaller fishes to advance and play around them till they come within his reach, when he instantly darts forward and secures them as his spoil.

The SIXTH and last ORDER OF FISHES is denominated CHONDROPTERYGIOS, as having the gills wholly cartilaginous, which constitutes its ordinal character. It includes, among other kinds, the acipenser or sturgeon, squalus or shark, raia or ray, petromyzon or lamprey, and gastrobranchus or hag-fish. Of these, one of the most useful is the sturgeon: its different species may be ranked among the large fishes; they are inhabitants of the sea, but ascend rivers annually. The flesh of all of them is most delicious; from the roe is procured the sauce called caviare, and from the sounds and muscular part is made isinglass. They feed on worms and other fishes, and the females are larger than the males.

This order, in the shark, contains the most dreadful of all the monsters of the main. The squalus *Carcharias* or white shark, which often extends to thirty feet in length, and four thousand pounds in weight, follows ships with a view of devouring every thing that comes in his way, and has occasionally been known to swallow a man whole at a mouthful. But in order to guard us in some degree against the perils of their presence, a peculiar stream of light issues in the dark from their tapering, subcompressed bodies, which cannot well be mistaken; and as some compensation for their rapacity, we obtain from their liver a large quantity of useful oil, and find in their skin a very valuable material for carriage-traces in some countries, and for polishing wood, ivory, and other hard substances, in all countries.

The next class to that of fishes in an ascending direction is named AMPHIBIA; which, for the sake of brevity, and having no English synonym to meet it, I shall take leave now, as I have on former occasions, to render AMPHIBIALS. The term, indeed, whether regarded as Greek or English, is not very strictly precise in its present application; for it intimates an intention to include in this class all animals capable of existing in the two elements of air and water. We have already observed, however, that there are various fishes, as the eel-tribe generally, one species of the perch, and two or three of the exocætus or flying-fish, to which many more might be added, that are capable of existing in air as well as in water; while the insect kinds offer us a still greater number that are similarly endowed, and the worms a still more numerous train. It has been said, indeed, that the animals of this class have a peculiar agreement in the structure of their organs of respiration, which

makes an approach to that of birds and quadrupeds, and differs very essentially from that of fishes, insects, and worms. Upon the whole, however, there is no class that offers so great a diversity in the make of its respiratory organs as the class before us, of which I had occasion to take notice in the progress of our last series of study. In the tortoise and others among the more perfect of the amphibious tribes, the remark of their approximation to the respiratory organs of the higher classes will unquestionably hold; but it will by no means hold in various cases of the lizards; while the proper place for the siren, which is possessed of both lungs and gills, remains doubtful to this moment: it is sometimes grouped among the fishes, sometimes in the order of amphibious reptiles; while Linnæus, after having in the earlier editions of his system fixed it in this last situation, appears to have intended, had his life been spared long enough to have formed a new order of amphibials for the express purpose of receiving it, which he proposed to denominate MEANTES.*

As the Linnæan class of amphibials at present stands, it consists of not more than two orders, REPTILES, or amphibious animals possessing feet; and SERPENTS, or amphibious animals without feet. The different kinds under each are but few: the reptiles containing only five; the testudo, draco, lacerta, rana, and siren; or, in plain English, the tortoise, flying dragon, lizard, frog or toad, and siren. The serpents comprise only seven genera: the crocotalus, or rattlesnake; boa; coluber, or viper; anguis, harmless snake, or blind worm; amphibæna; cæcilia; and achrochordus.

Among the REPTILES, the most extensive and important kind is the lacerta or lizard; for it includes, among other species, the alligator, crocodile, proper lizard, chameleon, salamander, newt, and eel.

Among the seven genera of SERPENTS, the first three, rattlesnake, boa, and viper, or rather coluber, are more or less poisonous: the rattlesnake in all its species, which are six or seven; the boa, in five, out of about seventeen; and the coluber or viper, in about thirty, out of about a hundred and thirty: the two most fatal of which last are, *c. Cerastes*, or horned serpent; and *c. Naja*, hooded serpent, or cobra de capello. In both Asia and Africa we meet with whole tribes of barbarians who are capable of handling the most poisonous of these amphibials, and of eating them up alive from head to tail, without the smallest injury: even the bite itself producing no mischief. These barbarians, some of whom were known to the Greeks and Romans, and are particularly alluded to by Celsus and Lucan, were formerly called Psylli. The power they affect has been laughed at by M. Denon, but without any kind of reason for derision. It is a curious subject, however, and connected with others of equal singularity; and must, therefore, be reserved for a future study.†

The poisonous serpents differ from each other in their respective kinds, by having their bodies more or less covered with scuta or plates, instead of with mere scales; excepting that the rattlesnake is chiefly distinguished by the rattle at his tail. The four harmless genera are characterized by having their bodies covered altogether with simple scales, and never with plates, or as being ringed, wrinkled, or tubercled.

This class is not much disturbed by M. Cuvier's later arrangement; but he has separated the tortoises from the lizards, denominating the first, as an order, CHELONIA; and the second, SAURIA; and has removed the frogs, salamanders, and siren, into a fourth order, to which he has given the name of BATRACHIA, characterizing them by the possession of a naked skin; feet; with branchiæ in the young.

But we must hasten in our rapid career to the BIRD CLASS, distinguished by having the body covered with feathers and down; protracted and naked jaws; two wings, formed for flight; and biped. This class consists of six orders:

* Gmelin and Camper introduced it into the class of fishes; and in Turton it occurs in the class *Marmalia*, order *Bruta*, as a variety of the *trichechus manati*, or *lamant.n.*
† See Lecture vi. of this Series.

accipitres; picæ; anseres; grallæ; gallinæ; passeræ. In English synonyms, birds of prey; pies; web-footed birds; waders; gallinaceous birds; and the mixed class of thrushes, sparrows, and finches. These orders are chiefly distinguished from each other by the peculiar make of the bill, and of the feet. Under M. Cuvier's classification, the divisions, and even the names, are the same, with the exception that for picæ or pies, he has given the better appellation of scansores or climbers. Every one of them, or rather every distinct kind under every one of them, might agreeably occupy us through an entire lecture; so curious, so attractive, so interesting, are their structures, their powers, their habits, their instincts. But all these must be reserved for subsequent studies.* Our only concern at present is to give a glance at the manner in which they are grouped under the Linnæan system. It is the mere alphabet of the science to which we must at present confine ourselves.

The ACCIPITRES, or predacious birds, constituting the FIRST ORDER, with a bill somewhat hooked downward, and four claws hooked and sharp-pointed. It consists of not more than four genera, the vulture, including the coudur (*v. Gryphus*), as one of its species; the falco, including the numerous families of the eagle, falcon, hawk, osprey, buzzard, and kite, together with various others; the owl and the lanus or shrike, of which the butcher-bird (*l. Collurio*) is one of the chief species.

The PICÆ OR PIES, form the SECOND and most numerous order. The bill is here compressed and convex, which constitutes the ordinal character. A secondary distinction, taken from the feet, divides them into tribes formed for perching, formed for climbing, or formed for walking. To this order belongs the trochilus or humming-bird, the minutest animal of the bird tribes; and which seems to connect the bird with the insect-class. In one of its species, *trochilus minimus*, or least humming-bird, it sometimes does not weigh more than twenty grains, nor measure much more than an inch; it is, consequently, less than several of the bee-tribes, and, like the bee, feeds on the nectar of flowers, which it hovers about and extracts while on the wing with a delighted hum.

To this order, also, from similarity of bill and foot, belong the very numerous families of the psittacus or parrot kind, including the proper parrot, macaw, parakeet, cockatoo, and lory; equally celebrated for their imitative powers, their longevity, and the splendid variety of their colours; the paradisæa or bird of Paradise, chiefly a native of New-Guinea, and distinguished by the long and taper elegance of its bending feathers; the monstrous rhamphastos or toucan, whose bill is, in some species, larger than its body, and whose tongue is quaintly tipped with a bundle of feathers, probably answering the purpose of an organ of taste.

All thus far glanced at are exotics. Among the kinds a few of whose species are inhabitants of our own country, I may mention the social and clamorous corvus or crow-tribe, including the rook, raven, jay, jack-daw, and various others; the picus or woodpecker, that drives into the stoutest and toughest timber-trees of the forest its hard and wedge-like bill, and often with a force and echoing sound like the stroke of the woodman; and whose bony and pointed tongue transfixes the various insects upon which it feeds, and in this state not unfrequently draws them out from a considerable depth in the bark of trees into which they have crept for protection. The alcedo, or kingfisher, is another genus of this order, whose species haunt streams and rivers for the little fishes on which they feed, and are most dexterous anglers in catching them. To these we may add the cuculus or cuckoo, that, with the same want of natural affection which marks the ostrich, builds no nests for its eggs, except under particular circumstances, but avails itself of that of the hedge-sparrow, or some other bird, and abandons to foster-parents the care of its eggs.

The THIRD ORDER of birds is denominated ANSERES, and in English WEB-

* See Lectures iv. v. viii. ix. of this Series.

FOOTED: they are ordinarily characterized by having the bill covered with skin, broad or gibbous at the tip, and a palmate or web-foot, formed for swimming: the tongue is uniformly fleshy, and the bill, in many instances, denticulate or toothed. It includes only thirteen kinds, of which I may take, as examples, the anas, comprehending the very numerous families of duck, goose, swan, wild-duck, teal, and shoveler: the mergus or merganser; alca or auk; aptenodytes or penguin; pelecanus or pelican; colymbus, comprising the grebes, guillemots, and divers; and procellaria or petrel. The petrels have an extraordinary habit of spouting from their bills a considerable quantity of oil upon any object that offends them. The procellaria *pelegica*, or stormy petrel, is the most daring of all birds during a tempest, though not more than six inches long. The moment he beholds the black clouds collecting, he quits his rocky retreat and enjoys the magnificent and growing spectacle; he darts exultingly athwart the concave, and skims with triumphant temerity the loftiest peaks and deepest valleys of the most tremendous waves. The appearance of this bird is, to the sailor, a sure presage of an approaching storm.

The GRALLE, or WADERS, form the FOURTH order of birds in the Linnæan system. They are characterized by possessing a roundish or subcylindric bill, a fleshy tongue, and legs naked above the knees. The ardea, or genus that includes the herons, cranes, and bitterns, is the most numerous. The scolopax, which includes the curlew, snipe, and woodcock; the tringa, which includes the sandpiper, the ruff, and reeve, and the lap-wing or pewit; the fulica, which includes the gallinule, coot, and moor-hen; and the charadrius or plover; are among those that are most familiar to us. To this order also belongs the tantalus or ibis, so celebrated for the divine honours paid to it for many ages throughout Egypt; and, at least, a most valuable bird from its clearing the land of those numerous reptiles and insects, which are left upon its surface after the exundations of the Nile. It is the abu-hannes of Bruce, which, however, M. Cuvier regards as not properly a tantalus; and has, consequently, made a distinct genus for receiving it, to which he has given the name of *neumenius*; and hence, under his classification, it is a *Neumenius Ibis*, instead of a *Tantalus Ibis*.

The FIFTH ORDER embraces the GALLINÆ or GALLINACEOUS BIRDS; those which strictly come under the denomination of poultry. They are chiefly characterized by having a convex bill, with the upper mandible arched. They are the least numerous of all the orders next to the ACCIPITRES, and extend to not more than ten kinds or genera; many of which, however, are very extensive in their species. The kinds most familiar to us are the phasianus or pheasant, including all the families, and their numerous varieties of common cock and hen; the tetrao or partridge, including all the families and their numerous varieties of grouse, red-game, black-game, ptarmigan, and quail; the pavo or peacock; and meleagris or turkey. To this order also belong the numidia, pintado or guinea-hen, the otis or bustard, the didus or dodo, and the struthio, including those large and stately birds, the emeu, cassiowary, and ostrich: the last of which, though incapable of flying, derives from its wings a fleetness of running, that is unrivalled by any animal whatever. This bird is capable of being tamed, and may be conveniently rode; and Adanson asserts, that, when mounted, it will surpass the speed of the most rapid courser. He tells us, that while he was at the factory at Podore, he was in possession of two tame ostriches, the oldest of which, though young, would carry two negroes upon its back, with a rapidity superior to what has ever been exhibited by the fleetest racer upon the Newmarket turf.

The LAST ORDER of the bird class is entitled PASSERES, for which, in the sense here intended, we have no exact English synonym; but it is designed to include various kinds and families, which, for the most part, may be denominated small birds and singing birds. They are characterized by having the bill conic and sharp-pointed, and the nostrils naked. To this order belong the alauda or lark kind; the columba, pigeon, and dove kind; the emberiza or bunting, including the yellow-hammer; the fringilla or finch, with all its

numerous species of goldfinch, green-finch, thistle-finch, linnet, and sparrow; the hirundo, including the swift, swallow, and martin; the loxia or grosbeak, including the bullfinch and hawfinch, the only finches, I am at present aware of, that do not belong to the fringilla genus: and the motacilla, a most interesting group, as including the nightingale, whose song surpasses that of all the singing birds of the grove; and the redbreast, whose song is, indeed, less sonorous and striking, but who is so justly celebrated and beloved for his social qualities; together with all the amusing species and varieties of wrens and wag-tails. To the order of passerres appertain also the pipra or manakin, some of which are peculiarly musical; and the turdus, comprising those sweet melodious choristers, the thrush, the throistle, and the blackbird.

Such is a brief and scanty survey of the interesting and instructive class of birds: and thus, in the elegant language of the poet of the Seasons,

Innumerable songsters, in the fresh'ning shade,
Of new-sprung leaves their modulations mix
Mellifluous. The jay, the rook, the daw,
And each harsh pipe, discordant heard alone,
Aid the full concert: while the stock-dove breathes
A melancholy murmur through the whole.*

Nor should we suffer their other curious endowments to pass by us unnoticed. The muscles, and delicate plumage of their wings, give them not merely the power of flight, but, under different modifications, a nearly equal command over earth, air, and water: for such a provision enables the rail, destitute as he is of a webbed foot, to rival, in swimming and diving, the guillemot; the ostrich, as we have just observed, to outstrip in running the speed of the race-horse; and even the diminutive swallow, and various other migratory birds, to double, when on the wing, the pace of the fleetest ostrich; and to dart, twice a year, across the Atlantic and Mediterranean, often at the rate of a mile in a minute for several minutes in succession; and perhaps

* Catalogue of singing birds, with the time of their beginning and ceasing to sing, from a mean of five years' observation, with the numerical value of their notes, twenty being that of absolute perfection. From an interesting article by Mr. John Blackwell, in *Memoirs of the Literary and Philosophical Society of Manchester*. Second Series, vol. iv.

Name.	Begins.	Ends.	Mellow- ness.	Spright- ness.	Plaintive- ness.	Compass.	Execution.
Redbreast	Jan. 3	Dec. 14	9	8	12	14	14
Wren	do. 13	do. 3	1	16	0	2	5
Missal Thrush	Feb. 1	May 28	3	4	1	5	3
Throstle	do. 8	Aug. 12	3	10	2	10	4
Skylark	do. 9	July 8	4	19	4	18	18
Hedge Warbler	do. 9	do. 19	3	4	3	4	4
Chaffinch	do. 10	do. 7	2	14	1	4	5
Starling	do. 15	May 30	2	2	2	4	2
Blackbird	Mar. 20	July 13	8	1	4	5	3
Green Grosbeak	do. 24	Aug. 12	5	3	5	5	5
Titlark	April 4	July 9	3	2	2	2	2
Lesser Redpole	do. 5	Aug. 5	1	4	0	2	3
Woodlark	do. —	Oct. 25	18	2	17	8	6
Goldfinch	do. 11	June —	4	16	4	10	12
Redstart	do. 14	do. 29	1	4	0	2	2
Willow Wren	do. 14	Aug. 23	6	4	5	5	5
Linnet	do. 15	July 6	10	15	6	12	19
Lesser Field Lark	do. 17	do. 8	8	7	5	4	5
Swallow	do. 19	Sept. 25	4	6	2	3	3
Stonechat	do. 24	June —	1	3	0	3	2
Whinchat	do. 25	July 1	1	3	0	2	2
Blackcap	do. 25	do. 22	14	19	12	10	8
Whitethroat	do. 29	do. 16	1	4	0	3	3
Patty-chaps	May 12	do. 11	14	6	14	10	9
Sedge Warbler	do. 17	do. 16	2	16	0	18	14

generally, and with perfect ease, at the rate of a mile every two minutes, or upwards of seven hundred miles every twenty-four hours, till it reaches the precincts of its summer or winter residence.

We ascend to the FIRST and HIGHEST CLASS—to that rank of animals which is most complicate in form and most competent in power. This class is chiefly distinguished by the possession of lungs, and an organ for suckling; and most of its kinds possess four supporters in the shape of hands or feet, or both. To this last character the class was formerly indebted for its classic name, which was QUADRUPEDS, OR FOUR-FOOTED. As some of the kinds under it, however, in its modern arrangement, are possessed of no supporters of any sort, either hands or feet; others have four hands and no feet; and others, again, have two of each, the absurdity of retaining such a name must be obvious to every one; and hence it has been correctly and elegantly exchanged, by Linnæus, for that of MAMMALIA, from the mammary or suckling organ which belongs to every kind of the class, as it stands at present, and to no kind whatever out of it; and which, as we have no fair synonym for it in our own tongue, I shall beg leave now, as I have on various other occasions, to render MAMMALS.

The class is distributed into seven orders; the characters of which are taken from the number, situation, and structure of the teeth. The seven orders are as follows:—primates, bruta, feræ, glires, pecora, belluæ, cete. It is difficult to find English synonyms for these Latin terms, which, in several instances, are used in a kind of arbitrary sense, not strictly pointed out by the terms themselves. The following are the best that occur to me: chieftains; brute-beasts; savage beasts; burrowing-beasts; cattle; warriors; and whales.

The FIRST ORDER, PRIMATES OR CHIEFTAINS, is distinguished by the possession of four cutting teeth in each jaw. This mark would also include the race of man; and Linnæus has actually included him in the order before us, as he is included in the class by Cuvier and most of the naturalists. From such arrangements, however, I shall take leave to differ. Man ought to stand by himself; he has characters peculiar to himself, and which place him at an infinite distance from all other animals. With this exclusion, the entire class is reduced to three kinds, the simia or monkey; the lemur or maucuco; and the vespertilio or bat: kinds which can only be collectively entitled to the appellation of primates or chiefs, from their very slight resemblance to man in the general distribution of the teeth: for though a few of the monkey tribes have an approximation in their exterior and erect form, in the greater number this character is very inappreciate, while it is nearly lost in the lemur, and altogether so in the bat.

Among the simia kind, the most singular species is certainly the ourang-outang, especially the grave, gentle, and very docile Pongo. I have only time to observe farther upon this kind, that those without tails are denominated apes; those with short tails, baboons; and those with long tails proper monkeys. Among the lemurs, the most curious, perhaps, is the *l. volans*, or flying maucuco, the *galiopithecus volans*, or flying colugo of Pallas and Shaw; an action which he is able to accomplish from tree to tree by means of a strong leathery membrane that surrounds the body and reaches from the head to the fore-feet, hind-feet, and extremity of the tail; and which gives him an approach to the bat.

Of the vespertilio or bat-kind, which is well known to fly only by night, and by means of an expansive membrane, instead of by wings, one of its most extraordinary faculties is that of a knowledge of the presence, and apparently of the approach, of objects, by some other sense or medium than that of vision; for when deprived of its eyes, this knowledge, and a consequent power of avoiding objects, seems still to continue. The vespertilio *Vampyrus*, or ternate bat, an inhabitant of India and Africa, is said to be fond of blood, and occasionally to fasten on such persons as he finds asleep, and to suck their veins till he becomes bloated. He might hence, under proper management, be rendered an able and valuable substitute for the leech. In poetry he has often been introduced, under the name of vampire, as a most hideous and appalling monster.

The SECOND ORDER, BRUTA, OR BRUTE-BEASTS, is distinguished by having no fore-teeth in either jaw. It includes the nine following kinds: rhinoceros, sukotyro, elephant, trichecus,—the morse, walrus, manate or lamantin, the dolphin of the poets of Greece and Rome, by whom it has been celebrated for its love of music, and perhaps not altogether without foundation;—the bradypus or sloth, the myrmecophagus or ant-eater, the manis or pangolin, the dasyppus or armadillo, and the platypus or duck-bill, the ornithorynchus *paradoxus* of Blumenbach; that curious little quadruped which has hitherto only been discovered in Australia, or the regions in and about New South Wales; and which seems to be a quadruped by its feet, a water-fowl by its bill, and an amphibial by its fondness for water. It is not yet quite certain whether this singular animal suckles its young, or has a mammary organ for this purpose; and if not, it must be discarded from its present situation, though we should be at no small loss to know where else to place it.

The THIRD CLASS OF MAMMALS is denominated FERÆ OR SAVAGE BEASTS; and is distinguished by having, in every instance, fore-teeth, above and below, the number varying in different kinds, from two to ten; and in possessing a solitary tusk. The order comprises eleven kinds, the names of which are as follows: the phoca or seal, a water-quadruped, whose skin is so useful to us for various purposes; and which, like the stag, is found to shed tears when in trouble: the canis or dog-kind, including the numerous families of wolf, fox, jackal, hyæna: the felis or cat-kind, including a variety of tribes of a somewhat similar appearance, but far mightier, and nobler in their powers, as the lynx, the leopard, the panther, tiger, and lion, all of which have a power of climbing trees, though the weight of the larger species makes them do it very awkwardly, and only to a short height; all of which pitch on their feet in falling; and all of which see better in the night than by day; the viverra, including the ichneumon, and several of the weasels: the mustela, including other species of the weasels, the stoat, polecat, otter, ferret, sable, and ermine; to the two last of which we are indebted for the luxurious dresses that pass under their name. Almost all of the mustelas have a power of secreting and discharging a most fetid and intolerable stench at their will; and many of them do it as a means of defence: and often so effectually that the very beast that pursues them is compelled to relinquish the chase, so completely is he overpowered by its noisome vapour. The remainder of this order are the ursus or bear; the didelphis or opossum; the marcopius or kangaroo, which is now naturalizing in the royal parks of our own country; the talpa or mole; the sorax or shrew; and the erinaceus or hedgehog; which last is capable of being tamed, and is actually tamed by the Calmucs, and made a very useful domestic servant in destroying mice, toads, beetles, and other vermin.

The FOURTH ORDER of mammalian animals is denominated GLIRES, for which we may use the words HIBERNATERS, OR BURROWERS. They are distinguished by having two fore-teeth in each jaw, close to each other, but remote from the grinders; and being without tusks. They all, in a greater or less degree, burrow in the earth, and almost all of them sleep through the whole, or a great part of the winter. To this order, therefore, we can all of us, of our own accord, refer the ten following kinds; which are the whole that are included under it. The hystrix or porcupine; the cavia or cavy; the castor or beaver; the mus genus, comprehending the numerous families of the mouse and rat; the arctomys or marmot; the sciurus or squirrel, some of which have a long flying membrane that enables them to vault from tree to tree, like some species of the lemur; the myoxus or dormouse; the dipus or jerboa, whose form resembles the kangaroo, but whose habits the dormouse; the lepus, comprising the hare and rabbit tribes; and the hyrax or daman: with most of which we are too well acquainted to require any detailed account in so cursory a survey as the present.

The PECORA OR CATTLE kinds form the next or FIFTH ORDER, and comprehend those horned quadrupeds which are most familiar and most useful to us. To this division, therefore, necessarily belong the bos, ovis, capra, and cervus kinds; or, in our own language, the ox, sheep, goat, and deer; and as con-

nected with these, in habits as well as in external appearance, the moschus, antelope, camelus—the musk, antelope, camel, and cameleopard, or giraffe. They are ordinarily distinguished by being without upper fore-teeth, but having six or eight in the lower jaw, remote from the grinders. They have all four stomachs, are hoofed, and have the hoof divided in the middle; and, except the camel, have two false hoofs, which, in walking do not touch the ground. Such as have horns have no tusks, and such as have tusks have no horns: they ruminant or chew the cud; and from the torpid action of their multiform digestive canal, are apt to have balls form in different parts of it, owing to the frequent concretion of their food, occasionally intermixed, but more usually covered with a quantity of hair, which they lick from their bodies. Some of these balls are of a whitish hue, and will bear a fine polish, and are known by the name of bezoards. These are chiefly the production of the antelope kind; and were formerly in very high estimation as amulets and febrifuges.

The SIXTH ORDER of mammals embraces the BELLUE or WARRIOR KINDS, possessing both upper and lower fore-teeth, and hoofed feet. The order consists of only four genera; the equus, or horse, mule, and ass tribes; the hippopotamus or river-horse; the tapir, which in appearance and habits makes an approach to the river-horse, but is smaller in size; and the numerous families of the sus or swine kind.

The LAST ORDER under the mammalian class consists of the CETE or WHALE KINDS, and embraces the monodon, sea-unicorn or narwahl; balæna, common whale; physeter, cachalot, or spermaceti whale; and delphinus or dolphin, including, as two of its species, the phocæna or porpoise, the orca or grampus, and the dugong.

There is some force in introducing these sea-monsters into the same class with quadrupeds; but they are still continued here by M. Cuvier. They have a general concurrence of structure in the heart, lungs, backbone, and organ for suckling; but their teeth have little resemblance; and they have neither nostrils, feet, nor hair; instead of nostrils, possessing a spiracle or blowing-hole on the fore and upper part of the head; and instead of feet, fins; in which, as well as in their general habits, manners, and residence in the waters, they have a close resemblance to fishes. These are chiefly inhabitants of the polar seas, and several of the larger species afford materials that are highly valuable as articles of commerce or manufactures. All of them produce a considerable quantity of blubber or the basis of the coarser animal oils; the common whale sometimes to as large a quantity as 6 or 8,000lbs. weight: from the horny laminae of whose upper jaw, as well as from that of the balæna *Physalus* or fin-fish, we obtain also extensive layers of whalebone; while the cachalot supplies us with spermaceti from its head, and with ambergris from some of its digestive organs; a substance, however, only to be procured from such organs when the animal is in a state of sickness. The most warlike of the order is the grampus, which will often engage with a cachalot or common whale of double its size, and continue the contest till it has destroyed it.

To this order also belongs the dugong or sea-cow of Sumatra, which has of late excited so much attention among naturalists. It was at one time supposed to be a hippopotamus or river-horse, but Sir Thomas Raffles has of late sufficiently proved it to be a cetaceous mammal. It is usually taken on the Malacca coast by spearing; its length is often from eight to nine feet. Its front extremities are two finny paddles; its only hind extremity is its tail, which is a very powerful instrument. It is never found on land or in fresh water, but generally in the shallows and inlets of the sea; the breasts of the adult females are of a large size, and especially during the time of suckling. Its food seems to consist entirely of fuci and submarine algae, which it finds and browses upon at the bottom of the shallow inlets of the sea, where it chiefly inhabits. Its flesh resembles that of young beef, and is very delicate and juicy.*

In M. Cuvier's arrangement the class of mammals is entirely recast,

* Phil. Trans. 1820, p. 174.

and divided into three orders, or principal sections, as distinguished by claws or nails, by hoofs, or by fin-like feet; while the whole of these orders are farther subdivided into eleven distinct families, of which the first six belong to the first order; the next three to the second; and the last two to the third.

The six families belonging to the first order, the nail or claw-footed, are these:—

I. Bimanum: two-handed. Thumbs separate on the superior extremities only. Designed to include man alone.

II. Quadrumana: four-handed. Thumbs or great toes separate on each of the four feet. Monkeys and maucaucoes.

III. Sarcophaga: flesh-feeders. No separate thumbs or great toes on the anterior extremities. Bats, flying lemurs, hedgehogs, shrews, moles, bears, weasels, civets, cats, including the lion and tiger-tribes; dogs, including the fox and wolf-tribes, and the opossums.

IV. Rodentia: gnawers. Want the canine teeth only. Cavies, beavers, squirrels, rats of all kinds.

V. Edentata: edentulate. Want both the incisive and canine teeth. Ant-eaters, pangolins, and armadilloes.

VI. Tardigrada: slow-footed. Want only the incisive teeth. Sloth tribes. The three families belonging to the second or hoof-footed order, are the following:—

VII. Pachydermata: thick-skinned. More than two toes; more than two hoofs. Elephants, tapirs, hogs, hippopotamus, rhinoceros, and hyrax or damon.

VIII. Ruminantia: ruminants. Two toes; two hoofs. Camels, musks, deer, giraffes, goats, sheep, oxen.

IX. Solipeda: single-hoofed. One toe, one hoof. Horse alone, including the ass-tribe.

The two families belonging to the third, or fin-footed order, are the following:—

X. Amphibia: amphibials. Four feet. Seals and morses. This family-name should be changed, since the same term is also employed by M. Cuvier, after other naturalists, as the name of a distinct class of other animals.

XI. Cetacea: cetaceous. Feet fin-like. Manates or lamantins, dolphins, cachalots, whales, and narwahls.

We have thus run rapidly over a map of the different classes and kinds of animals as they are found extant in our own day. But those traced in a living state in our own day are by no means the whole that have existed formerly. In the lecture on Geology, in the preceding series,* we had occasion to observe that the various formations of rock, and especially the transition formations, open to us very numerous examples of whole families now no longer in existence; many of which have probably ceased to exist for several thousands of years; some of which, indeed, are so far removed from the races of the present day, as to require the invention of new genera, if not of new orders in a zoological arrangement for their reception.

Stukeley, Lister, and other paleologists and naturalists of the last century, paid no small attention to this subject, and dragged forth the unrecognised relics of various animals from their fossil abodes: but it has since been pursued with extraordinary spirit and activity by the concurrent labours of Karg, Schlottheim, Fischer, Espen, Collini, Blumenbach, Humboldt, Werner, Buckland, and, above all others, Cuvier; insomuch that the ascertained lost kinds bid fair in process of time to be almost as numerous as those that are living.

The last physiologist is well known to have formed a most valuable and extensive museum for the reception and arrangement of fossil animal remains; and so rich and varied is his possession, that he has commenced and made a considerable progress in a classification for systematically distinguishing them. The alluvial soil of our own country has furnished him with numerous examples; the shell-marl and peat-bogs of Ireland, with one or two of still more striking character, and particularly with specimens, more or less per-

* Series i. Lecture vi.