ORR'S

CIRCLE OF THE SCIENCES:

A SERIES OF TREATISES ON THE PRINCIPLES OF SCIENCE, WITH THEIR APPLICATION TO PRACTICAL PURSUITS.

VOLUME III.

ORGANIC NATURE—VOL. III.

VERTEBRATED ANIMALS—W. S. DALLAS, F.L.S.

NEW EDITION.

LONDON AND GLASGOW:
RICHARD GRIFFIN AND COMPANY,
PUBLISHERS TO THE UNIVERSITY OF GLASGOW.

1860.

countries on whose coasts they live, for the sake of their flesh and oil. Humboldt states that the flesh of the South American species is excellent, and furnishes a most welcome article of food to the Roman Catholics of Brazil, as it is regarded by the Church as a fish, and may consequently be eaten on fast-days. When salted, and dried in the sun, it will keep for a whole year. The oil of this species is also excellent in quality, and quite free from smell; its skin is cut into harness, and frequently also into whips, which are much dreaded by the unfortunate slaves in those countries.

On the east coast of Africa, and on all the shores of the Indian Ocean, the place of the Manatees is taken by the Dugong (*Halicore cetacea*), in which the molars are never more than five on each side in each jaw, whilst in old animals their number is reduced to two. The form of the upper jaw in this animal is very remarkable; it is bent downwards in front of the lower jaw, and terminated by two rather large incisor teeth (Fig. 8). The tail is notched. In its habits the Dugong resembles the Manatees, but it exceeds these animals in size, full-grown individuals measuring eighteen or twenty feet in length. It is found on the coasts of the Indian Ocean, especially amongst the islands of the Eastern Archipelago, and on the north coast of Australia, where the natives kill them in considerable numbers. Westwards it extends to the Red Sea and the east coast of Africa, but it does not appear to be known north of the Eastern Archipelago, on the coasts of China and Japan.

The skulls of several species of gigantic animals have been found in the tertiary strata of different parts of the world, which are referred by Palæontologists to the present sub-order. Amongst these we shall only refer to the remarkable *Dinotherium*, of which the skull has been found on the banks of the Rhine. This animal appears to have been more than equal to the Elephant in size, and like that quadruped it was furnished with a pair of long tusks; but these projected from the end of the lower jaw, which is curved downwards at a right angle to the body of the jaw; the tusks were thus directed downwards, and it is supposed that the animal employed them to support his head upon the shore. The molar teeth are broad, and furnished with notched transverse ridges; and the nasal cavity is of very large size, as in the Elephant; from this and other circumstances it is supposed that the *Dinotherium* was furnished with a short flexible trunk.

Order IV.—Pachydermata.

General Characters.—With the Pachydermata we commence the series of Ungulated or Hoofed Quadrupeds, and, this order may be defined as including all the Ungulata, which do not ruminate, and have more than one hoof on each leg. It consequently includes a great variety of forms, some of which, indeed, seem to have very little to do with the rest, but in many cases the apparent gaps between the different families are filled up by the fossil forms, which show that it would be difficult to arrange them otherwise than in a single group. This multiplicity of forms, however, renders it almost impossible to give positive characters for the group.

We have already mentioned that each foot is furnished with more than one hoof, and that the animals do not ruminate. The most striking character is the thick and usually naked skin with which they are covered, and from this the name given to the order is derived. The mouth is almost always furnished with all three kinds of teeth; and the molars are broad, and adapted for grinding the vegetable matters which constitute the principal food of all the species.

The Pachydermata are, for the most part, inhabitants of the warmer regions of

the earth; they are generally of moderate or large size, only one very aberrant family being composed of small animals.

Divisions.—Professor Wagner divides the Pachydermata into three great sections—the *Anisodactyla*, the *Zygodactyla*, and the *Lamnunguia*. The *Anisodactyla* are distinguished by having the hoofs arranged in a single series round the bottom of the foot, and the animals walk upon the whole foot. The skin is usually naked. This group includes four families.

The first of these is that of the *Elephantidæ*, including the Elephants, the largest of existing terrestrial Mammalia. These animals, as is well known, are distinguished by the possession of a long trunk, or proboscis, which serves them in place of a hand, and enables them to perform many extraordinary feats, which have excited the admiration of mankind from a very early period. This proboscis consists of the nose, which is produced into a long muscular tube of great flexibility, and furnished at its extremity with a finger-like process, which adds greatly to its power of picking up small objects (Fig. 328). The skull is very large, but a great deal of its bulk is due to the enormous thickness of the bones of the cranium, the cavity in which the brain is lodged being of comparatively small size. These bones, however, are not solid, but their interior is occupied by large cells filled with fat, by which means the enormous skull is rendered sufficiently light to be no burden to its possessor, at the same time that its greatly increased surface affords the space required for the attachment of the powerful muscles of the proboscis. The lower jaw is also of immense size.

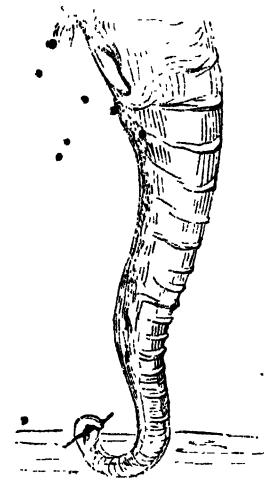

Fig. 328.—Trunk of the Indian Elephant.

The dentition of the Elephants is of a very remarkable nature. The upper jaw bears a pair of tusks, which often acquire an immense development in the males; they spring from the intermaxillary bones, and are, therefore, to be regarded as representatives of the incisors. They grow from a permanent pulp, and continue to increase in size during the life of the animal. The incisor teeth are wanting in the lower jaw, as are also the canines in both jaws, and the only other teeth possessed by this great quadruped consist of two molars, of a most remarkable structure, on each side of each jaw. These teeth are of a very large size, and of a quadrangular form. They consist of a series of transverse plates of the ordinary substance of teeth (*dentine*), each coated with a layer of enamel, and united together into a mass by a material softer than either of the others, called the *cement*. The form of these transverse plates of dentine and enamel varies greatly in the different species. The formation of the molar teeth, like that of the tusks, is going on as long as the Elephant lives, but with this difference, that whilst after the shedding of the first, or milk tusks, the pulp of each tusk continues adding matter to its base without any change, in the case of the molars, it is a succession of separate teeth that is produced, the hindmost passing gradually forwards to take the place of those which have been abraded by use, and cast off as unserviceable.

The Elephants are large, unwieldy animals, supported upon legs of considerable height and of great thickness. The feet are furnished with five flat hoofs, corresponding with the five toes which are distinctly recognizable in the skeleton, but which are completely concealed within the skin. The skin in the recent species is naked, with the exception of a few bristles in particular parts, and especially at the tip of the short tapering tail, which is terminated by a tuft of rather long bristles. The external ears are of large size, and hang down upon the sides of the head. The female possesses only two teats, which are placed upon the breast.

The existing species of Elephants are now confined to the tropical parts of the Old World, but at a period immediately preceding that in which the earth received its human population, gigantic quadrupeds belonging to this family inhabited the northern parts of both continents, and the remains of one species, the Mammoth (*Elephas primigenius*), occur in such plenty in Siberia, that their tusks constitute an important article of commerce in that desolate region.

Of the recent Elephants only two species are known, the Indian (*E. indicus*), and the African Elephant (*E. africanus*). They both live in considerable herds in the luxuriant tropical forests, feeding entirely upon vegetable substances which they convey to their mouths by means of their trunks, the total absence of cutting incisors rendering it impossible for them to graze in the manner of the ordinary herbivorous quadrupeds. With this extraordinary organ, as with a hand, the Elephant is enabled to twist the herbage from the ground and to strip the foliage from the trees, and as the shortness of its neck, and the conformation of its mouth prevent it from drinking in the usual way by immersing the lips, it sucks up the water into the hollow of the trunk, and then putting the end of this organ into its mouth, pours out the fluid which it contains. The water is prevented from passing back into the nasal cavities by a peculiar valve. The Elephant also frequently avails himself of this power of filling his trunk with water and again expelling it, to indulge in the luxury of a shower bath, by spouting the water over all parts of his body.

The Indian or Asiatic Elephant (*Elephas indicus*) has the forehead concave, the ears of moderate size, and the dentine and enamel of the teeth arranged in transverse bands. The males of this species are sometimes twelve feet in height at the shoulder, but the females rarely exceed eight feet. Both males and females are employed in the East as beasts of burden,—an office in which they exhibit extraordinary docility, especially when we consider that the animals have been reclaimed from a wild state, as the Elephant very rarely breeds in captivity. Their sagacity, though generally over estimated, is certainly very considerable, and a good sized volume might be filled with anecdotes illustrative of this quality in the Elephant. The wild Elephants are taken by driving or enticing them into a strong enclosure, from which they are released one by one, but only to be put into a still more disagreeable confinement. They are tied with strong ropes to the trunks of trees, and left in that uncomfortable condition until starvation and fetters have tamed them. In the capture of the wild Elephants the hunters are always assisted by tame ones, which appear to take a treacherous delight in depriving the others of their liberty. The females in particular will load the wild males with caresses, and thus by their blandishments seduce them into captivity.

The African Elephant (*E. africanus*) is confined to the southern parts of the African continent. It is distinguished from the Asiatic species by the convexity of its forehead, the enormous size of its ears, and the lozenge-shaped arrangement of the dentine and ivory in its molar teeth. It was formerly trained in the same way as the Indian

Elephant, and was undoubtedly the species known to the Romans, but in the present day it is never reclaimed. It is, however, pursued with great eagerness by the hunters for the sake of the tusks, which are of very large size, sometimes more than nine feet long, and furnish a beautiful ivory.

The Mammoth (*Elephas primigenius*), one of the extinct species, appears to have inhabited the most northern parts of the Asiatic continent at a comparatively recent period, for the carcase of one of these animals was found frozen in a bed of gravel at the mouth of the river Lena, in Siberia, with the flesh in such a state of preservation that it was devoured by the dogs and bears. The skin was covered with hair, so that it appears that the Mammoth must have lived in a climate much colder than that inhabited by our living species of Elephants. Vast quantities of the remains of this gigantic creature have been found in alluvial soil in Siberia; and the tusks, which sometimes measure eleven feet in length, are in such good condition that they are constantly used as ivory in Russia.

The Mastodons, the remains of a gigantic species of which have been found in alluvial soil in North America, also belong to this family.

The second family of the Pachydermata is that of the *Tapiridæ*, or Tapirs, in which the nose is produced into a short proboscis, and the skin covered with hair. The form of the head is very different from that of the Elephant, and the bones of the skull are entirely destitute of those cellular expansions, which contribute so much to the sagacity of that quadruped's appearance. The skull in the Tapirs is of a pyramidal form, somewhat like that of a Pig; but the nasal bones are much arched, to give support to the muscles of the proboscis. The jaws are fully furnished with teeth; there are six incisors and two small canines in each jaw; the upper jaw has seven and the lower six molars on each side.

The ears in the Tapirs are small, upright, and of much the same form as in the Pig; the neck is high, and furnished with a sort of stiff mane; the skin is clothed with short close hair; the tail is very short; and the fore feet are furnished with four and the hinder with three toes, all distinctly separated and terminated by nail-like hoofs.

In their form the Tapirs are not unlike Pigs, but their legs are considerably longer. They live in the moist tropical forests, generally sleeping during the day in the thickets, and wandering forth at night to feed on grass and other vegetable substances. They are also fond of the water, and swim well.

Three species of this family are known, of which two are inhabitants of South America, whilst the third is a native of Sumatra and the peninsula of Malacca. The best known species is the common American Tapir (*Tapirus Americanus*), which occurs in all parts of South America, from the Isthmus of Panama almost to the southern extremity of that continent. It is a large animal, measuring as much as six feet in length, and is of an uniform brown colour. It inhabits the forests, always in the neighbourhood of water, in which it delights to bathe, frequently rolling in the mud like a Pig. In unfrequented districts it is said to move about in the day time; but in the neighbourhood of human habitations it is more cautious, and rarely leaves its resting-place except at night. It frequently breaks into the cultivated grounds in large herds, when the destruction caused by the trampling of so many heavy feet is often very serious. The second South American species (*Tapirus villosus*) is but little known; it differs from the preceding in the great length of its hair. It is found upon the Andes, at a considerable elevation.

The Eastern Tapir (*T. bicolor*) is a larger animal than either of the American species, measuring seven or eight feet in length. It is remarkable from its colouring,—the anterior portion and the legs being black, whilst all the hinder parts of the body are white. In its habits it appears to resemble the other species. It has only been found hitherto in Sumatra, Malacca, and Borneo; but from Chinese books and figures there is no doubt that it also exists abundantly in some parts of China. All the Tapirs, but especially the eastern species, are of a gentle disposition, and may be readily tamed; in confinement they appear to be very indiscriminate in their food.

Nearly allied to the Tapirs, and intermediate between these and the Swine, is a remarkable group of fossil animals, the remains of which are found abundantly in the gypsum beds of Paris. In the form of the skull they resembled the Tapirs, and as the nasal bones are strongly arched, they were doubtless furnished with a short proboscis. The structure of the incisor and canine teeth is also the same as in the Tapirs; but the molars were very different in form. All the feet had three toes, which were nearly equal in length. These animals form the genus *Palæotherium* of Cuvier; their size was sometimes small, but some of the species were as large as a horse.

The *Hippopotamidæ*, forming the third family of the Pachydermata, differ from the two preceding families in the form of the muzzle, which is exceedingly thick and blunt. The head is very large, but the greater part of its bulk is made up of the facial bones, which are of enormous size when compared with the cranium. The lower jaw is of immense size and power. Both jaws are armed with teeth of the three different sorts, and some of these attain a large size. The incisors are four in each jaw; they are of a cylindrical pointed form, the two middle ones are much longer than the others, and those of the lower jaw project forwards considerably. The canines are very large in the lower jaw; they are always worn away at the point by rubbing against one another. The molars are six or seven in number on each side, both above and below; they are of a quadrangular form, and exhibit at first numerous triangular tubercles, which, when worn down, leave peculiar isolated spots of enamel on the surface of the teeth.

The form of the body in the *Hippopotamus*, which is the only living species of this family, is peculiarly unwieldy, even amongst the Pachydermata; it is covered with a very thick naked skin, which only bears a few bristles upon the lips and at the tip of the very short tail. The legs are very short and stout, and the feet have four toes, each terminated by a hoof. The eyes and ears are small.

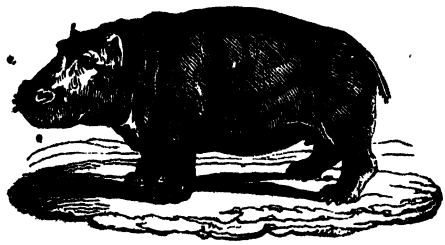

Fig. 329.—Hippopotamus (*H. amphibius*).

The only established species, the *Hippopotamus amphibius* (Fig. 329), is exclusively an inhabitant of Africa, in many of the rivers of which continent it is tolerably abundant. It is a large animal, the males, according to some travellers, attaining a length of fourteen or fifteen feet. It feeds entirely upon vegetable substances, cropping the herbage and bushes on the banks of the rivers, and occasionally visiting the cultivated grounds during the night, when it does great damage. It passes most of its time in the water, where it swims and dives with great ease, and is

said even to walk at the bottom of the water. On shore, they trot heavily but with considerable rapidity, and when two of them meet on solid ground they frequently fight ferociously, rearing up on their hind feet, and biting one another with great fury, so that, according to African travellers, it is rare to find a Hippopotamus which has not some of his teeth broken, or the scars of wounds upon his body. When not irritated, they appear to be quiet and inoffensive; but a very trifling irritation is sufficient to rouse their anger, when they attack the offender most furiously with their teeth; and a Hippopotamus which had been touched accidentally by a boat, has turned upon it and torn out several of the planks, so that it was with difficulty the crew got to shore. A Hippopotamus has also been known to kill some cattle which were tied up near his haunts, apparently without the slightest provocation.

The flesh of this unwieldy animal is said to be very good, and not unlike pork; it is in high esteem with the inhabitants of South Africa, both native and European. The feet, the tongue, and the tail are the favourite parts, and a thick layer of fat which covers the ribs is held in great esteem when salted and dried. It is called *Zeekoe-speck*; the name given to the Hippopotamus by the Dutch colonists being *Zeekoe*, or Sea-cow. The skin is cut into whips, which are highly prized, and the large canine teeth are sometimes used to furnish ivory. Two specimens of the Hippopotamus a male and female, are now living in the gardens of the Zoological Society; the male was the first ever brought to Europe, at all events in modern times.

A second species of *Hippopotamus* (*H. senegalensis*), inhabiting the rivers of Western Africa has been described by some authors; but its distinctness from the old species still requires confirmation. The fossil remains of several species are found in different parts of the world, principally in Europe and Asia.

A fourth family is that of the *Rhinocerida*, including the different species of Rhinoceros, which are nearly as bulky and unwieldy as the Hippopotamus, and, like that animal, are covered with a naked skin. The skin, however, in these animals, has a much rougher exterior than in the preceding family, and in some cases is laid in large folds, which give the creatures a curiously shielded appearance. The head is elongated and triangular, and from the upper surface of the muzzle there springs a single or double horn, composed of a solid mass of horny fibres, supported upon a broad bony protuberance of the nose. These horns are of considerable size, measuring frequently two feet and a half in length, and sometimes much more. They are of an elongated conical form, and usually more or less curved backwards; but in the British Museum there are two horns which are evidently curved in the opposite direction, and probably belonged to a species of which nothing further is

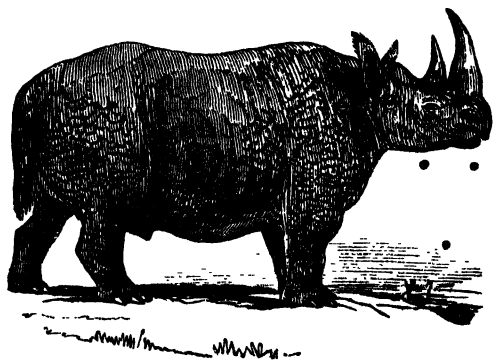

Fig. 330.—Two-horned Rhinoceros or Borélé (*Rhinoceros bicornis*).

at present known. The same collection contains another horn, which is more slender than usual, and curved backwards almost in a semicircle; all these have been described by Dr. Gray (*Proc. Zool. Soc.*). When two horns are present, they are placed one behind the other, and the hinder one is much shorter than the anterior. Only two sorts of teeth, incisors and molars, are found in the jaws, and of these the former sometimes fall out before the animal is full grown. The canines are entirely wanting. The molars are usually seven in number on each side of each jaw; their surface exhibits projecting lunate ridges. The body is very bulky, and is supported upon short, strong legs; the feet have three toes, which are only indicated externally by the hoofs.

These animals are found in the same regions of the Old World which are inhabited by the Elephants; they live like them in the forests, and feed upon herbage and the leafy twigs of trees and shrubs. They appear, as a general rule, to be peaceable animals, unless irritated; but in this case they charge with great fury upon their enemy, holding the head down, so as to present the point of the horn towards him. They are generally hunted merely for the sake of sport; but the natives of the countries inhabited by them kill them when they can, for the sake of the flesh; walking-sticks of great beauty are cut out of their thick hides, and their horns are worked into boxes and drinking-cups; to the latter of which the eastern nations attribute the power of indicating the presence of poison in any fluid that may be put into them.

Little more than twenty years ago only four living species belonging to this family were known, but the number has since been increased to seven; and Dr. Gray has very recently described the horns of what appear to be two other species, distinct from any of those previously described.

Of the seven species, two have only a single horn upon the nose, and both these are natives of the East Indies and its islands. The best known is the Indian Rhinoceros (*R. unicornis*), which appears to be the species with which the ancients were best acquainted. It is a huge, unwieldy creature, measuring twelve or thirteen feet in length, and covered with an excessively thick skin, which lies in broad folds upon different parts of the body. This is also the case with a second eastern species, the Javanese Rhinoceros (*R. sondaicus*), which appears to be confined to the island of Java. In this species the surface of the skin is covered with numerous pentagonal shields, which constitute the epidermis.

Of the two-horned species, one (*R. Sumatranus*) is found only in Sumatra; it is distinguished from the other Indian species by the comparative smoothness of its surface. The remainder are all inhabitants of Africa, and principally of the southern extremity of that continent, where they occur in considerable abundance. The best known of these is the Borélé (*R. bicornis*, Fig. 330). The bones of several species of this family have also been found in a fossil state.

The division of the *Zygodactyla*, in which the feet are formed of two hoofed toes available for walking, and two others placed at some little elevation on the back of the foot, includes only a single family, that of the *Suidæ*, or Swine, of which the common Hog may be taken as an example. In these animals the nose, although possessing considerable power of motion, is not produced into a proboscis, nor is it swelled up into a blunt rounded mass as in the Hippopotamus, but runs in a tapering cylindrical form to the extremity, where it is suddenly truncated. The tip is of a firm cartilaginous nature, and is principally employed in turning up the earth in search of

roots and other articles of food. The skull is of a pyramidal form and the nasal bones are not elevated as in the Tapirs; but the facial bones are very large in comparison with the cranium. The jaws are always furnished with the three kinds of teeth whilst the animals are young, but the incisors are always small, and in some cases fall out with increase of age. The canines, on the contrary, are always of large size, especially in the males, in which they project from the sides of the mouth; those of the lower jaw, from constantly rubbing against their fellows in the upper, are usually sharpened to a most acute edge, and constitute formidable weapons. The molar teeth vary from three to seven on each side in both jaws. The feet consist of four toes, of which the two middle ones are considerably longer and stouter than their fellows, forming a cloven hoof, upon which the animals walk; the two lateral toes are also furnished with hoofs, but they are placed at the back of the foot at some little elevation from the ground. One of these hinder toes is wanting in some cases, whilst monstrosities have occurred with five toes, and others with a single hoof. The eyes are small, and the ears of moderate size and upright. The form of the body resembles that of our ordinary swine, but is lighter and less bulky in the wild species. The tail is rather short and slender; in most cases it is capable of being twisted up into a sort of curl upon the rump. The skin is covered with bristles.

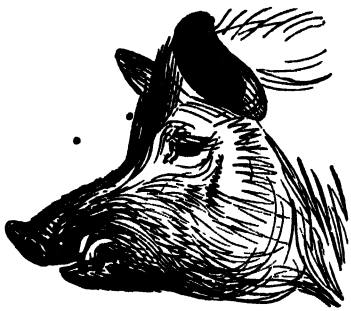

Fig. 331.—Head of the Boar.

Unlike the Pachydermata of the preceding families, which only produce one or at the utmost two young at a birth, the Swine are very prolific, bringing forth frequently from eight to twelve young ones. The species are found in the warmer parts of both continents, only one, the Common Hog (*Sus scrofa*), being found wild in the temperate parts of the Old World. They live in the woods and forests, generally in marshy places, and feed partly upon roots and herbage and partly upon animal substances, such as insects and their larvæ, small mammalia, and even upon carrion. The females and young males live together in flocks, but the old boars are usually solitary, except during the rutting season, which they pass in company with the females; and at this period they have tremendous combats amongst themselves.

The best known species is the Common Hog (*Sus scrofa*), which is found wild in many parts of Europe, all over Asia, and in the north of Africa. It is also the original of our tame breeds, and from individuals of these which have escaped from captivity the American forests have been supplied with a numerous race of wild hogs. They feed at night, and often do immense damage to the crops cultivated in the neighbourhood of their abodes, rooting up all the produce in search of food. In the autumn they find a plentiful nourishment in the acorns and beech mast which fall from the trees. They are pursued with powerful dogs, and hunting the Wild Boar has always been a favourite sport in the countries where they abound. The flesh is superior to that of the domestic swine.

Domestication has produced an immense number of varieties in this Hog, but in all cases it is a most valuable animal. Its flesh is very good, and bears salting and drying remarkably well; it furnishes an abundance of fat, and both the leather made

from its skin, and the bristles which cover it, are applied to many important purposes. Add to this, that it is an animal easily kept, and that it thrives upon almost any description of food, and we shall easily see that few of our domestic animals are superior to it in importance. In this country, the Hog is rarely put to any use until after its death; but in Minorca, according to Pennant, he is employed as a beast of draught, and is often seen in that island working in company with the ass; and the same author tells us that he was informed by a Scotch minister that on his first going to his parish in Morayshire, he had seen a cow, a sow, and two young horses, "yoked together, and drawing a plough in a light sandy soil; and that the sow was the best drawer of the four."

Several other species of the genus *Sus* are found in a wild state in India and the Indian Islands. Some of the latter and the peninsula of Malacca are also inhabited by a singular species of Hog, called the Babyrussa (*Babyrussa alfurus*), in which the upper canines are of great length, turned completely upwards and curved backwards in a semicircle. The object of this peculiar structure of the tusks is entirely unknown; some of the older writers tell us that the Babyrussa hangs himself to the bough of a tree by means of these organs when he wishes to take a quiet nap; but the absurdity of this statement is very apparent. The Babyrussa is of a lighter form and furnished with more slender limbs than the other Hogs; it is of a mild disposition, and its flesh is very good.

Southern Africa possesses several large species of Hogs belonging to the genera *Phacochœrus* and *Potamochœrus*. The former are called Wart Hogs, from their having a large fleshy protuberance on each cheek; they are of moderate size, but furnished with most formidable tusks. The *Potamochœri*, instead of fleshy warts on the cheeks, are disfigured by a large bony ridge on each side. The head, in both of these genera, is large, and the animals have a most unprepossessing expression of countenance.

In South America this family is represented by the Peccaries (*Dicotyles*), in which the hind feet have only three toes, one of the hinder ones being deficient, and the tail is reduced to a mere rudiment. In form these animals resemble small Pigs, and they agree exactly in their habits with the Old World species. They are, however, far less prolific, only producing one or two young at a birth. On the back, concealed by the hair, the Peccaries have a peculiar gland which secretes a strongly odoriferous fluid; this is cut away by the Indians when they kill a Peccary, as otherwise the whole of the flesh would be contaminated. There are only two species, of which the commonest is the Collared Peccary (*Dicotyles torquatus*), which occurs in almost all parts of South America, and even extends into the southern parts of the United States. It furnishes an important article of food to the American Indians, and may be easily domesticated. In a wild state the Peccaries are usually seen in parties of eight or ten. They often swim across rivers, but as they are not active in the water they are easily killed in this situation by the Indians, who knock as many as they can on the head and pick up their bodies when there are no more to be killed.

In this section of the order we must also place the *Anoplotheridæ*, a family of fossil Mammalia, which constitute a most remarkable transition from the Pachydermata to the Ruminantia. They were of a more slender form than the other members of the present order, and were supported upon long slender legs, which were terminated by two distinctly separated toes, furnished with hoofs like those of the Ruminants. In addition to these, some species had a third small hoof at the back of the foot. The dentition in these animals was of a singular nature; they had six incisor teeth in

each jaw, on each side of which was a small canine tooth, and behind these seven molars on each side; and it is remarkable that the molars came close to the canine teeth without leaving any interval, an arrangement, which, in the living Mammalia, is peculiar to the human species. The Anoplotheridæ were furnished with a long tail; in some species, indeed, this organ was nearly as long as the body. They were of very variable size, and appear to have lived in society in marshy places, as their remains occur in situations which evidently possessed this character. They are found in the older tertiary strata.

In the *Lamnunguia* of Professor Wagner, with which we conclude the order Pachydermata, the feet are furnished with flattened nails instead of hoofs, and the animals composing the only family, that of the *Hyracidæ*, included in this section, are certainly very aberrant forms of the present order. They are of small size, and in many respects appear to approach the diminutive Rodentia; but it is generally admitted amongst zoologists, that their nearest alliance is to be found amongst the gigantic *Rhinoceridæ*. They are little Rabbit-like animals, entirely covered with hair, amongst which numerous bristles are scattered. Their legs are short; the anterior feet are composed of four toes, and the posterior of three, all furnished with flat hoof-like nails. The tail is entirely wanting. The incisor teeth are two in number in the upper, and four in the lower jaw; they are large and sharp, and as the canines are entirely deficient, the jaws present a superficial resemblance to those of the Rodentia, with which these animals were at one time arranged. The molars are seven in number on each side in both jaws; they closely resemble those of the Rhinoceros in form and structure.

The majority of the *Hyracidæ* are found in rocky districts in Africa; but one species, the *Hyrax syriacus*, is an inhabitant of Arabia and Syria. It is the *Shaphan* of the Hebrews, incorrectly translated *cony* in our version of the Bible. They run about with great activity upon the rocks, among the clefts of which they conceal themselves upon the least alarm. They feed upon herbage and the tender shoots of shrubs.

The Cape Hyrax (*Hyrax Capensis*), which is common at the Cape of Good Hope, is said also to extend up the east coast of Africa, as far as Abyssinia. It is called the *Dassie*, or Badger, by the Dutch boors at the Cape, and its flesh is sometimes eaten. It is the largest species, but measures only about eighteen inches in length. Another species, which also inhabits the Cape, is said to lodge in the holes of trees; it is from this called *Hyrax arboreus;* and Mr. Fraser has recently described a second arboreal species from the west coast of Africa under the name of *Hyrax dorsalis*. They are all very similar in their habits, and strongly resemble rabbits in this respect, frequently gambolling in small groups in the vicinity of their holes, whilst, according to some observers, an old male is set as a watchman, to give notice of the approach of danger, which he does with a shrill whistle. In the Jewish law, the Shaphan is said to chew the cud; and it seems not improbable, from the complex nature of the stomach, that it may, like the Kangaroo, possess the power of regurgitating its food into the mouth, to undergo a second mastication.

Order V.—Solidungula.

General Characters.—This order has been established for the reception of the Horse and its allies, forming the single family of the *Equidæ*. Their most striking character consists in the structure of the feet, which are composed only of a single toe, inclosed at its extremity in an entire hoof. The structure of the leg bones is much the same as in the generality of the Mammalia, except that the humerus and femur