XIII a 3 21

CONTENTS OF VOL. III.

BOOK NO. 1262

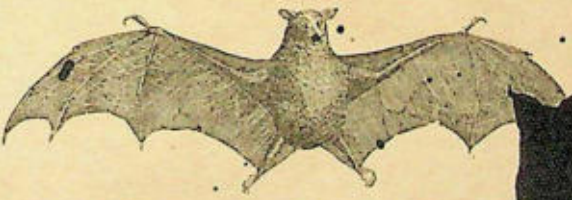
ORDER—PACHYDE

599 HKS V.3

184.—Amboyna Pteropus.

ches of one of these are sometimes covered with them. pass the greater portion of the day in sleep, hang- motionless: ranged in succession, with the head wards, the membrane contracted about the body, often in close contact, they have little resemblance ing beings, and by a person not accustomed to their my are readily mistaken for a part of the tree, or fruit of uncommon size suspended from its branches. neral these societies preserve a perfect silence ing the day; but if they are disturbed, or if a con- tention arises among them, they emit sharp piercing rieks, and their awkward attempts to extricate them- lves when oppressed by the light of the sun exhibit a licrous spectacle. In consequence of the sharpness of ir claws, their attachment is so strong that they can- eadily leave their hold without the assistance of the

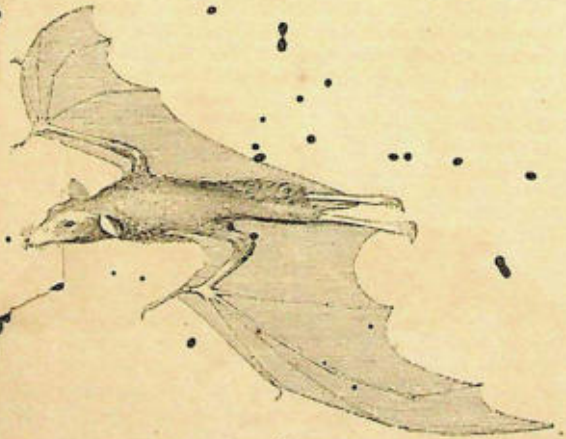
expanded membrane; and if suddenly killed in the natural attitude during the day, they continue suspended after death. It is necessary, therefore, to oblige them to take wing by alarming them, if it be desired to obtain them during the day. (Fig. 143.) Soon after sunset they gradually quit their hold, and pursue their nocturnal flight in quest of food. They direct their course, by an unerring instinct, to the forests, villages, and plantations, occasioning incalculable mischief, 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. By the latter, as well as by the European colonists, various methods are employed to protect the



142.—Kalong.

orchards and gardens. Delicate fruits, such as mang jambus, lansas, &c., as they approach to maturity, are niously secured by means of a loose net or basket, skil constructed of split bamboo. Without this preca little valuable fruit would escape the ravages of the ka There are few situations in the lower parts of J which this night-wanderer is not constantly obse as soon as the light of the sun has retired, one an seen to follow the other at a small but irregular di and this succession continues uninterrupted till da obstructs the view. The flight of the kalong is slo steady, pursued in a straight line, and capable of continuance. The chase of the kalong forms occasio

an amusement of the colonists and inhabitants during the moonlight nights, which in the latitude of Java are uncommonly serene. He is watched in his descent to the fruit-trees, and a discharge of small shot readily brings him to the ground. By this means four or five individuals are frequently obtained in the course of an hour.



143.—Kalong.

Pallas's Molucca Bat (*Harpyia Pallasii*).

The genus *Harpyia* of Illiger (not of Cuvier) differs in having the wings arising from the centre of the back, the lips thick, and the head broad and short; index-finger clawed. The *Harpyia Pallasii* (*Cephalotes Pallasii*, Geoffroy) is a native of the Moluccas. It measures two feet in the expansion of the wings. The dental formula is thus:—Incisors, $\frac{2}{0}$; canines, $\frac{1-1}{1-1}$; molars, $\frac{4-4}{5-5}$.

Of the habits of this species we have no details; but we give a representation of the head and jaw. (Fig.144.)

It may surprise some to learn that fourteen distinct species, referable respectively to the genera *Rhinolophus*, *Barbastellus*, *Plecotus*, *Vespertilio*, and *Scotophilus*, are indigenous in our island. Of these however, several are extremely rare and restricted to certain localities; but some, as the *Pipistrelle* (*Vespertilio Pipistrellus*, Geoff.; *Scotophilus communis*, Gray) and the Long-eared Bat (*Plecotus auritus*), are everywhere abundant. Nor is the Great Bat (*Vespertilio Noctula*, Schreb.; *Scotophilus Noctula*, Gray) of unfrequent occurrence.

144.—Pallas's Molucca Bat.

It has been suspected that some of our British bats may possibly migrate, and pass the winter, like the swallow, in some genial region where their insect prey is abundant. For this supposition there is not the slightest foundation; all our bats hybernate; but the period at which they become torpid in their retreats, and revive to visit again "the glympses of the moon," differs in the different species. The pipistrelle, or common British bat, is the soonest roused from its lethargic trance. It usually appears in March, and does not retire until the winter has decidedly set in, and its insect food has disappeared. Yet during the winter it will often rouse up and flit about, and that too during the middle of the day, as we have ourselves often witnessed. We have seen it abroad in November and December, though the weather was cold; and a friend shot one of these bats just before Christmas in the middle of the day, which, though the temperature was near or at the freezing point, was clear and bright. The noctule appears at the latter end of April, and seeks its winter dormitory in August. The

long-eared bat (*Plecotus auritus*) is active in the early part of October.

The various species of our bats differ more or less distinctly from each other in the style and character of their flight. The pipistrelle flits quickly, making abrupt and zigzag turns, and often skims near the ground; the noctule, which was first noticed as an English bat by White, sweeps high in the air on powerful wings, whence he termed it *altivolans*. On one occasion we saw three or four of this species wheeling round a row of sycamore-trees in Kent, uttering continually sharp grating cries. The chafer (*Melolontha vulgaris*) was at the same time flying about in great numbers, and no doubt proved a source of attraction to them. The flight of the long-eared bat is rapid, and it makes large circles, or courses to and fro like the swallow. In the aërial evolutions of the bats, the tail and membrane extending between the two hind limbs act as a rudder, enabling the animals to turn more or less abruptly: it would seem moreover that the tail is to a certain extent a prehensile organ. Mr. Bell, who first noticed the circumstance, observes that a small portion of the tail in most of our bats is exserted beyond the margin of the interfemoral membrane, and in ascending or descending any rough perpendicular surface this little caudal finger hooks upon such projections as occur, so as to add to the creature's security. When a bat traverses the wires of a cage this action of the tail is particularly conspicuous.

White observes that it is a common notion that bats will descend chimneys "and gnaw men's bacon," and adds that the story is by no means improbable, as a tame bat did not refuse raw flesh, though insects seemed to be most acceptable. The common bat often enters larders, and has been seen clinging to a joint of meat in the act of making a hearty meal upon it. Of this circumstance we are assured by Mr. Bell.

That bats can be tamed is a remarkable fact; but various species differ in the degrees of their docility. Mr. White's bat, a pipistrelle, was so tame that it would take flies out of a person's hand. "If you gave it anything to

eat, it brought its wings round before the mouth, hovering, and hiding its head in the manner of birds of prey when they feed. The adroitness it showed in shearing off the wings of the flies, which were always rejected, was worthy of observation, and pleased me much."

In the 'Proceedings of the Zoological Society' for 1834 we find the following interesting details relative to the habits of the pipistrelle in captivity, by Mr. G. Daniell. In July, 1833, he received five specimens of this little bat from Elvetham, Hampshire; all were females, and pregnant. "They had been kept in a tin powder-canister for several days, and, on being turned loose into a common packing-case with a few strips of deal nailed over it to form a cage, they exhibited much activity, progressing rapidly along the bottom of the box, ascending the bars to the top, and then throwing themselves off as if endeavouring to fly. They ate flies when offered to them, seizing them with the greatest eagerness, and devouring them greedily, all of them congregating together at the end of the box at which they were fed, crawling over, snapping at, and biting each other, at the same time uttering a grating kind of squeak. Cooked meat was next presented to them, and rejected; but raw beef was eaten by them with avidity, and with an evident preference for such pieces as had been moistened with water. This answered a double purpose: the weather being warm, numbers of blue-bottle flies (*Musca vomitoria*, Linn.) were attracted by the meat, and on approaching within range of the bat's wings were struck down by their action, the animal itself falling at the same moment with all its membranes expanded, and cowering over the prostrate fly, with its head thrust under, in order to secure its prey. When the head was again drawn forth the membranes were immediately closed, and the fly was observed to be invariably taken by the head. Mastication appeared to be a laboured occupation, consisting of a succession of eager bites or snaps, the sucking process (if it may be so termed) by which the insect was drawn into the mouth being much assisted by the looseness of the lips. Several

minutes were employed in devouring a large fly. In the first instance the flies were eaten entire, but Mr. Daniell afterwards observed detached wings in the bottom of the box. These, however, he never saw rejected, and he is inclined to think that they are generally swallowed. A slice of beef attached to the side of the box was found not only to save trouble in feeding, but also, by attracting the flies, to afford good sport in observing the animals obtain their food by this new kind of bat-fowling. Their olfactory nerves appear to be very acutely sensible. When hanging by their posterior extremities and attached to one of the bars in front of the cage, a small piece of beef at a little distance from their noses would remain unnoticed; but when a fly was placed in the same situation, they would instantly begin snapping at it. The beef they would eat when hungry, but they never refused a fly. In the daytime they often clustered together in a corner, but towards the evening they became very lively, and gave rapid utterance to their harsh grating notes. One of them died on the fifth day after they came into Mr. Daniell's possession, two on the fourteenth, the fourth survived until the eighteenth, and the fifth until the nineteenth day." Each was found to contain a single young one. On the 16th of May, 1834, the same gentleman procured five specimens of the noctule bat, four females and a male. The latter, which died in two days, was very impatient of confinement, restless and savage, snapping at the females and breaking his teeth in his attempts to escape by biting the wires of the cage. He constantly rejected food. The females were also at first sulky, but in about two days began to eat, preferring small bits of beef to flies, beetles, or gentles. In the course of a few days three of these died, each found to be pregnant with a single offspring. The survivor lived for more than a month, and fed in preference upon the hearts and livers of fowls: she rejected large flies, but partially devoured one or two chafers (*Melolontha vulgaris*). In taking food, it was remarked that the wings were not thrown forward as in the pipistrelle, the food being seized with an action similar to that of a

dog. The water that drained from the food was lapped, but the noctule did not raise its head in drinking as the pipistrelle was observed to do. This noctule took great pains in cleansing herself; she used the hinder limbs as combs, parting the hair on either side from head to tail, and forming a straight line down the middle of the back. The membrane of the wings was cleaned by the creature's nose, which it forced through the folds so as to expand them. During her captivity she brought forth a single offspring perfectly destitute of hair and blind: this she wrapped up so closely as to prevent any observation being made. In the evening of the day after giving birth to her offspring she died. But the young one was alive, and attached to the teat of the mother; whence it was removed, wrapped in warm flannel, and fed with milk, which it took from a sponge. It survived eight days, at which time its eyes had not opened, and it had acquired very little hair. The long-eared bat seems to be far more docile than the noctule. In captivity this elegant species is confident and familiar, very careful in cleaning its fur, and enjoying to gambol and play with others of its species, pretending to bite as we see dogs do when in good-humoured sport. Mr. Bell informs us that Mr. James Sowerby possessed a long-eared bat, which when at liberty in the parlour would come to the hand of those who held a fly towards it, and take the insect without hesitation. "If the insect were held between the lips, the bat would then settle on its young patron's cheek, and take the fly with great gentleness from the mouth; and so far was this familiarity carried, that, when either of my young friends made a humming noise with the mouth in imitation of an insect, the bat would search about the lips for the promised dainty."

The barbastelle (*Vespertilio barbastellus*, Linn.) is timid and restless, and very impatient of confinement. This bat seems to become torpid more readily than most of our British bats, and also more completely so. The reddish-gray bat (*Vespertilio nattereri*) was found by Mr. Bell to be very familiar and confiding, readily taking food from the hand; while the whiskered bat (*V. mysta-*

that these hoof-cased toes, consisting of three phalangal bones, terminate a single long canon-bone. In the camels, however, the toes, instead of being short, abruptly truncated, and cased in pointed hoofs, so as to form a solid basis on which to rest, are elongated and only tipped with small hoofs, the animal resting on a large pulpy sole or pad, placed like a cushion beneath the toes. (See

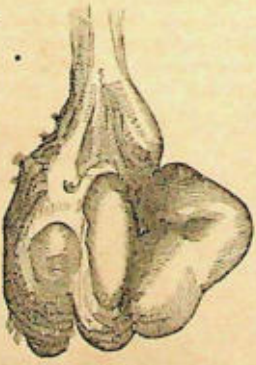


Fig. 4.

Figs. 3 and 4.) Besides the two large or true toes, there are in some groups, as for instance the deer, two small short lateral toes consisting of three phalanges, and supported by stylets of bone. In the sheep these accessory toes are merely horny protuberances filled with condensed fatty cellular tissue.

The act of ruminating supposes a complicated structure of the stomach. This organ is divided into four compartments, viz.: 1, the first cavity or paunch, la panse (*ventriculus*); 2, the hood or honey-comb, le bonnet (*reticulum*); 3, the manyplies, le feuillet (*omasus* or *psalterium*); 4, the rud, la caillette (*abomasus*). These cavities are so arranged that the coarsely-ground herbage

received into the first cavity is gradually propelled into the hood through a valvular aperture, where it is compacted into small balls, which, while the animal reposes at its ease, are returned seriatim to the mouth, to be remasticated by a voluntary effort. The aliment, when sufficiently remasticated, is again swallowed, and passes at once into the third, or plicated, compartment, by means of a peculiar mechanism, where it is compressed into flattened portions, which are gradually transmitted through a valvular orifice into the fourth compartment, or *abomasus*, the true digestive cavity.

The inner membrane of this portion secretes a fluid (the gastric juice) well known for its power of coagulating milk; taken from the calf, salted and dried, it is known under the name of rennet, and used in making cheese.

In young Ruminants, while their food is merely the mother's milk, the process of rumination is not carried on; and the proportion which the different compartments of the stomach bear to each other is very different from that presented afterwards, when their aliment is changed from milk to herbage. The huge paunch, for instance, is less than the *abomasus*, or fourth stomach, this being as yet the largest of the compartments, and the milk as it is swallowed passes at once into it, where it becomes curdled and then digested. In the camel, besides the almost total absence of the third stomach, or *omasus*, there is another peculiarity to be noticed, viz. an arrangement of deep cells in the paunch for the reception and preservation of water, and the enlargement of the cells of the *reticulum* for the same purpose. The paunch is divided into two portions, a right and a left, by a longitudinal ridge of muscular fibres: in the left is a series of deep cells capable altogether of containing from four to five quarts of water; in the right is a smaller series capable of containing about a quart. When these cells are filled, the fluid is kept free from mixture with the food by the contraction of the orifice of each cell, and it can be forced out at pleasure by the action of a muscular expansion covering the bottom of this cellular apparatus. The deep cells of the *reticulum* are arranged in twelve

rows, and are formed by muscular bands, intersecting each other transversely. This compartment in the camel appears to be destined exclusively as a reservoir for water, never receiving solid food, as in the ox or sheep; and it would seem that the remasticated food passes into the third small cavity, being conducted along the upper margin of the second, through a canal formed by a muscular ridge, which contracts with so much force as not only to open the orifice of the second cavity, but so as to bring forward the mouth of the third into the second, by which action the muscular ridges that separate the rows of cells are brought close together, so as to exclude these cavities from the canal through which the water passes. Sir E. Home observes, that, "while the camel is drinking, the action of the muscular band opens the orifice of the second cavity; at the same time it directs the water into it: and when the cells of that cavity are full, the rest runs off into the cellular structure of the first cavity. It would appear that camels, when accustomed to journeys in which they are kept for an unusual number of days without water, acquire the power of dilating the cells, so as to make them contain a more than ordinary supply for their journey; at least such is the account given by those who have been in Egypt." The llama resembles the camel in the arrangement of a cellular apparatus in the stomach. Fig. 5 represents a portion of the cellular apparatus of the camel's stomach, one-ninth of the natural size.

The Ruminantia are dispersed throughout the globe from the equator to regions within the arctic circle; but are most numerous in the warmer latitudes. The universality of the distribution of these animals is essentially connected with the welfare of our race, for not only is the flesh of most species acceptable as food, but that of some is in the highest estimation: nor is this all—their hair or wool, their skin, their hoofs, their horns, their antlers, nay, their bones, and even their intestines, are converted to our benefit. It is from this order that man has derived the most valuable of his domestic animals, which have spread with him as he has spread, becoming, like himself, denizens of the globe. Such is the case with the

ox, the sheep, and the goat. Domesticated from the earliest period, they have ever formed a main part of the national wealth of civilized kingdoms in all ages, and are intimately connected with the prosperity of our race. All the Ruminants, however, which man has domesticated are not universally spread; some few are adapted by their constitution to certain localities, beyond the bounds of which their value becomes diminished. They are formed for the places they tenant, and are there of the highest importance. Of these, one is the reindeer, an animal essential to the comforts if not the existence of the simple inhabitants of Lapland's ice-bound realm, where the ox and the sheep cannot exist. There "the reindeer form their riches." And again, who has not heard of the ship of the desert, the camel, which now, as in ancient days, freighted with merchandise, traverses the burning desert patient of thirst and hunger? To this animal let us first direct our attention.

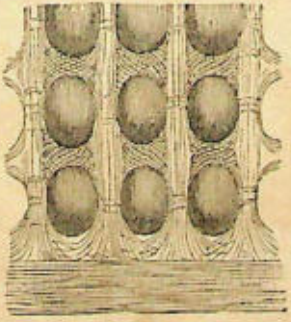


Fig. 9.

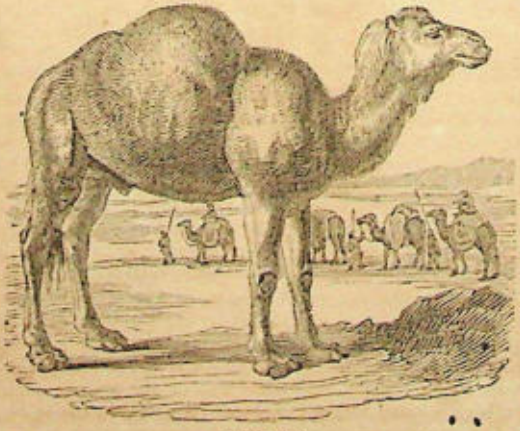
The Camel

(*Camelus dromedarius*; Gamal of the Hebrews; Djemel of the Arabs).

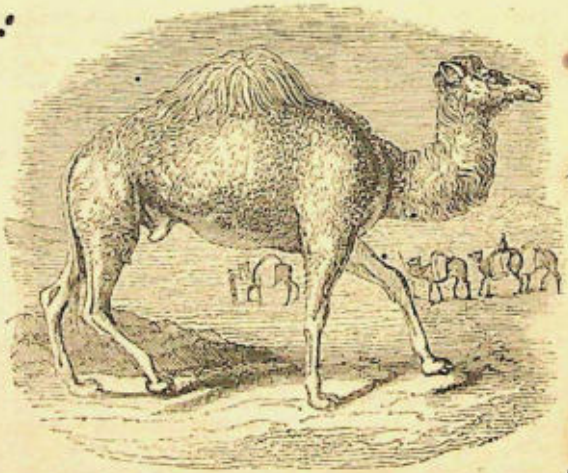
There is something strange and imposing in the aspect of the gaunt and angular camel, destitute, as it con-

fessedly is, of grace and animation. We are amazed at its height, its uncouth proportions, its long thin neck, its meagre limbs, and the huge hump on its back, which conveys the idea of distortion. Quietly it stands in one fixed attitude, its long-lashed eyelids drooping over the large dark eyes: it moves—and onward stalks with slow and measured steps, as if exercise were painful. To complete the picture, it is covered with shaggy hair, irregularly disposed, here forming tangled masses, there almost wanting. Its thick mobile upper lip is deeply divided; its feet are large and spreading, the toes being merely tipped with little hoofs. There are two species of this animal, the Bactrian and the Arabian. It is to the latter that we shall first direct our observation. (Figs. 6 and 7.)

The Arabian camel is distinguished from the Bactrian by having only one large fatty hump upon the back, and in being of a somewhat slighter make. It is not known in a wild condition, but most probably was indigenous in



6.—Camel.



7.—Swift Camel.

Arabia and the adjacent regions, the whole of its structure proclaiming the desert as its destined abode. Reclaimed from the earliest state, its history is interwoven with that of the patriarchs of old: time immemorial it has been the bondslave of man; and under his mastership is spread over the whole of northern Africa as far as Nubia, and from Syria, throughout Arabia, Persia, and India, being valued in all these regions as a beast of burden. In central Asia the Bactrian camel takes its place, but it is inferior in those qualities which render the Arabian species so eminently adapted to the arid burning desert over which it moves silently along, heavily loaded, patient of thirst and hunger, thus maintaining an intercourse between districts separated by vast plains of sand, a barrier more effectual than that of the rolling ocean. It is the unwearied patience, the strength, the docility, the power of maintaining long journeys on scanty fare,

that render the camel in its own country of intrinsic importance. By its means the merchant transports his merchandise from Aleppo or Bagdad to Mecca or Bassorah. Long strings of camels, or caravans as they are called, venture across the desert, each animal bearing a load of five hundred or even six hundred pounds weight, and the procession moves at the rate of nearly three miles an hour, regular as clock-work, day after day for eight hours daily. A caravan of camels thus wending their way over the plain, their footsteps falling noiselessly, so that the ear cannot catch the sound of their approach, whether on hard ground or sand, strongly impresses those who for the first time witness this truly eastern spectacle, which indeed calls to mind the days when "a company of Ishmaelites came from Gilead with their camels, bearing spicery, and balm, and myrrh, going to carry it down to Egypt." (Fig. 8.)

8.—Caravan in the Desert.

The more prominent of the structural peculiarities of the camel may here be briefly noticed. The camel treads flat on his toes, and not, as the ox, on a thick hoofed termination: we have already stated that they are cushioned beneath with large spreading callous elastic pads, connecting them together, and extending laterally beyond them, the horn-covered tips being alone free and separate (see Fig. 3—the Camel's Foot with the skin removed). This cushion expands by pressure at each step, a provision of evident advantage to the animal in passing over a sandy, yielding surface, while on hard or stony ground the elasticity of the pad gives ease to its

movements. The camel kneels down to be loaded (Fig. 9), and kneeling is its natural state of repose, and hence it is provided with certain callosities upon which to throw the weight of the body, both in kneeling down and rising up. The largest of these callosities occupies the chest, which is always brought to the ground; one is placed on each elbow and knee of the fore-limbs, one on the front of each knee of the hind-limbs, and a very small one on the outer side of each hock. These natural cushions are not produced by the habit of kneeling, as some have been ready to suspect, for the young camel is born with them already formed, and it may be observed that a similar callous pad is spread on the breast of the ostrich, which dwells in the desert, and reclines upon its chest. The camel is essentially the inhabitant of a flat expanse of country, beneath a burning sky. Elevated as it carries its head, it can discern the green oasis in the sea of sand at a vast distance; and so acute is its sense of smell, that it can scent the far-distant water. To shield the large eyeball from the glare of light, a beetling brow overarches it, and long lashes fringe the upper lid. Incessantly exposed to clouds of suffocating dust, the camel has its nostrils so constructed as to exclude, as much as

9.—Loading the Camel.

possible, the particles of sand driven by the wind; they are in the form of slits, converging towards each other, with elevated margins, the upper of which is capable of being shut down like the lid of a box, so as to close the aperture, or keep it open to any degree, at pleasure.

Hard and scanty is the desert fare upon which this animal subsists; but the fertile meads and flowery vales of our climate would afford it no temptation. Thorny shrubs, date-leaves, and the leaves and branches of the tamarisk, are its staple diet; and dates, beans, the hard kernels of which it crushes to powder, with cakes of barley, provided by its master, suffice to refresh it on its wearisome pilgrimage. Hence we see the necessity of its strong incisors, canine teeth, and canine-like molars, which enable it to browse on the coarsest shrubs with ease, and sever branches of considerable thickness. With its powerful, cleft, prehensile lip it draws the twigs or leaves to its mouth, or even nips off the tender shoots, or holds the tuft of herbage as it is gradually undergoing mastication. Hard and scanty, we have said, is the desert fare of the camel, but oftentimes the supply fails for days, or is to be obtained only in small quantities, and the travel-worn beast is put upon short allowance; then it is that we recognise the utility of that hump, which seemed at first a deformity. The fatty mass is gradually absorbed into the system, which thus receives nutriment; for the hump is a magazine against a time of want, to which the system has recourse when other supplies are inadequate.

It is a saying of the Arabs that the camel feeds on its own hump, and in a certain sense they are correct. After the wasting of this fatty mass, as described, three or four months of repose and copious nourishment are required to restore it to its usual condition, and this does not take place till the other parts are well replenished. When an Arab is about to commence a journey, the first thing about which he is solicitous is the state of his camel's hump.

We have already alluded to the cellular apparatus in the camel's stomach. At all times patient of thirst, with

this provision the camel can endure it for several days, subsisting on what is reserved in the cells; and sometimes, it is said, driven by necessity, the driver sacrifices his camel in order to obtain the water, and prolong, perhaps preserve, his existence. This may have happened, but the statement rests on insufficient authority.

10.—Head of Camel, with Bells.

From the data collected by Burckhardt there appears to be a great difference among different breeds of camels as respects the power of enduring thirst, according to the mode of life to which they have been inured. Thus, the camels of Anatolia require water every second day during a summer's journey; but the camels of Arabia can dispense with it until the fourth, or even the fifth. In spring, when the young herbage is succulent, the camel

scarcely requires to drink, and the journey across the great Syrian desert, from Damascus to Bagdad, twenty-five days, may be then performed without any water being needed by or given to the camels.

The senses of sight, hearing, and smell are exquisitely acute in the camel: it is said to delight in the jingle of the bells hung about its neck, for it is often thus ornamented, as in ancient days, and as pack-horses formerly were in England, perhaps in order that stragglers may be enabled to rejoin the caravan. (Fig. 10.) Shells called cowries, and even ornaments of silver, are also added: the shells are strung in a semicircular form; hence the phrase, "ornaments like the moon."

11.—Halt of Camels.

During a journey it is customary to halt about four o'clock, to remove the loads and permit the camels to feed. (Fig. 11.) If the Arabs are desirous of preventing them from straying too far, they tie their fore-legs together, or bind the fetlock to the upper joint by a cord. Towards evening they are called in for their evening meal, and placed in a kneeling posture round the baggage. They do not browse after dark, and seldom attempt to

rise, but continue the process of rumination for the greater portion of the night.

The halts of the caravan for the night are exceedingly curious and picturesque. The following is Mr. Mac Farlane's description of a halt:—

"On their journeys, the devidjis always choose, for halting-places, spots that abound in bushes or brakes, where such are to be found; the camels are left at liberty to browse, and their drivers smoke their pipes or go to sleep. There is no danger of the camels escaping or wandering to any distance; they keep close to the spot where they are set at liberty, and can be rallied and formed in a line in a moment. I have more than once seen this done by the mere voice. When they rest for

12.—Halt of Camels.

the night, they generally kneel down in a circle—it is rarely considered necessary to tie one of their fore-legs at the bend of the knee. They always repose on their knees; and a curious thing in relation to their natural habits is, that I never saw one of them throw himself, *even for a moment*, on his side. (Fig. 12.) During the night's rest the devidjis generally sleep in the midst of the circle formed by the recumbent camels; if it be a *rainy* winter night they will pitch a little tent, but (I speak of Asia Minor) in this genial climate they nearly always repose like their quiet beasts, *à la belle étoile*. I once invaded a primitive dormitory of this sort in a curious

manner. It was at Boudja, a village (a few miles from Smyrna) where many of the Franks have their country-houses. I was hurrying home on a very dark night: at the entrance of the village, and in the shadow of a garden wall, I stumbled over something, which proved to be a young camel (they accompany their dams on their journeys almost as soon as they are born); and going forward I stumbled again over a sack, and fell headlong through an opening of the 'domestic circle' into the midst of it, and upon the sleeping *devidjis*. I suppose they were surprised at the intrusion, but both men and beasts were very civil—the latter, indeed, never moved, and seemed as passive as if I had been falling over roots of trees."

Camels are formed by nature to endure great variations of temperature. The winds of the desert are sometimes exceedingly keen: and even in Asia Minor, the winter cold is occasionally very severe. We add one more quotation from Mr. Mac Farlane.

"The winter of 1827-8 was the coldest that had been known for many years in Asia Minor: yet, on the coldest days, when I, though a native of the north, have been shivering and suffering, I have often seen the camels, at nightfall, *bivouacking* near Smyrna, on the banks of the Meles (Homer's river—as insignificant as is, or *was*, Fleet-ditch in summer, but a broad, brawling stream in winter), there to pass the inclement night in the open air. Their own instinct teaches them to contract their circle and kneel close together, and their masters merely cover their loins with a material as primitive as their modes of life and encamping. It is a coarse thick sort of cloth, always dyed red, made of camel's wool, mixed with sheep's wool and goats' hair."

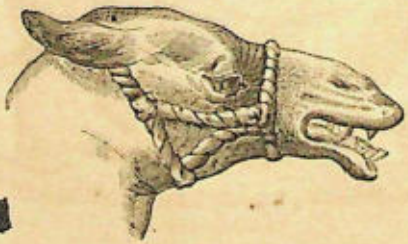
Amongst themselves they are sometimes very quarrelsome, and, after the hardest day's journey, no sooner is the baggage removed than they begin to fight, and are prone to give each other the most savage bites, and are not to be separated without danger. (Fig. 13.) One of the favourite amusements of the Turks of Asia Minor is camel-fighting: each being previously muzzled, they

13.—Camels fighting.

strike each other's heads, twist their neck, wrestle with their fore-legs, each endeavouring to throw the other to the ground. Crowds attend to witness the spectacle, and, as at the disgraceful dog-fights of our country, the Turks will clap their hands, encourage their respective favourites, and bet upon their success. The Pasha of Smyrna used frequently to regale the people with these games in an enclosed square before his palace. It is, however, only at particular seasons that the temper of the animal is thus excited, and that these combats take place.

The camel is often excessively loaded, and sometimes inhumanly, the load is laid on sores or wounds; yet even then the animal neither refuses to rise nor attempts to cast it off: when suffering and irritated, however, he cries out, but his complaint is only of injustice, and then it must be extreme for him to complain at all. Fig. 14 is a delineation of the head of an ill-used camel uttering

its cry of distress. When a camel, loaded or unloaded, fails, from hunger and excessive fatigue, and sinks down, it seldom gets on its legs again, and is left to perish. Wellsted tells us that he often passed them when thus abandoned, and remarked the mournful looks with which they gazed on the receding caravan. When the Arab is upbraided with inhumanity, because he does not at once put a period to the animal's sufferings, he answers that the law forbids the taking away of life save for food,



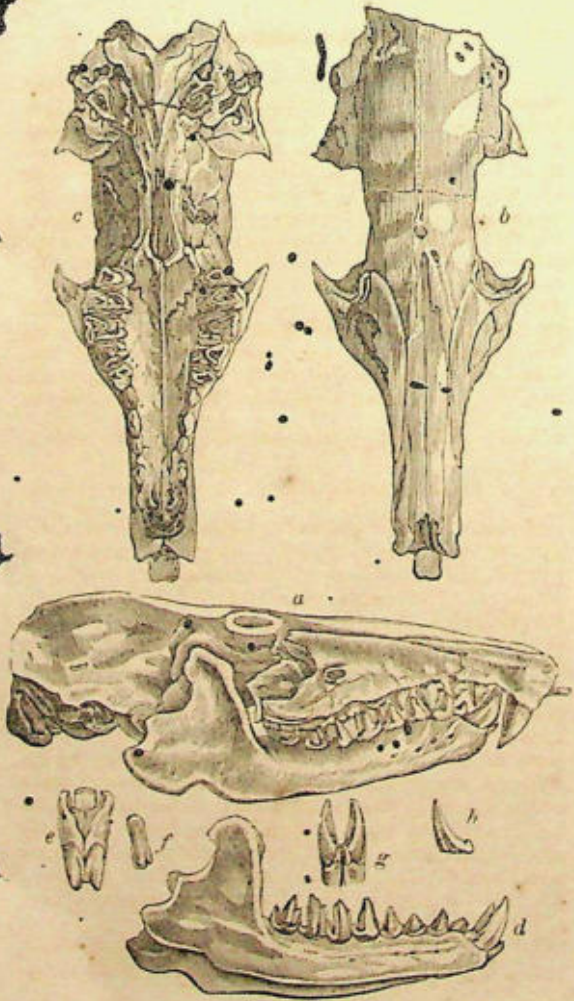
14.—Camel uttering its cry.

and even then pardon is to be asked for the necessity which compels the act. When death approaches the poor solitary beast, vultures collect around, and, eager for food, commence their repast even before life is extinct. The traveller continually sees remains of this faithful servant of man, exhibiting sometimes the perfect skeleton covered with a shrunk, shrivelled hide, sometimes the bones only, deprived of flesh, and bleached to dazzling whiteness by the scorching rays of a desert sun.

The Arabian or one-humped camel is usually called, by way of distinction, the Dromedary, but erroneously.

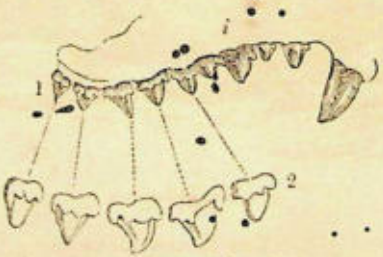
The dromedary is a light variety of this species, and is termed Maherry or el Heirie in the Arabian desert, and Sabayee in the north of Africa. It is used principally for journeys of despatch, carrying a single rider, or but a very light burden; and it will perform very long

13.—Mounted Camels.

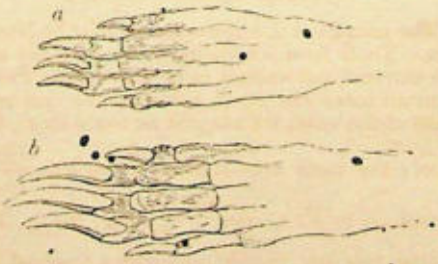


99.—Skull of Solenodon.

ported by a stylet of bone, denote it to be a burrowing animal. (Fig. 102.) An imperfect skin, in the museum of the Zoological Society, was sent by Mr. Hearne from Hayti, who thus writes respecting it:—"The only quadruped, I believe, found on the island on the landing of Columbus was the agouta, a little larger than, and somewhat resembling, a rat, with an equally long tail and a longer snout, whose food is chiefly grain, although the

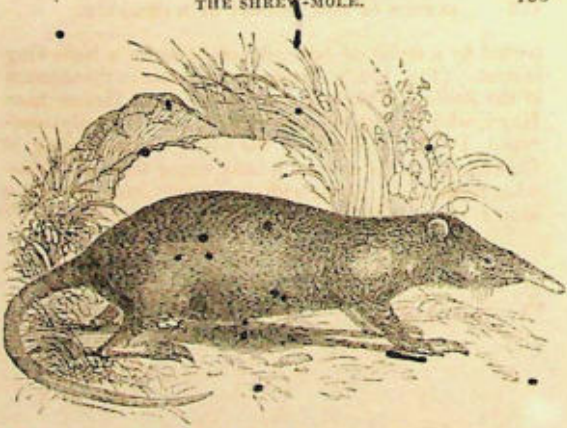


160.—Teeth of Solenodon.



161.—Foot of Solenodon.

animal is carnivorous also: its hair is red. I had one alive, intended for the Society, but it received a wound from a cat, of which it died." ('Zool. Proceeds.' 1835, p. 105.)



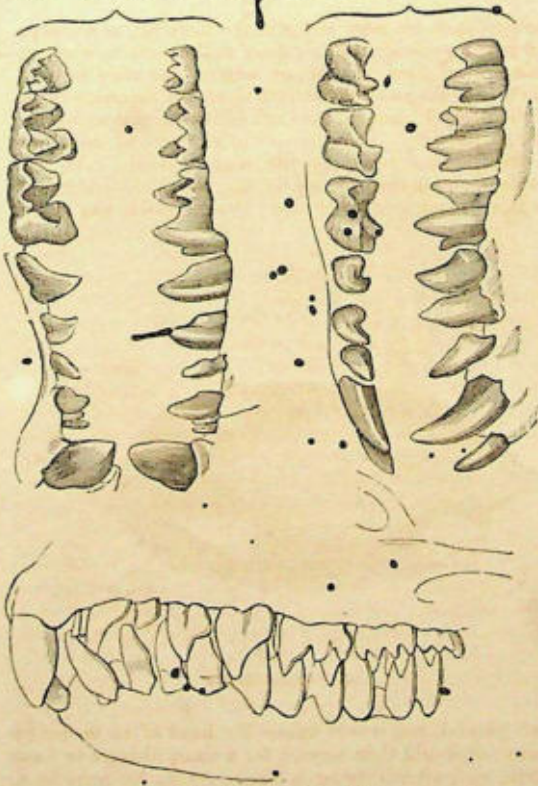
102.—Solenodon.

The Shrew-Mole

(*Scalops canadensis*, Desm.; *Sorex aquaticus*, Linn.; *Scalops aquaticus*, Fischer).

The animals of this genus are peculiar to North America. Their form is mole-like; the eyes are minute in the extreme, and scarcely to be discovered; there are no external ears; the fur is velvety; the fore paws, like those of the mole, are adapted for burrowing; the tail is short: the teeth are—incisors, $\frac{2}{2}$; molars, $\frac{10-10}{10-10}$, or, according to F. Cuvier, $\frac{9-9}{9-9}$ (Fig. 103). The snout is long, tapering, flexible, and with a terminal disc.

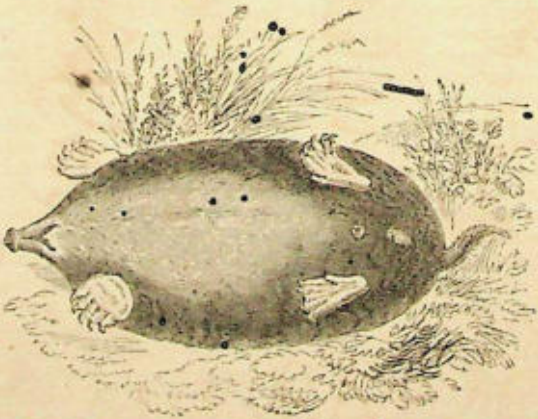
The Canada shrew-mole measures about seven inches and a half long, exclusive of the tail, which is one inch and a half. The general colour is brownish-black. It inhabits the banks of the Columbia and the adjoining coasts of the Pacific. (Fig. 104.)



103.—Teeth of Shrew-Mole.

According to Dr. Richardson, the shrew-mole resembles the common European mole as much in habits as in form, forming galleries, throwing up mounds, and feeding on worms and grubs. Dr. Godman states that

these animals are most active in the morning, at midday, and in the evening; coming daily to the surface, when in their natural state, at noon, at which time they may be taken by driving a spade beneath them and throwing them on the ground; but they are not easily taken at any other part of the day. They burrow in a variety of soils, but in wet seasons retire to the high grounds. An individual kept in confinement by Mr. T. Peale fed largely on fresh meat, cooked or raw; drank freely, was lively



104.—Shrew-Mole.

and playful, and would follow the hand of its feeder by scent; it would then burrow for a short distance in loose earth, and, after driving a circle, return for more food. It employed its flexible snout in a singular manner whilst it was eating, doubling it down, like a proboscis, upon its food, so as to direct and force it into the mouth. An allied species (*Scalops Townsendii*) is a native of California, and another (*Scalops Pennsylvanicus*, Harland) is found in Pennsylvania.

The Common Mole (*Talpa Europæa*).

Mouldwarp and Mouldiwarp; Want in Dorsetshire and Devonshire; Wand, Old Danish; Vond, Norwegian; Maulwerf, German; Mol, Dutch; Muldvarp, modern Danish; Mulvard and Surk, Swedish; La Taupe, French; Talpa, Latin and modern Italian; Topo, Spanish; Toupeiro, Portuguese; Gwadd and Twrch daear, ancient British.

We need not say that the mole is a miner, living an almost exclusively subterranean life, ever pursuing its prey through the soil, and working out long galleries in the chase. In accordance with its destined habits is the whole of its structural development. The body is cylindrical and compact; the snout prolonged and pointed; the limbs very short; the anterior pair present a thick, contracted arm, terminating in broad solid paws, with five fingers scarcely divided, and armed with strong flat nails. The tournure of these scrapers, for such they are, gives them an obliquely outward position, and facilitates their use as scooping instruments, by which the soil is not only dug up, but thrown backwards at each stroke, and that with great energy. The hinder limbs are small, and the feet feeble in comparison with the anterior scrapers; while the body tapers to them from the chest and shoulders, so that the hinder quarters offer no impediment to the animal's progress through its narrow galleries. The fur, moreover, is such as best befits a subterranean dweller—it is extremely close, fine, short, and smooth, and resembles the nap of black velvet. Some instances have been known of their being found of a white or rather cream colour. There is no external conch to the organs of hearing, the sense of which is acute in the extreme; a simple auditory opening, capable of being closed or dilated at pleasure, leads to the internal apparatus, which is effectually defended from the intrusion of particles of earth or sand. At a cursory glance the mole appears to be destitute of eyes; they are, however, not wanting, though very small, and buried in the fur. A limited power of vision is sufficient for

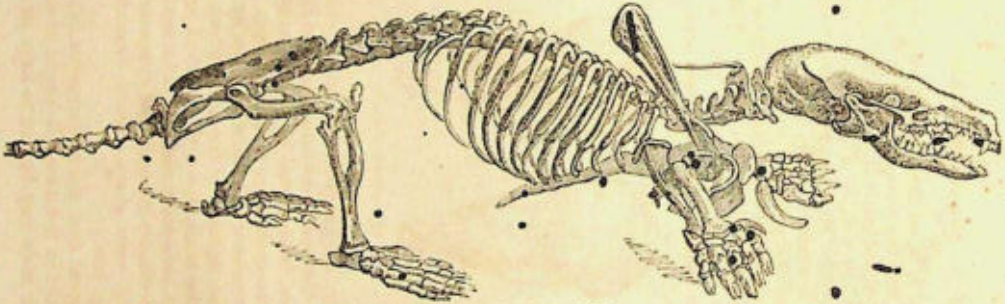
this dweller in the dark; the mole, however, can see better than might be imagined. By a peculiar muscular contrivance it is capable of bringing forward, or of drawing in, the eye—and this, when withdrawn, is enveloped in and defended by the close fur; so that, as in the case with the ear, no particles of earth can injure it. We have said that the sense of hearing is exquisite; and to it the mole trusts for warning on the approach of danger:—

"Pray you, tread softly, that the blind mole may not
Hear a foot fall."—SHAKSPERE.

But the sense of smell is equally delicate; and by this it is guided in its search for food. It bores its long sharp

105.—Mole.

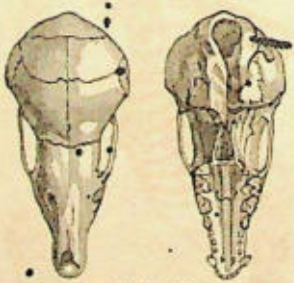
nose in the earth as it traverses its galleries, and immediately detects worms and the larvæ of insects, which constitute its chief food. Nor is the feeling of this part



106.—Skeleton of Mole.

at a low ratio; it is, on the contrary, very acute and susceptible, and aids the sense of smell in the procuring of food. The pointed snout is, indeed, a finger-like organ of prehension, as well as a boring instrument. The general skin of the body is strong and tough, and not easily torn or lacerated. (Fig. 105.)

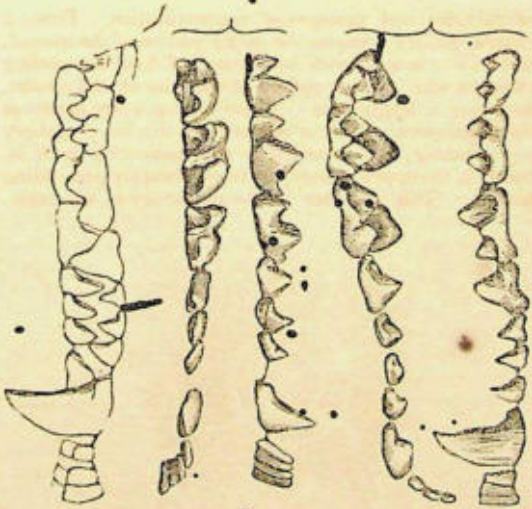
The osseous and muscular development of the mole exhibits a perfect correspondence with its external characters and the perfection of its senses. The great development of the skeleton (Fig. 106) is anteriorly, namely, in the bones of the shoulders, arms, and chest.



107.—Skull of Mole.

The skull (Fig. 107) is depressed above, elongated, and pointed; and the snout, continued beyond the maxillary and nasal bones, is supported by a little additional bone, produced by the ossification of the cartilage. Its boring faculties are rendered still more effective by the ossified condition of the ligament of the neck, which passes from the back of the skull, down the cervical vertebræ, and which in other animals is elastic. The teeth are small, exhibiting a decidedly insectivorous character, the molars being crowned with sharp-pointed tubercles or eminences. (Fig. 108.)

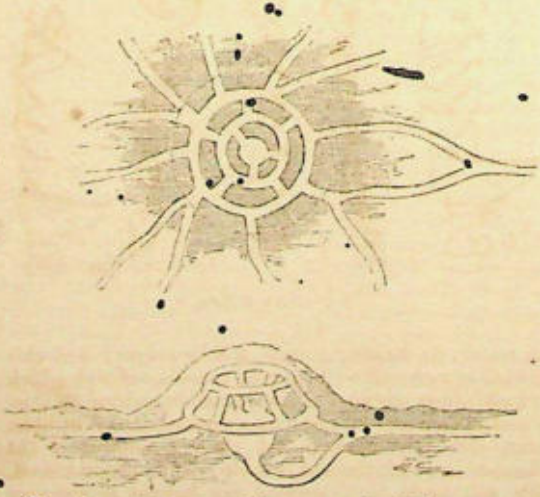
It would appear that the subterranean labours of the mole are exerted in the accomplishment of very different objects. Each mole may be said to have its own district



108.—Teeth of Mole.

or manor, its hunting-ground, and its lodges; and this ground is traversed by high-road tunnels, through which it travels from one part to another, all branching off from a central fortress—its ordinary residence, which is, however, not only distinct, but often remote from the chamber in which the nest is made and the young reared. We will begin by describing the fortress or ordinary domicile. (Fig. 109.) The fortress is constructed under a hillock of considerable size (not one of those ordinarily thrown up every night, indicating its hunting excursions), and raised in some secure place, where a high bank, the roots of a tree, or the base of a wall, afford protection. The earth forming this mound is well compacted together, and made solid by the labours of the architect; and within this firm-set mound is a complex arrangement

of galleries and passages of communication. First, a circular gallery occupies the upper portion of the mound, and this communicates by means of five descending passages with another gallery at the base of the mound, enclosing a larger area. These passages are nearly at equal distances. Within the area of this lower gallery is a chamber, not immediately communicating with it, but with the upper gallery by three abruptly descending tunnels. This chamber is the dormitory of the mole.



169.—Habitation and Hunting-ground of Mole.

From the basal gallery opens a high-road tunnel, which is carried out in a direct line to the extent of the manor over which the individual presides, and from the bottom of the central chamber a passage descends, and then sweeping upwards joins this main road at a little distance from the hillock; so that the mole can enter the high-

road either from its dormitory or from the basal gallery. Besides the high-road, eight or nine other tunnels are carried out from the basal gallery; they are of greater or less extent, and wind round more or less irregularly, opening into the high-road at various distances from the hillock: these irregular tunnels the mole is continually extending in quest of prey; throwing up the soil above the turf, through holes which it makes for the purpose, and which form the ordinary mole-hills which we often see crowded thickly together. The high or main road exceeds in diameter the body of the mole, and is solid and well-trodden, with smooth sides; its depth varies, according to the quality of the soil, instinct directing the little excavator in his work. Ordinarily it is five or six inches below the surface, but when carried under a streamlet or pathway it is often a foot and a half beneath. It sometimes happens that the mole will drive two or more additional high-roads in order to the extension of its operations; and one high-road occasionally serves several moles, which, however, never trespass on each other's preserves. They often meet in these roads, which will not admit of two passing at the same time; one therefore must retreat, but when two males thus come into collision they frequently attack each other, the weaker falling a victim in the combat. The alleys opening from the sides of the high-road are generally inclined downwards with a gradual slope, and then at the termination of these the mole excavates branch alleys, upheaving mole-hills, as it works onwards in pursuit of prey. This, however, is not invariably the case, but rather where prey is abundant in rich soils: where the soil is barren, the mole is constantly driving fresh alleys; these in winter are carried deep down to where the worms have pierced their way beyond the line to which the frost penetrates; for, be it observed, the mole does not hybernate, but is as active during winter as in spring or summer, though the results of his operations are less manifest. In soft rich soils, where the worms are among the roots of the turf, the mole, as may be often noticed, drives very superficial runs in the pursuit of them; these

runs are to be seen where a thin layer of richly manured soil overlays a stratum of gravel; in fact, the depth of these alleys is always determined by the quality of the soil and consequent situation of the worms. With respect to the nest of the female, it is generally constructed at a distance from the fortress, where, at some convenient part, three or four passages intersect each other; this point of convergence is enlarged and rendered commodious, and fitted to receive a bed made of dry herbage, fibrous roots, &c. The chamber is generally beneath a large hillock, but not always; and the surrounding soil is usually such as to afford abundant food to the female with little trouble on her part. The mole breeds in the spring, mostly in April, and brings forth four or five young at a birth. These are supposed to remain under the mother's care till about half-grown, when they commence an independent existence.

Such is the constitution of the mole, that a short fast proves fatal. It would appear that all its animal appetites are in excess; its hunger is voracity amounting to rage, under the influence of which it fastens on its prey with intense eagerness. Earthworms are its favourite food, and these it skins with great address, squeezing out the earthy contents of the body before swallowing it. It is not, however, exclusively upon earthworms and the larvæ of insects that the mole feeds; during the months of June and July it is in the habit of leaving its runs under the turf, and of wandering during the night (and occasionally even during the day) on the surface, in quest of prey, such as birds, mice, frogs, lizards, snails, &c.; but it refuses to touch the toad, in consequence no doubt of the acrid exudation from that reptile's skin. During these nocturnal excursions it often falls a prey to the owl; and we have seen it in the day-time caught and killed by dogs.

The voracity of the mole and its perpetually recurring repasts upon animal food render water not only a welcome refreshment, but necessary to its existence. A run, sometimes used by many individuals, always leads to a ditch, stream, or pond, if such be within a moderate

distance. If these natural supplies be not at hand, the mole sinks little wells, in the shape of perpendicular shafts, which become filled with the rain, and retain the water; and they have sometimes been found brimfull. Scarcity of water, or a drought, as well as a scarcity of worms, often obliges the mole to shift its quarters, and locate upon other grounds. In its migration it will cross brooks or rivers, swimming admirably; and when spring or autumn floods inundate the fields, it easily saves itself by these means. It is moreover affirmed that in this peril the male and female brave the waters together, and expose themselves to the utmost danger in order to save their young, in which office of parental devotion they mutually assist and protect each other.

The disposition of this animal is fierce and combative. If several moles be kept in a box of earth, and not supplied with an abundance of food, they attack each other, and the weaker falls a prey to the stronger: when the mole seizes, it holds like a bull-dog, with a tenacious gripe, and is not easily disengaged. M. Geoffroy St. Hilaire describes the manner in which the mole approaches and seizes a bird: it exerts several stratagems to get within reach of its victim, employing the utmost address and caution; but when this is accomplished, it suddenly changes its plan, and makes an instantaneous and impetuous attack, fastens on the hapless bird, tears open the abdomen, thrusts its snout among the viscera, and revels in its sanguinary repast. After satiating its ravenous appetite, it sinks into a profound repose: in the winter it slumbers in its fortress; but in the summer, beneath some ordinary mole-hill in one of its alleys. This sleep endures for about four hours, or perhaps longer in the middle of the day, when it awakes with a renovated appetite. Its busiest time is in the evening, during the night, and early in the morning. It might be supposed from the figure of the mole that its motions were very slow and deliberate; it trips along, however, at a fair pace, and traverses its underground runs and galleries with great rapidity.

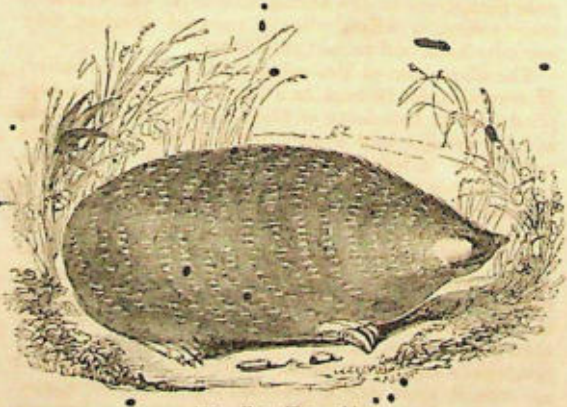
The mole does not exist in the extreme north of Scot-

land, in Zetland, or the Orkney Islands, nor has it been seen in any part of Ireland.

Varieties of this animal often occur: we have examined specimens of a mouse-colour, of a white, cream-white, and pale yellowish orange.

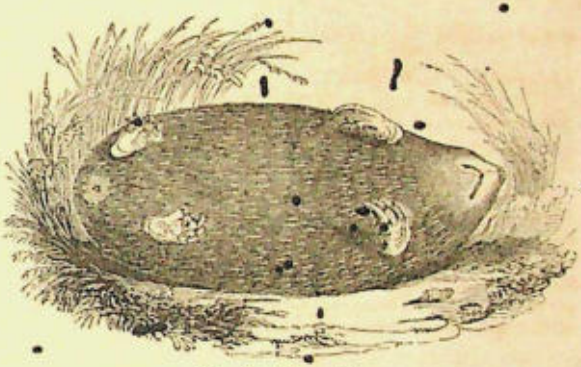
The Cape Chrysochlore (*Chrysochloris Capensis*).

The Mole is represented in Africa by the Chrysochlore, but the fore paws are only armed with three nails, of which the outermost is long, thick, arched, and pointed; there is no tail. (Figs. 110 and 111.) This



110.—Cape Chrysochlore.

singular animal is less than a mole, and appears to be entirely destitute of eyes. Its velvety fur has a metallic lustre, changing from dark green to bronze or copper in different lights. This species is a native of southern Africa, where it lives like the mole in burrows, and feeds on worms and insects. It is the *Taupe dorée* of the French. A second species, the Rufous Chrysochlore (*Ch. Hottentota*), has been discovered by Dr. A. Smith.



111.—Cape Chrysochlore.

The Thick-tailed Condylure, or Star-nosed Mole

(*Condylura Macroura*).

The condylures, or star-nosed moles, are confined to North America; they closely resemble the common mole in their feet, general aspect, and habits, but the tail is longer, and the disc at the end of the snout is encircled by little moveable cartilaginous processes like the rays of a star. The eyes are extremely minute; external ears are wanting; fur deep, thick, and fine. The teeth con-

112.—Teeth of Star-nosed Mole.

sist of incisors, $\frac{2}{4}$; canines, $\frac{1-1}{1-1}$; molars $\frac{8-8}{7-7}$. (Fig. 112, teeth of *C. cristata.*)

We have no minute details respecting the manners and instincts of the Chrysochlores, of which three species are distinguished; they are burrowing animals, feeding upon worms and the larvæ of insects, &c. The thick-tailed Condylure was discovered by Mr. David Douglas on the banks of the Columbia River. The colour of the fur above is deep lustrous brown, paler on the under parts. The tail is contracted at its root, whence it gradually enlarges, and then tapers to a fine point. Length of head and body, four inches and a half; of the tail, two inches and a half. (Fig. 113.)

113.—Star-nosed Mole.

The Hedgehog (*Erinaceus Europæus*).

Riccio of the Italians; Erizo of the Spanish; Ourizo of the Portuguese; Hérisson of the French; Igel of the Germans; Eegelvarken of the Dutch; Pin-suin of the Danes; Draenog and Draen y coed of the ancient British; Urchin, Provincial English; Ἐχῖνος of the Greeks. It is superfluous to enter into an elaborate description of this spine-covered animal; all are well acquainted with its external characters, and all know that it has the power of rolling itself up into a ball, presenting an array of serried spines formidable to its antagonist. A peculiar muscular expansion beneath the skin enables the hedgehog thus completely to enshroud itself in its panoply, as in a hood, the margin of which is closed by means of a circular muscle, the head and limbs being retracted within. While the animal is thus enveloped in its armed skin, the spines are stiffly set by the action of the muscular expansion, and radiate from the ball; and such is the strength and elasticity of this covering, that a hedgehog may roll down a steep place or precipitous bank without the slightest injury. Mr. Bell assures us that he has repeatedly seen a domesticated hedgehog in his possession run towards the precipitous wall of an area, and, without hesitation or a moment's pause for preparation, throw itself off, contracting at the same instant into a ball, in which condition it reached the ground from a height of twelve or fourteen feet, when after a few moments it would unfold itself and run off unhurt. The hedgehog is nocturnal in its habits: it frequents woods, copses, old gardens, orchards, and thick hedge-rows, where it remains rolled up in its retreat during the day, coming forth on the approach of twilight, and continuing on the alert till morning. Its motions are quick and irregular, and its pace a sort of heavy paddling, the body being close to the ground, and the feet plantigrade. Its food consists of insects, slugs, frogs, toads, mice, and even snakes; to which it adds eggs, young nestlings, and various kinds of vegetables, as the roots of grass and plantain, and ripe orchard-fruits

which fall from the trees. White notices the manner in which it bores with its snout, to get at the root of the plantain, which it eats, leaving the tuft of leaves untouched. In the first volume of the 'Zoological Journal' is the narrative, from the pen of Mr. Broderip, of an experiment made by Professor Buckland, relative to the destruction of snakes by the hedgehog, from which it would appear that the cunning quadruped makes a sudden attack on the reptile, and, giving it a hard bite, instantly rolls itself up for safety, then cautiously unfolds, and inflicts another wound, repeating its attacks till the snake is "scotched," its back-bone being broken in several places; it next passes the body of the snake gradually through its jaws, cracking the bones at short intervals, which done, it proceeds to eat its victim as one would eat a radish, beginning with the tip of the tail, and slowly proceeding upwards. We have frequently seen hedgehogs eat frogs, rapidly crunching their bones with an audible noise. The hedgehog may be easily domesticated, and becomes familiar, feeding on soaked bread, vegetables, and meat; it is useful in kitchens, which it effectually clears of crickets, cockroaches, beetles, &c., and, as it keeps quiet in its nest or retreat all day, produces itself no inconvenience. Superstitious ignorance, as in the case of the poor little shrew, has led to the cruel persecution of the hedgehog, because, forsooth, it was (and in some places still is) believed to drain dry the udders of the cows during the night, to the surprise of the milkmaid and the indignation of the farmer. To the Slow-worm and the Fern-owl (*Caprimulgus*) the same mischievous habits have also been attributed, the physical impossibility of their committing such a theft being overlooked or not appreciated. With respect to the hedgehog, this accusation, as Mr. Bell observes, is about as well founded as that by Pliny, and exaggerated by Sperling, who asserts that it ascends trees, knocks off the apples and pears (Ælian says figs), and, throwing itself down upon them so that they may stick to its spines, trots off with the prize.

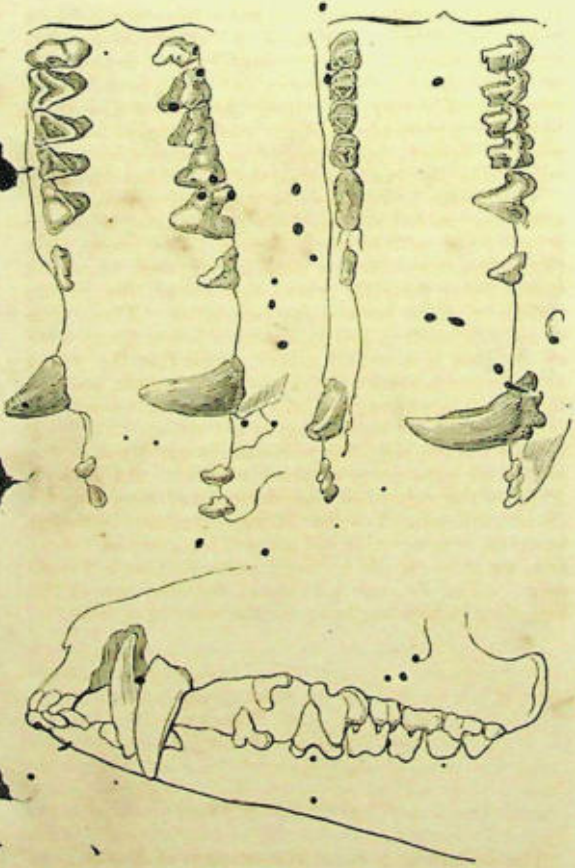
The hedgehog hybernates, passing the winter in a

state of complete torpidity. It makes its retreat in banks under the hollow roots of trees, in holes or other sheltered and convenient places, constructing a sort of nest or bed of grasses, dried leaves, and moss; with these it covers itself deeply and closely, and when discovered hybernating resembles a ball or roundish mass of herbage, which it seems to have attached to its spines by repeatedly rolling itself round amidst the heap it had stored up.

The female breeds early in the summer, forming an artful nest, roofed so as to throw off the rain; within, it is well lined with leaves and moss. The young, from two to four in number, are blind at their birth, about two inches long, perfectly white, and naked, though the rudiments of the prickles are perceptible. These soon develop themselves, and harden even before the eyes are opened, but it is not till a later period that the young are able to draw down the skin over the muzzle, and fold themselves into a complete ball. The mother is devoted to her offspring, and unremitting in her duties. Formerly the flesh of the hedgehog was eaten in our island, and is so still on some parts of the Continent. An intimate friend of the writer had one dressed and served up for dinner, and assured us that it was excellent; we must however, remember the old adage "De gustibus," &c.: few, we think, would willingly partake of such "small deer." The Romans made use of the spiny skin of the hedgehog in hackling hemp for the weaving of cloth.

114.—Skull of Hedgehog.

The hedgehog is found in most parts of Europe; its length, when full grown, is about nine inches and a half. Fig. 114 represents the skull. The dentition is as fol-



115.—Teeth of Tenrec.

lows:—Incisors, $\frac{6}{6}$, the two middle the longest; false molars, $\frac{3-3}{3-3}$; molars with acute tubercles, $\frac{3-3}{3-3}$; small tuberculous molars, $\frac{1-1}{1-1}$.

Closely allied to the genus *Erinaceus* is the genus *Centetes*, Ill. (*Centenes*, Desm.; *Setiger*, Geoff), which comprehends certain hedgehog-like animals, confined, as far as we know, to the Mauritius and Madagascar. They are covered with spines, but these spines are feebler than those of the hedgehog, nor do the animals enjoy so completely the power of rolling themselves up into a ball. They differ moreover in their dentition, the incisors being $\frac{6}{6}$ or $\frac{4}{4}$; canines, $\frac{1-1}{1-1}$; molars, $\frac{6-6}{6-6}$ (Fig. 115). The muzzle is long and pointed; the tail wanting. These animals hybernate during the dry season, when their natural food, insects and worms, fails, and revive on the return of the rainy season. In their habits they are nocturnal.

The Tenrec, or Tanrec

(*Centetes ecaudatus*, Cuv.; *Erinaceus ecaudatus*, Linn.).

This species exceeds our hedgehog in size, and is covered above with long flexible spines, except on the top of the head; the under parts are clad with yellowish bristly hairs, a few black ones being intermixed.

The Tenrec is a native of Madagascar, but has been naturalized in the Mauritius. Of its habits we have but imperfect details. In June 14, 1831, a letter respecting these animals, addressed to the Zoological Society, and dated Port Louis, December 15, 1830, was read at the scientific meeting. It referred to previous unsuccessful attempts on the part of the Society's valuable correspondent to transport from the Mauritius to England living Gouramies and Tenrecs, and promised a repetition

of the experiment. Mr. Telfair states that he has now a pair of living tenrecs, fully grown, ready to send to England when he can place them under proper care. "They live on boiled rice, but will probably not exist long upon that alone, as their natural food is chiefly composed of worms, insects, lizards, and the eggs of snails, of which it would be difficult to carry a sufficient supply in a living state on board ship. Fresh supplies might, however, be obtained at Madagascar or the Cape of Good Hope, at St. Helena, Ascension, and the Cape de Verd Islands; and the animals might thus arrive in good health in England, where they would probably survive for some time, burrowing under a dungheap, or living in straw in a hothouse or greenhouse. An opportunity would thus be furnished of observing their habits. In the Mauritius they sleep through the greater part of the winter, from April to November, and are only to be found when summer heat is felt, which being generally ushered in by an electric state of the atmosphere, the negroes (with whom they are a favourite food) say they are awakened by the peals of thunder which precede

116.—Tenrec.

the summer storms or "pluies d'orage." (Fig. 116.) Even in summer they are not often seen beyond the holes in which they burrow, except at night. Their favourite haunts are among the old roots of clumps of bamboos. They have a very overpowering smell of musk at all times, which is increased to an extraordinary degree when they are disturbed or frightened; yet their flesh is considered so savoury by the negroes, that they are unwilling to sell those which they catch, and would not exchange it for any other food, except perhaps for the "ourite," which is the catfish hung up in the sun until it acquires a most fetid smell, tainting the atmosphere to a great distance; in this state it is a chief ingredient in their favourite ragout.

117.—Striped Tenrec.

THE STRIPED TENREC (*Centetes semispinosus*).

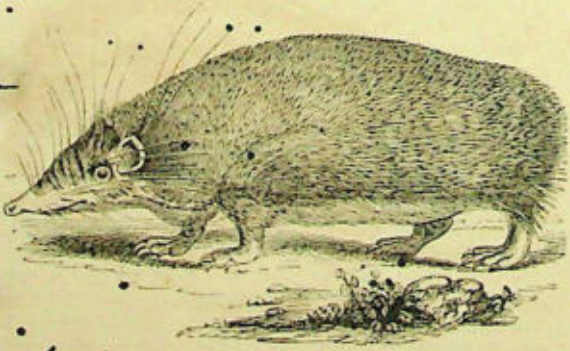
This species is of small size: the head is very conical; the muzzle elongated and pointed; the body is clothed with a mixture of spines and bristles, and is banded longitudinally yellow and black. Native country, Madagascar. (Fig. 117.)

The Spiny Tenrec, or Tendrac

(*Centetes spinosus*; *Ericulus nigrescens?* of Isidore Geoffroy).

Incisors, $\frac{4}{4}$; molars, $\frac{7-7}{7-7}$.

The tendrac of Buffon is more like a hedgehog in appearance than are the two previous species. It is covered above with close, short, stiff spines, and with bristle-like hairs on the under parts. The spines are of a deep mahogany colour, whitish at the root and point. Under parts, yellowish white. Native country, Madagascar, where it is said to make a burrow in the neighbourhood of fresh or salt water; its habits resemble those of the rest of its race, and it is acceptable to the negroes as food. (Fig. 118.)



118.—Spiny Tenrec.

An insectivorous animal allied to the tendrac, and called Sokinah at Madagascar, will be found described and figured under the name of *Echinops Telfairi*, Martin, in the 'Trans. Zool. Soc.,' vol. ii. p. 249, and characterized in the 'Zool. Proceeds.,' 1838, p. 17. Of its habits and manners no accounts have been obtained;

but from the rigidness of the spines, and the development of the muscular subcutaneous expansion (*Panniculus carnosus*), it appears probable that this animal has, like the hedgehog, the power of rolling itself up into a ball, which is not the case with the tenrec.

119.—Gymnure.

The Gymnure (*Gymnura Rafflesii*).

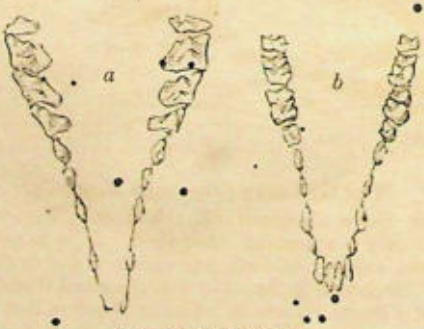
Of the genus *Gymnura* (Horsfield and Vigors) one species only is at present recognised. It is a native of Sumatra, and its introduction to science is due to the late Sir. T. Stamford Raffles, who first described it under the title of *Viverra Gymnura*. Cuvier observes that it appears to approach *Clodobates* (*Tupaia*) in its teeth, and the shrews in its muzzle and scaly tail. The toes are five in number on each foot; the eyes are small; the whiskers long; the fur consists of a short dense woolly undercoat, and long coarse thinly-set hairs. The body, legs, first half of the tail, and a stripe above the eyes, are black; the head, neck, and end of the tail are white; the muzzle is elongated. The dentition as follows:—Incisors, $\frac{6}{6}$; canines, $\frac{1-1}{1-1}$, molars, $\frac{6-6}{6-6}$. Of its hibits

nothing definite is known. It exhales a strong musky smell. Specimens are preserved in the Museum of the Zoological Society. (Fig. 119.)

The Banxring (*Tupaia Javanica*).

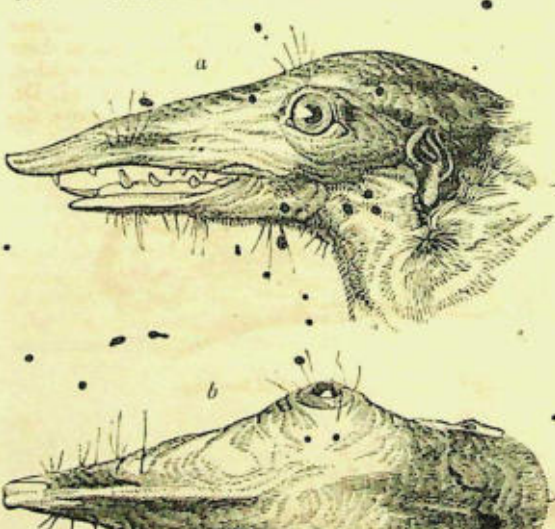
The genus *Tupaia*, Raffles (*Cladobates*, F. Cuvier; *Sorexglis*, Diard; *Glissorex*, Desmarest; *Hyogale*, Temminck), contains about three species, natives of Sumatra and Java, where they inhabit the forests. In their dentition there is some resemblance to that of the hedgehog.

The formula stands as follows:—Incisors, $\frac{2}{6}$; canines, $\frac{1-1}{1-1}$; molars, $\frac{7-7}{6-6}$. Fig. 120 represents the teeth: *a*,



120.—Teeth of Banxring.

those of the upper jaw; *b*, those of the lower. The head is oblong and depressed; the snout long and attenuated; the nostrils lateral; the eyes very large and rather prominent; the body long, slender, and covered with close fur and soft hairs; the tail is longer than the body, and compressed; the feet plantigrade and pentadactyle; the toes compressed and furnished with hooked claws; the thumb is distinct, and moveable in a direction

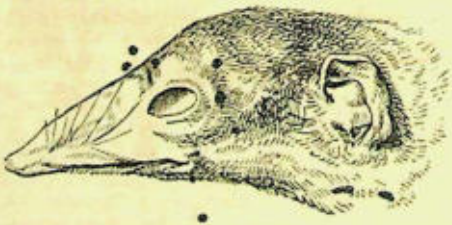


121.—Head of Tupaia Tana.

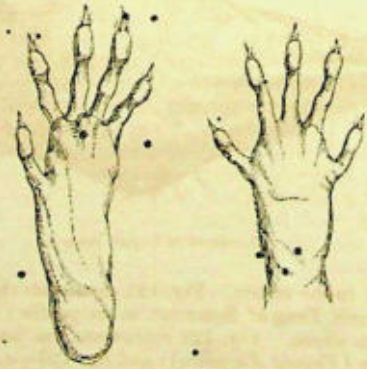
opposite to the others. Fig. 121 represents the head of the *Tupaia Tana* of Sumatra: *a*, in profile; and *b*, as seen from above. Fig. 122 represents the head of the banxring (*Tupaia Javanica*): and fig. 123—*a*, the fore-foot; *b*, the hind foot; in both the thumb is seen distinct, especially in the hind foot.

Dr. Horsfield ('Zoological Researches in Java') states that in the Malayan language the name of Tupai is a general term for various small animals which have the external form and agility of the squirrel; while each dif-

ferent species, agreeably to the observations of the natives of the islands of the Eastern Archipelago, where these animals are found, is distinguished by a particular epithet. Thus two small animals which, according to Dr. Horsfield's classification, belong to the genus above de-



122.—Head of Banxring.



123.—Feet of Banxring.

scribed, are, he says, denominated *Tupai Press* and *Tupaï Tana*; while several other animals belonging to the genus *Sciurus* are denominated Tupai Jinjang, Tupai Tankrawa, &c. The same author states that three

species of *Tupaia* had been discovered when he wrote, two of which are natives of Sumatra, Penang, and Singapura, while the third has been found exclusively in Java, where it is distinguished by the name of Bangsring or Sinsring.

The tupaias, instead of being strictly terrestrial, lead, to a certain extent, the life of squirrels, having all their sprightliness and activity, and much of the general appearance of those animals. They are, in fact, semi-arboreal insectivora, and, were it not for their long head and pointed snout, could scarcely be distinguished, at a distance, from some of the Sciuri. Their fine soft fur is of a dark red, and on the tail the hair, which is long and bushy, is distichous, or arranged laterally, especially if viewed on the under surface. Sir T. Stamford Raffles states that they are decidedly diurnal, their large bright eyes being suited to daylight, and that they live principally on fruits, and especially that of the Kayo gadis. The banxring or bangsring of Java is lively and active. Dr. Horsfield, who met with it during his researches in Java, states that, in traversing the province of Blambangan, in 1806, he discovered it in the extensive forests which almost entirely cover the eastern extremity of the island; and he thinks that its range, though it may not be confined exclusively to that province, is extremely limited. From the scanty information afforded by the natives, it would seem that the bangsring lives on trees, and feeds "on fruits and nuts;" but Dr. Horsfield observes that this account must be received with due limitation, and he refers to the system of dentition as indicating that the bangsring is more adapted to animal than vegetable food. Length from extremity of nose to the root of the tail, six inches five lines; of tail, six inches five lines. (Fig. 124.)

The fur of the bangsring is close, silky, and delicate, with a few longer, more rigid, and darker-coloured hairs dispersed throughout it. The upper parts are brown, slightly diversified with gray of different shades; the lower parts dirty white, with a slight tint of grayish: the tail agrees with the upper parts; and the scapular

line, which is nearly an inch long, agrees with the neck.

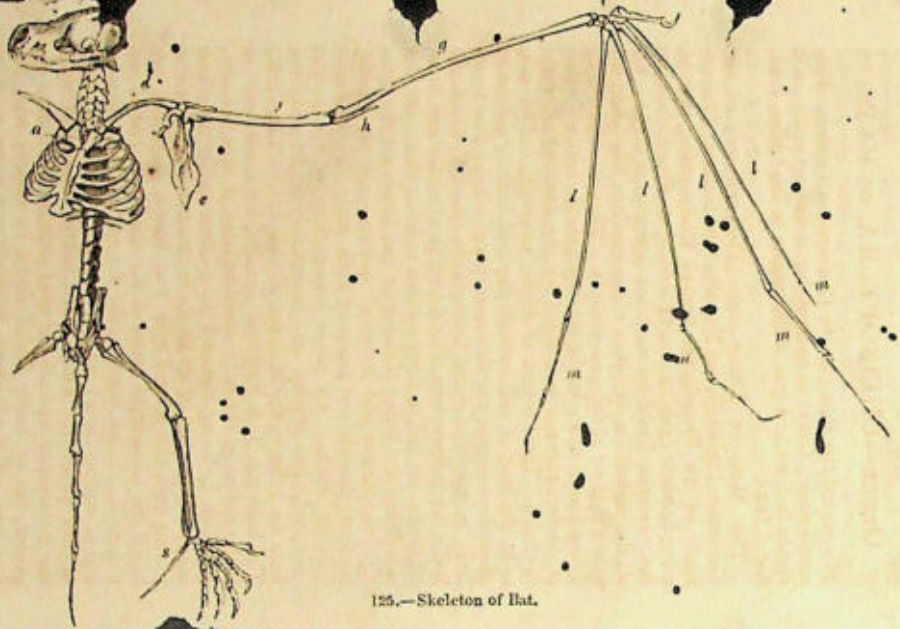
The ferruginous Tupaia is a native of Sumatra, and does not appear to differ essentially in its habits from the Java species. Sir Stamford Raffles states that a tame *Tupaia ferruginea* was suffered to go about at perfect liberty, ranged in freedom over the whole house, and never failed to present himself on the breakfast and dinner table, where she partook of fruit and milk. Dr. Horsfield also quotes an extract from the 'Proceedings of the Asiatic Society,' where it is stated that a living *Tupaia ferruginea* was brought to Bengal by a medical gentleman; it ran about the house tame, but would not allow itself to be caught for close inspection. Though at liberty to run out of doors whenever it liked, it showed no disposition to leave its quarters, and evinced some attachment to the family; for whenever strangers entered the house it showed disquietude and made a chattering noise. It gave no trouble in feeding, for it was always on the search after insects, and its favourite food seemed to be flies, crickets, grasshoppers, and cockroaches. Specimens of the three species are preserved in the Museum of the Zoological Society.

124.—Banxring.

Order—CHEIRÓPTERA, or BATS.

We regard the Bats (family *Cheiroptera*, Cuvier; *Vespertilionidæ*, Gray) as constituting a distinct order, as it stands in the Catalogue of Mammalia in the 'Mus. Zool. Soc.,' 1838.

The Bats, or Flitter-mice (Fledermäuser) of the Germans; Pipistrelli and Nottoli of the Italians; Chauve-souris of the French, are termed Cheiroptera, that is, wing-handed (χείρ, a hand; πτερον, a wing), because their anterior limbs are modified as organs of flight. Of all the mammalia, the bats alone emulate the feathered tribes in their aërial endowments. They are essentially flying insectivora: in the air they pass the active portion of their existence and revel in the exercise of their faculties. Their organs of flight, however, consist not, as in the bird, of stiff feathers disposed in order and based upon the bones of the fore arm, but of a large thin membrane stretched over and between the limbs, to which the bones act as stretchers, like the strips of whalebone in an umbrella, the tail in many species assisting also. Of this membrane the bones of the arms and hands are the principal supporters and levers of motion,—we say hands, because, though not graspers, such must the anatomist consider them. All these bones, those of the carpus excepted, are slender and remarkably elongated, and here we refer to the skeleton of the bat. (Fig. 125.) The humerus, *f*, is long and slender, but much more so is the radius, *g*, the only complete bone of the fore arm, the ulna, *h*, being reduced to a mere rudiment. The carpus, *i*, consists of six bones in two rows, the first row having two, the second row four bones, on which are based the metacarpal bones of the thumb, *k*, and of the fingers, *l*. These bones of the fingers are very slender and of extraordinary length, diverging from each other as they proceed. They are, however, moveable upon the metacarpus, and are not only capable of closing together, but of being folded down in contact with the fore arm. The phalanges, or true finger-bones, *m*, carry



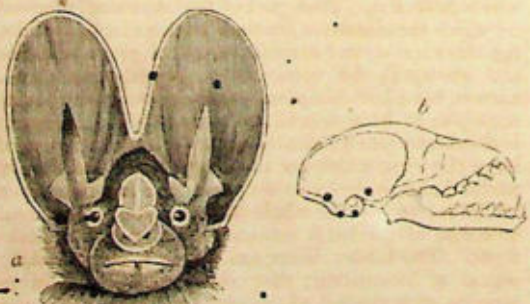
125.—Skeleton of Bat.

on the elongation of this framework, and taper to a point, like the extremity of an angling-rod, unfurnished with nails or claws. These fingers are essential not only for carrying out the wing to a due distance, but for keeping its margins stretched out, and for folding it down when requisite. In some genera the first finger consists but of one very fine bone, the second finger consists of three: occasionally the first finger is tipped with a very small hook-like nail. The thumb, *k*, is free and usually short, consisting of a metacarpal and two digital bones, the last of which is armed with a strong hooked claw. Such then is the hand of the bat, essentially an apparatus for flight. Thus designed and constructed, rotation of the fore arm would not only be an unnecessary, but indeed an inconsistent endowment; its motion, therefore, is simply hinge-like, while that of the shoulder is to a great extent rotatory.

It will easily be conceived that a membrane so extensive as the wing of the bat will require for its effective movements an extraordinary development of the muscles which govern it. That part of the skeleton, therefore, on which these muscles are fixed is accordingly modified; the clavicles, *d*, and scapulæ, *e*, are of great magnitude and strength; the sternum, or breast-bone, though narrow, has a keel-like elevation along its anterior surface, analogous to what is seen in birds, while its upper end is developed into a manubrium, *a*, for the support of the large clavicles, which are thus thrown far laterally, the pectoral muscles being at the same time exceedingly voluminous; indeed the whole of the osseous and muscular structure of the bat is concentrated upon its organs of flight. The hinder limbs can scarcely be regarded as organs of locomotion; they principally serve, in conjunction with the tail where present, to keep the membrane duly expanded—they are therefore comparatively feeble: the toes are five in number, and armed with sharp hooked claws, by which the animal suspends itself while at rest in its retreat. When with folded wings the bat attempts to proceed along a level surface, its movements, though tolerably quick, are awkward and

shuffling; and it uses the claw of its thumb as a hook for catching hold of any irregularities in order to drag itself along: hence, on a smooth polished surface it is greatly embarrassed, but in the hollows of trees, in the crevices of masonry, and in rough chinks or fissures, it can climb and crawl about with considerable facility, as also about the wire-work of a cage, as we have often witnessed. The ground, however, is not the destined province of the bat—the air is its home; it is here that these singular creatures are all alertness, pursuing their insect prey, and uttering their short sharp cry as they wheel in circling flights, or perform their abrupt and zigzag evolutions.

In the bat the senses of smell and hearing, as might be concluded from the development and complication of their respective organs, are wonderfully acute. In several extensive genera, with a view to the refinement of these senses, we see the nose furnished with a membranous foliation or leaf of most delicate structure, and often complex in its arrangement; while the external membranous ears are large, expanded, and often united



126.—Trifoliated Megaderma.

together, having folds or an inner reduplication, and capable of being folded down. (See fig. 126, the head of *Megaderma trifolium*.) In short, both the osteological characters of the skull and the development of the external appendages, traversed by multitudes of nerves,

announce the acuteness both of smell and hearing. But these creatures have another sense, that of feeling, so exquisitely refined as to require especial notice. The wings of these creatures consist, as we have stated, of a delicate and nearly naked membrane of great amplitude; and these, as well as the membranous tissues of the ears and nose, are abundantly supplied with nerves, and have their sensibility so high as to afford something like a new sense which stands in the stead of sight. The modified impressions which the air in quiescence, or in motion, however slight, communicates—the tremulous jar of the faintest current—its temperature—the indescribable condition of such strata as are in contact with different bodies, are all apparently appreciated by the bat. If its eyes be covered up—nay, if it be even cruelly deprived of sight—it will pursue its course about a room with a thousand obstacles in its way, avoiding them all; neither dashing against the walls nor flying foul of the smallest thing, but threading its course with the utmost precision and quickness, and passing adroitly through apertures, or the interspaces of threads placed purposely across the apartment. This endowment, which almost exceeds belief, has been abundantly demonstrated by the experiments of Spallanzani and others; it is the sense of touch refined to an inconceivable degree of perfection, rendering the bat aërial in feeling as in habits.

Bats are all crepuscular or nocturnal; during the day they sleep in their recesses, hanging head downwards, suspended by the hind feet. Numbers often congregate together on one common dormitory, and in Java and other adjacent islands one of the most extraordinary sights is that of a tree literally loaded with a crowd of huge roussettes, or flying foxes (*Pteropus*), all clustered together in pendant rows along the branches. In our latitudes the bats all hybernate, hanging in the same manner as during their ordinary sleep; but whether this law of hybernation prevails among those species which are natives of the hotter regions does not appear to be satisfactorily determined; probably it does, for the tenrec (an animal allied to our hedgehog) hybernates in Madagascar, its native country.

The bats are extremely numerous, and are distributed over every portion of the globe, excepting in the coldest latitudes; it is, however, in the warmer regions that they are the most abundant, and attain to the largest dimensions.

We have said that the bats are insectivorous; some, however, are bloodsuckers; and some, as the roussettes (*Pteropus*), eat fruit, plundering the gardens of their choicest productions. It would seem that some of the Brazilian bats also are frugivorous, devouring the fruit of the fig-tree, and that it is almost impossible to prevent the mischief, as they will creep, like mice, under the netting spread to protect the trees.

In the bats the mammæ are two, and pectoral; the dentition varies: the symphysis of the lower jaw is firmly ossified, as in man and the ape tribe; a slender stylet (*s*, Fig. 125) runs from the heel to support the interfemoral membrane. The bats are divided by Mr. Gray into five great sections or tribes, as follows, under two primary heads:—

I. *Istiophori*, or Leaf-nosed Bats.—Nostrils placed in a bald space, often elevated behind into a leaf; teeth acutely tubercular; index-finger not clawed.

Tribe 1. *Phyllostomina*. Nose-disc expanded into a leaf behind, simple, and pierced with the nostrils in front.

Tribe 2. *Rhinolophina*. Nose-disc expanded into a leaf behind, and with a pit or process between the nostrils in front.

II. *Anistiophori*. Simple-nosed Bats. Nostrils without a nasal leaf.

Tribe 3. *Vespertilionina*. Grinders acutely tubercular; wings broad and large; tail elongated and enclosed in the large conical interfemoral membrane; upper incisor teeth near the canines, with a central space.

Each nostril placed in front of a groove, with a spiral, convolute, outer margin lobed anteriorly.

Tribe 4. *Noctilionina*. Grinders acutely tubercular; wings long and narrow; body thin; tail thick, short, the tip appearing on the upper surface of the large interfemoral membrane.

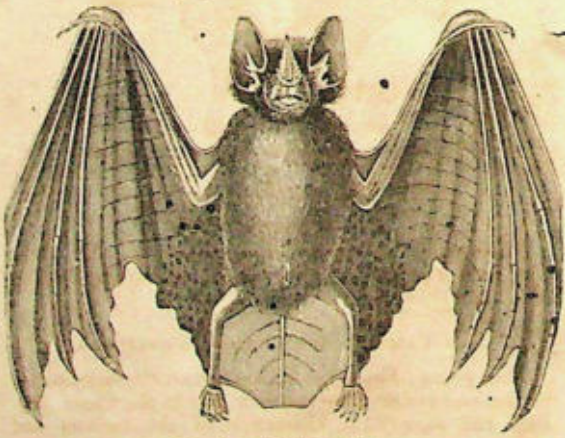
Tribe 5. *Pteropina.* Grinders bluntly tubercular; nose simple; nostrils slightly produced; end of index-finger clawed; head conical; ears simple; wings long; lower joint of thumb long, united to the wing by a membrane; interfemoral membrane short; tail none, or short. Fruit-eating bats of Indian islands and Polynesia.

Each of these tribes is again subdivided according to the variations of minor points of structure, the genera being arranged under each subsection; but to pursue the subject into these niceties would be here out of place; we, however, recommend our scientific readers to the 'Revision of the Genera of Bats,' &c., by J. E. Gray, F.R.S., published in the 'Magazine of Zoology and Botany,' No. xii.

Of the first tribe (*Phyllostomina*) our pictorial museum affords us several examples.

THE CRENULATED JAVELIN-BAT

(*Phyllostoma crenulatum.*)



127.—Crenulated Javelin-Bat.

In the genus Phyllostoma the canine teeth are very strong. Dental formula:—Incisors, $\frac{4}{4}$; canines, $\frac{1-1}{1-1}$; molars, $\frac{5-5}{5-5}$; =32. There are two nasal appendages, one like a horse-shoe, the other like a leaf or spear-head, rising up behind the former; the ears are large, with a dentilated inner slip (oreillon, or tragus); the tongue is bristled with papillæ; the tail is variable in length, sometimes wanting. The present species, of which the habits and exact locality are unknown, is a native of America. (Fig. 127.)

128.—Greater Javelin-Bat.

The Greater Javelin-Bat

(*Phyllostoma perspicillatum*).

This species is a native of South America. Mr. Darwin found it at Bahia. Of its habits we have no details. (Fig. 128.)

The Vampire-Bat (*Vampirus spectrum*).

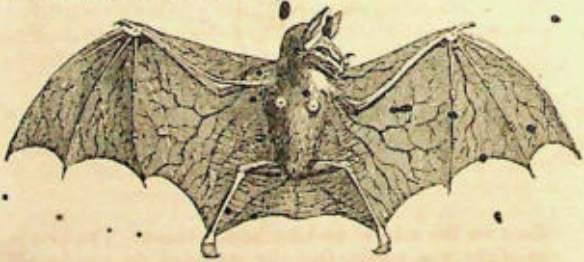
The genus *Vampirus* differs from *Phyllostoma* in having one molar more on each side in the upper jaw. Fig. 129 shows the characters of the incisors and canines.

This species, the Andira-Guacu of Piso, is a native of South America; its total length is about six inches. (Fig. 130.) Piso thus describes its habits:—These bats "seek out every kind of animal and suck their blood; but in Maranham there is a certain kind which approaches by night the naked feet of men, and wounds

Fig. 129.

them for the sake of sucking human blood. The bite is so slight and subtle, that the wounded do not feel it before the bed, covered with blood, gives token of the wound. So great a quantity of blood flows from the envenomed bite, that it can only be stopped with difficulty, and the peril is imminent unless a cure by the prescribed remedies be effected. The inhabitants first wash these wounds with sea-water, and afterwards apply hot ashes, or even cautery, if the blood be not stopped." Captain Stedman, who states that he was bitten, thus describes the operation:—"Knowing, by instinct, that the person they intend to attack is in a sound slumber, they generally alight near the feet, where, while the creature continues fanning with its enormous wings, which keeps one cool, he bites a piece out of the tip of the great toe, so very small, indeed, that the head of a pin could be scarcely received into the wound, which is consequently not painful; yet through this orifice he continues to suck the blood until he is obliged to disgorge. He then begins again, and thus continues sucking and disgorging till he is scarce able to fly; and the sufferer has often

been known to sleep from time into eternity. Cattle they generally bite in the ear, but always in places where the blood flows spontaneously. Having applied tobacco ashes as the best remedy, and washed the gore from myself and my hammock, I observed several small heaps of congealed blood all round the place where I had lain upon the ground; on examining which, the surgeon judged I had lost at least twelve or fourteen ounces during the night.



130.—Vampire-Bat.

From these and similar accounts, themselves a little overcoloured, have arisen extravagant representations and false statements, to which too much credit has been given: bloodsucking propensities, moreover, have been attributed to the bats of Java and other countries, without any authority; and the tongue, instead of the sharp lancet-like teeth, has been regarded as the instrument by which the puncture is made. D'Azara, speaking of the bloodsucking bats of South America (and he is a faithful describer), observes that "the species with a leaf upon the nose differ from the other bats (of Paraguay) in being able to run, when on the ground, nearly as fast as a rat, and in their fondness for sucking the blood of animals. Sometimes they will bite the wattles and crests of fowls while asleep, and suck their blood. The fowls generally die of this, as gangrene is engendered in the wounds. They bite also horses, mules, asses, and horned cattle, usually on the shoulders, buttocks, or neck, as they

are better enabled to arrive at those parts from the facilities afforded them by the mane and tail. Nor is man himself secure from their attacks: on this point I am able to give a very faithful testimony, since I have had the ends of my toes bitten by them four times while I was sleeping in the cottages in the open country. The wounds which they inflicted, without my feeling them at the time, were circular, or rather elliptical; their diameter was trifling, and their depth so superficial as scarcely to penetrate the cutis." The blood drawn "is merely from the capillary vessels of the skin, and is extracted thence, beyond doubt, by the action of sucking or licking." Nobody "fears these animals or gives himself any trouble about them."

To the same effect is Mr. Swainson's testimony:— "They are constantly in the habit of attacking animals during the night and sucking their blood. Our own horses and mules on many occasions, after having arrived at the end of the day's journey and being turned out to graze, would be brought in by the guides in the morning with their shoulders and haunches covered with blood; neither is it an uncommon thing for these real vampires to enter the habitations of the natives, and fasten on the legs of some incautious sleeper who has not snugly secured his feet beneath the coverlid. Stories, indeed, are told of these incautious sufferers having bled so profusely as to have died; but we never could ascertain the fact, nor did we ever suffer from the visits of these midnight phlebotomists."

Mr. Darwin was fortunate enough to capture a blood-sucking bat (*Desmodus D'Orbignyi*, Waterhouse) in the act. "The vampire-bat," says Mr. Darwin, in that part of his highly interesting book which relates his adventures when travelling on horseback in the neighbourhood of Rio Janeiro, "is often the cause of much trouble by biting the horses on their withers. The injury is generally not so much owing to the loss of blood as to the inflammation which the pressure of the saddle afterwards produces. The whole circumstance has lately been doubted in England: I was, therefore, fortunate in being present when one was actually caught on a horse's

back. We were bivouacking late one evening, near Coquimbo, in Chile, when my servant, noticing that one of the horses was very restive, went to see what was the matter, and, fancying he could distinguish something, suddenly put his hand on the beast's withers, and secured the Vampire. In the morning the spot where the bite had been inflicted was easily distinguished, from being slightly swollen and bloody. The third day afterwards we rode the horse without any ill effects."

"It is interesting," says Mr. Waterhouse, "to find that the structure of the animal is in perfect accordance with the habits above detailed by Mr. Darwin. Among other points, the total absence of true molars, and the consequent want of the power of masticating food, is the most remarkable: on the other hand, we find the canines and incisors perfectly fitted for inflicting a wound such as described, while the small size of the interfemoral membrane (giving freedom to the motions of the legs), together with the unusually large size of the thumb and claw, would enable the bat, as I should imagine, to fix itself with great security on the body of the horse. ('Zool. of Beagle,' No. 1 of Part II., p. 2.)

131.—Skeleton of Vampire.

Fig. 131 represents the skeleton of a species of vampire, as figured by De Blainville.

The Trifoliated Megaderma

(*Megaderma trifolium*).

In the genus *Megaderma* the nose-leaf is simple and erect; the wings and ears are very large; there is no tail; incisor teeth wanting. The *Megaderma trifolium* inhabits Java, where it is called Lovo by the natives. In Fig. 126, *b* represents the skull of the *Megaderma frons* of Western Africa.

Passing to the second tribe, *Rhinolophina*, we find the following examples:—

132.—Splendid Horseshoe-Bat.

The Splendid Horseshoe-Bat

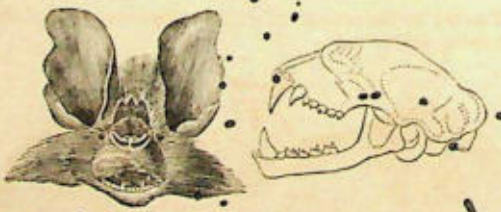
(*Rhinolophus nobilis*, Horsf.; *Hipposideros nobilis*, Gray).

This fine species, a native of Java, is called Kébblék by the Javanese. The nasal apparatus consists of a broad membrane stretching transversely across the nose in form of a shelf; the sides are bounded by several parallel folds, and inferiorly it constitutes a semicircular envelope, which has a short, obtusely-rounded point in the middle. Colour above, pure brown; beneath, brown variegated with gray. Fur remarkably long and silky, and supplied with a most delicate down at the base, so as to be throughout very soft to the touch. Body four inches in length. Expansion nineteen inches and a half. (Fig. 132.)

The Three-toothed Horseshoe-Bat

(*Rhinolophus tridens*, Geoff.; *Hipposideros tridens*, Gray).

This is a small species, found in great numbers in the tombs of Egypt, where the objects of ancient idolatry are, indeed, given "to the bats," which find in the recesses and chambers of temples and pyramids a congenial retreat. Fig. 133 shows the head and skull.



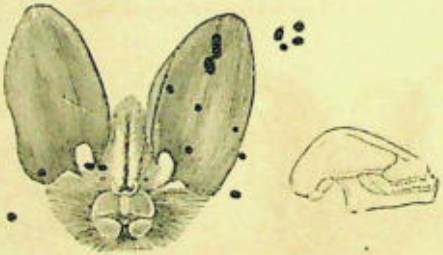
133.—Three-toothed Horseshoe-Bat.

Of the third tribe, *Vespertilionina*, the following are specimens:—

Geoffroy's Nycteris (*Nycteris Geoffroyi*).

We have already alluded to the sensibility with which the integuments of the bats are endowed; this, however, is not the only peculiarity to be noticed, for in the genus *Nycteris* there exists a power of inflation to such a degree, that, when the faculty is exerted, the animal looks, according to Geoffroy, like a little balloon fitted with wings, a head, and feet. The subcutaneous tissue is the part inflated, and, as the skin adheres to the body at particular points only, the connexion being by means of loose cellular membranes, spaces are left which can be filled with air at the will of the *Nycteris*, through the cheek-pouches, which are perforated at the bottom so as to communicate with those spaces. When the Nycteris wishes to inflate its skin, it draws in its breath,

closes its nostrils, and transmits the air through the perforations of the cheek-pouches to the subcutaneous spaces, and the air is prevented from returning by the action of a sphincter, which closes those openings, and by valves of considerable size on the neck and back. Fig. 134 shows the head and skull.



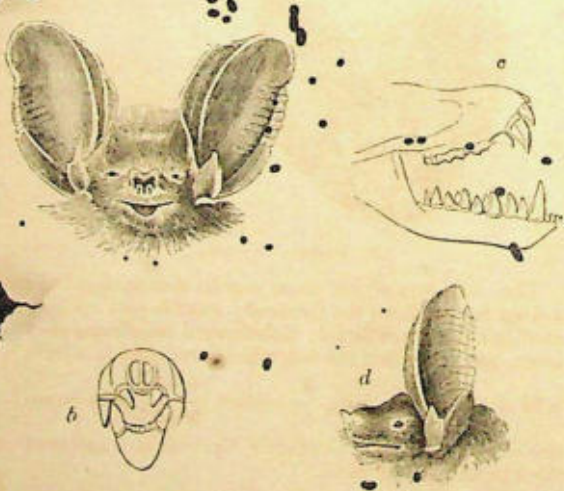
134. Geoffroy's Nycteris.

The characters of this genus may be thus summed up: a deep furrow down the forehead; nostrils covered by a cartilaginous moveable lid; interfemoral membrane very large, comprehending the tail, which terminates in a little bifid cartilage. Incisors, $\frac{4}{6}$; molars, $\frac{4-4}{5-5}$; ears large, united at their base. Geoffroy's Nycteris is a native of the Thebaid and Senegal.

Of the British bats, the Common Bat (*Vespertilio pipistrellus*), the Great Bat (*V. noctula*), and the Long-eared Bat (*Plecotus auritus*), it is not necessary to give representations; but Fig. 135 represents the head and skull of the *Vespertilio pipistrellus:* Fig. 136 the head and skull of the Timor Long-eared Bat (*Plecotus Timoriensis*); *b*, front view of the teeth; *c*, profile of the skull; *d*, profile of the head.

Of tribe 4, *Noctilionina*, the following are examples:—

135.—Head and Skull of Common Bat.



136.—Timor long eared Bat.

The Mauritius Taphozous

(*Taphozous Mauritianus*).

In the genus Taphozous there are no incisor teeth on the upper jaw. Several species are known; the one of which we represent the head is a native of the Mauritius. (Fig. 137.)

The Leporine Noctilio (*Noctilio leporinus*).

Canines very strong; muzzle short and swollen, and divided and studded with fleshy tubercles or warts; nose simple, and losing itself in the lips; ears small and lateral; interfemoral membrane very much developed; and enveloped at its base. Dental formula:—Incisors,

137.—Mauritius Taphozous.

138.—Leporine Noctilio.

proportion to its size, its strength is very great. Slow in its movements, it makes up by perseverance and industry for this defect, and at a steady pace pursues its prey for miles, hunts out weak or dying animals, and destroys hares, marmots, and birds, which it seizes unawares.

Buffon, relying on the authority of Olaus Magnus, Isbrandt, and others, has contributed to render current the statement (which many later naturalists have deemed not incredible) that the glutton has recourse to the most subtle artifice in order to surprise its victims, and that it lurks in the branches of trees until the reindeer approaches to browse beneath, when it throws itself upon the unsuspecting animal with unerring rapidity, fixes its strong claws in the skin, and proceeds to tear the neck and throat, till the wretched victim falls exhausted and dies, when the victor devours his prey at leisure. Gmelin, in his account of his journey through Siberia, after quoting the statement of Isbrandt, adds, "This address of the glutton managing to seize animals by surprise is confirmed by all hunters." . . . . "Although it feeds on all animals, living or dead, it prefers the reindeer. It lies in wait for large animals as a robber on the highway, and it also surprises them as they lie asleep." To the circumstance of the glutton fixing on the reindeer, and also the elk, Desmarest expressly alludes, evidently relying on the narratives of the earlier writers. On the contrary, Dr. Richardson, in his able history of the American glutton, or wolverene, affirms that no such artifice is resorted to by that variety, and he appears altogether to disbelieve the account. No doubt the details have been exaggerated, still we are not altogether to throw aside the assurances of old travellers of credit; indeed we think it very probable that the glutton may steal upon the reindeer asleep, or attack enfeebled or dying deer, or young fawns, and fixing on the great blood-vessels of the throat (as the weasel does when attacking the hare), thus destroy its victims. Gmelin, Dr. Richardson, and Mr. Graham agree in the fact that the glutton is extremely annoying to the fur-hunters,

visiting their traps and devouring the animals taken in them. In Siberia, it rifles the traps of the sable and corsac fox; and, as Mr. Graham observes, in northern America it will follow "the marten-hunter's path round a line of traps extending 40, 50, or 60 miles, and render the whole unserviceable merely to come at the baits, which are generally the head of a partridge on a bit of dried venison. They are not fond of the martens themselves, but never fail of tearing them in pieces or of burying them in the snow by the side of the path at a considerable distance from the trap. Drifts of snow often conceal the repositories thus made, in which case they furnish a regale to the hungry fox, whose sagacious nostril guides him unerringly to the spot. Two or three foxes are often seen following the wolverene for this purpose." During the summer the beaver is the common prey of this animal.

The glutton is nocturnal, cunning, and determined; it fights very resolutely, and is more than a match for a single dog, its strength being very great. Its fur is in much request, especially that of the Siberian animal, which is dark and beautifully glossy. The length of the glutton, exclusive of the tail, is about two feet six inches; that of the tail, including the long full fur, ten inches. The female breeds once a-year, the cubs being from two to four in number. Their fur is soft, downy, and of a pale yellowish white.

The Grison

(*Galictis vittata*, Bell; *Gulo vittatus*, Desmarest; *Viverra vittata*, Linn.; *Petit Furet*, D'Azara; *Grisonia vittata*, Gray; *Lutra vittata*, Trail; *Ursus Braziliensis*, Thunberg; *Fouine de la Guyane*, Buff. 'Suppl. III.').

The grison is a native of the intertropical provinces of America, Guiana, Paraguay, and Brazil. It is remarkable for its sanguinary and fierce disposition, and the disgusting odour of the secretion of its scent-glands. A specimen was living some time since in the Menagerie of the Zoological Society, and its death afforded us an opportunity of investigating its internal anatomy.

65.—Grison.

('Zoological Proceedings,' 1833, p. 140.) In its figure the grison is very elongated, the head is flat, and the muzzle somewhat acute; the general colour is grizzled black; the top of the head and neck gray, with a white semilunar-shaped band across the forehead, extending to the shoulders. Length of body one foot six inches; of tail six inches and a half. (Fig. 65.) A second and larger species has been characterised by Mr. Bell, under the name of *Galictis Allamandi*. Linnæus applied the name of *Mustela barbata* to a large musteline animal inhabiting the woods on Brazil and Paraguay, which Azara denominated the *Grand Furet*, and Pennant the Guiana Weasel. By Desmarest it is referred to the genus Gulo,

and is termed *Gulo Barbulus*. This animal is the Taira (or *Galera* of Brown). Two specimens from Trinidad, differing from each other in colouring, are preserved in the Museum of the Zoological Society. (See 'Proceeds. Zool. Soc.,' 1831, p. 74.) To the musteline group belong the Zorilles of Africa: most writers seem to consider the Zorille as constituting a single species (*Zorilla Capensis*). We are however of opinion that the Cape species is different from that which we have seen repeatedly from the northern coast of Africa. The Senegal zorille has not come under our notice, but it is stated to differ from the Cape animal. The zorille is less than the polecat, and, like that animal, is fierce and exceedingly active. It dwells in burrows, which it digs in the ground, concealing itself during the day. The colour of the back is an irregular mixture of black and white, in broken or indefinite lines. The head, sides, and under-surface are black, with the exception of a white oval spot on the forehead, and a white mark over each eye. To this genus is apparently referable a species from Madagascar, *Mustela striata*, Geoff.; *Putorius striatus*, Cuv.; *Galictis striata* of Isidore, Geoffroy.

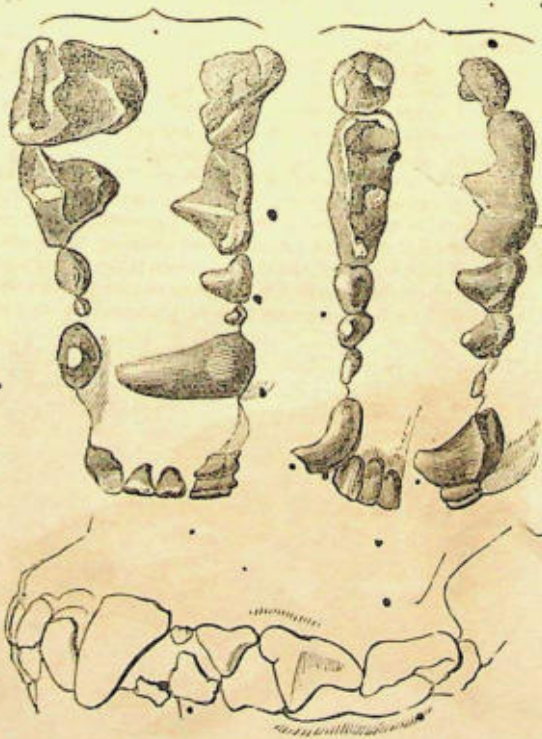
The Skunk (*Mephitis Americana*).

Several species of these animals, called Mouffettes, Mephitic Weasels, Bêtes puantes, Enfans du Diable, &c., are natives of America. The genus is intermediate between that of the polecats and the badgers.

These animals are notorious for the intolerable odour of the secretion of their glandular pouches, which neither man nor dog can endure. The head is small, the snout pointed, the body robust and covered with long coarse hair, the tail rather long and very bushy. The general colour of the upper surface is white, interrupted by a stripe, more or less broad, of black along the spine; the limbs and under surface are black. (Fig. 66.) According to Kalm, the skunk of North America "brings forth its young in the hollows of trees and in burrows; it is not confined to the ground, but climbs trees; it is an

66.—Skunk.

enemy to birds; it destroys their eggs and also devours their young; and when it can enter the poultry-roost it makes great destruction. When it is chased either by men or dogs it runs as far as it can or climbs a tree; but when it finds itself hard pressed, it ejects its fluid against its pursuers: the odour of this is so strong as to suffocate; if a drop of this pestilential secretion falls in the eyes, it is at the risk of losing sight; and when it falls on the clothes, it communicates an odour so powerful, that it is very difficult to get rid of it; most dogs fear to attack it, and flee when touched by a drop." Mr. Graham confirms this account, and says that he knew several Indians



67.—Teeth of Skunk.

68.

who had lost their eyesight in consequence of inflammation produced by this fluid having been thrown into them by the animal, which has the power of ejecting it to the distance of upwards of four feet. The odour produces nausea, a sense of suffocation, and not unfrequently fainting. Audubon, in his 'Ornithological Biography' (p. 310), gives, under the name of "Polecat," an amusing narrative, proving how long wearing-apparel tainted with the odorous secretion preserves, spite of every attempt to remove it, the overpowering effluvium. With all this, however, the skunk is often taken young and tamed, when the animal seldom gives out its pestilential secretion; its flesh, moreover, is very frequently eaten

69.—Head of Skunk.

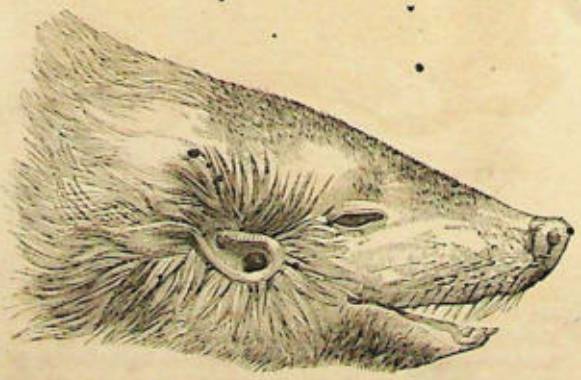
and is said to be well flavoured. It appears that when the natives kill a skunk, they remove the whole of the glandular sacs, in order that no unpleasant smell or flavour may be communicated to the flesh. In the northern latitudes the skunk passes its winter in a hole, seldom stirring abroad, and then only for a short distance. It

preys on young hares, rats, and mice, and has been observed to feed much on frogs. The skunk is about eighteen inches in length, exclusive of the tail, which is nearly as long as the body. Fig. 67 represents the dentition of the genus *Mephitis;* Fig. 68, the incisors and canines. Fig. 69 represents the head of another species of the present genus (*Mephitis dimidiata*). Besides the common skunk (*Mephitis Americana*) four distinct species are in the Museum of the Zoological Society. From the genus Mephitis we pass by an easy transition to that group of the Mustelidæ which includes the Ratel, the Mydaus or Teledu, and the Badgers.

The Teledu (*Mydaus meliceps*, F. Cuv.).

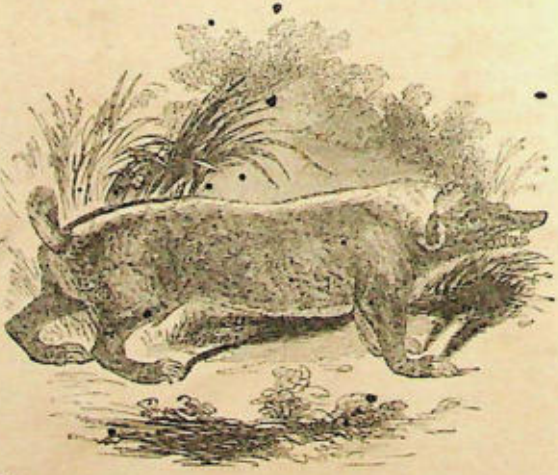
In Java and Sumatra the Teledu holds the place of the skunks in America, and may be regarded as representing them; it agrees with them in dentition and general habits, and the secretion of a fluid insupportably disgusting.

The teledu is considerably less than a badger in size;



70.—Head of Teledu.

the ears are close and scarcely apparent (see the Head of the Teledu, Fig. 70); the head is conical, and the snout gristly at the tip and almost destitute of hair. The feet are remarkably strong, the toes, five in number, being united as far as the last joint, and armed with enormous claws, especially those of the fore-feet. The hair of the body is coarse, and rises to a peak on the occiput, that covering the neck being directed forwards. The general colour is deep brown: a white stripe, beginning broad on the top of the head and back of the neck, runs along the spine, and includes the short tuft-



71.—Teledu.

like tail. (Fig. 71.) The teledu is slow in its motions, and lives in burrows which it excavates in the earth. Notwithstanding its offensive odour, it is eagerly sought for by the natives, who prize its flesh as food, which, if the animal be surprised and suddenly despatched, is almost entirely free from any offensive taint. The following in-

teresting account of this animal is from the pen of Dr. Horsfield, who investigated its native regions. "The *mydaus meliceps* presents a singular fact in its geographical distribution. It is confined exclusively to those mountains which have an elevation of more than 7000 feet above the level of the ocean; on these it occurs with the same regularity as many plants. The long extended surface of Java, abounding with conical points which exceed this elevation, affords many places favourable for its resort. On ascending these mountains, the traveller scarcely fails to meet with our animal, which, from its peculiarities, is universally known to the inhabitants of these elevated tracts, while to those of the plains it is as strange as an animal from a foreign country. A traveller would inquire in vain for the teledu at Batavia, Samarang, or Surabaya. In my visits to the mountain districts I have uniformly met with it, and, as far as the information of the natives can be relied on, it is found on all the mountains. It is, however, more abundant on those which, after reaching a certain elevation, consist of numerous connected horizontal ridges, than on those which terminate in a defined conical peak. Of the former description are the mountain Prahu, and the Tengger Hills, which are both distinctly indicated in Sir Stamford Raffles's map of Java. It was less common on the mountain Gede, south of Batavia; on the mountain Ungarang, south of Samarang; and on the mountain Tjen, at the farthest extremity; but I traced its range through the whole island.

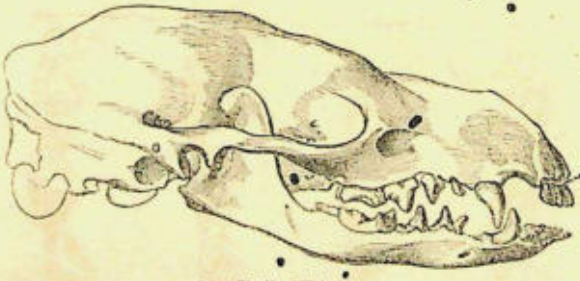
"Most of these mountain-ridges furnish tracts of considerable extent, fitted for the cultivation of wheat and other European grains. Certain extra-tropical fruits are likewise raised with success; peaches and strawberries grow in considerable abundance, and the common culinary vegetables of Europe are cultivated to a great extent. To most Europeans and Chinese a residence in these elevated regions is extremely desirable; and even the natives, who in general dislike its cold atmosphere, are attracted by the fertility of the soil, and find it an advantage to establish villages and clear the grounds for culture.

"Potatoes, cabbages, and many other culinary vegetables are extensively raised, as the entire supply of the plains on these articles depends on these elevated districts. Extensive plantations of wheat and other European grains, as well as of tobacco, are here found, where rice, the universal product of the plains, refuses to grow. These grounds and plantations are laid out in the deep vegetable mould, where the teledu holds its range as the most ancient inhabitants of the soil. In its rambles in search of food this animal frequently enters the plantations, and destroys the roots of young plants; in this manner it causes extensive injury; and on the Tengger Hills particularly, where these plantations are more extensive than in other cultivated tracts, its visits are much dreaded by the inhabitants. It burrows in the earth with its nose, in the same manner as hogs, and in traversing the hills its nocturnal toils are observed in the morning in small ridges of mould recently turned up.

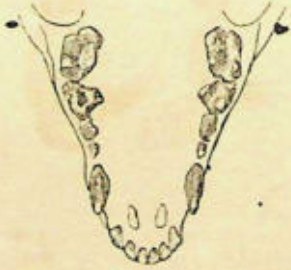
"The *mydaus* forms its dwelling at a slight depth beneath the surface, in the black mould, with considerable ingenuity. Having selected a spot defended above by the roots of a large tree, it constructs a cell or chamber of a globular form, having a diameter of several feet, the sides of which it makes perfectly smooth and regular; this it provides with a subterranean conduit or avenue, about six feet in length, the external entrance to which it conceals with twigs and dry leaves. During the day it remains concealed like a badger in its hole; at night it proceeds in search of its food, which consists of insects and their larvæ, and worms of every kind. It is particularly fond of the common lumbrici, or earth-worms, which abound in the fertile mould. The teledu, agreeably to the information of the natives, lives in pairs, and the female produces two or three young at a birth."

When taken young, the teledu is easily tamed, and perfectly inoffensive.

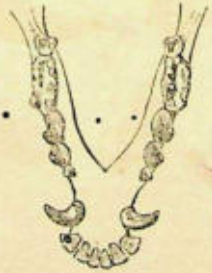
Fig. 72 represents the Skull of the Teledu; Fig. 73, the teeth of the upper jaw; Fig. 74, the teeth of the lower jaw. The molars, it will be seen, consist, in the upper jaw on each side, of two false—a pointed carnas-



72.—Skull of Teledu.



73.



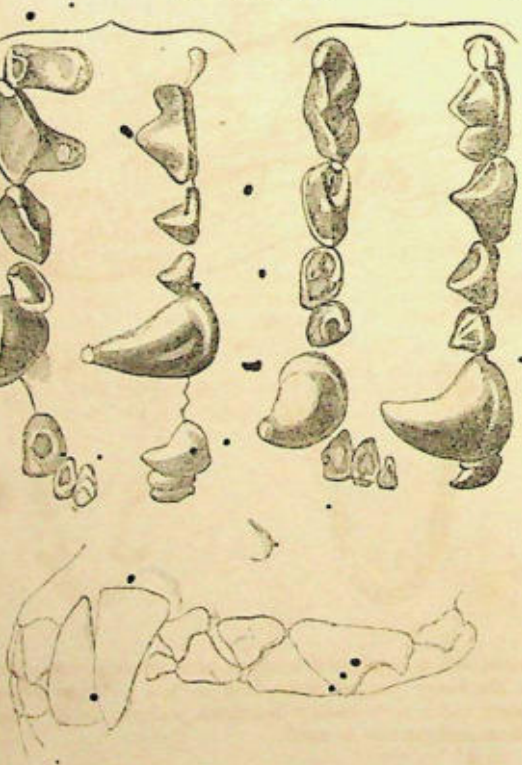
74.

sière, and a large and nearly square tuberculous molar; in the lower jaw, of three false molars, a large carnassière, and a very small tuberculous posterior molar. Incisors and canines as usual.

Cape Ratel

(*Ratelus Capensis*, F. Cuv.; *Mellivora Capensis*, Storr; *Viverra mellivora*, and *Ursus mellivorus*, Blumenb.; *Taxus mellivorus*, Tiedem.; *Meles mellivora*, Thunberg; *Ratel*, Sparrman; Honey-weasel, Shaw).

In their dentition, the ratels closely approximate to the true badgers (*Meles*), excepting that the last molar



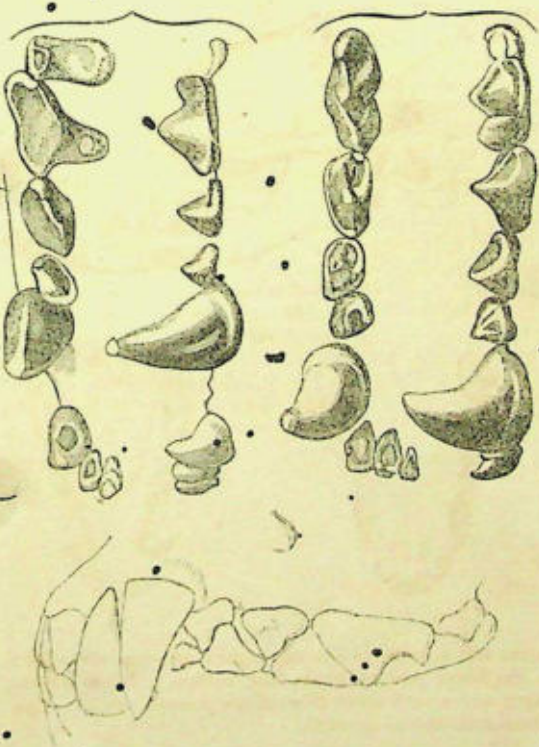
75.—Teeth of Ratel.

is smaller and narrower in proportion from its anterior to its posterior edge. (Fig. 75.)

The Cape ratel is a thickset clumsy animal, with short limbs, and a partially plantigrade walk. The claws are very robust, the muzzle is elongated, the eyes are small

and sunk, and the external ears nearly rudimentary; the general aspect is badger-like. The Cape ratel is a native of South Africa, and has been celebrated for the destruction it makes among the nests of the wild-bee, to the honey of which it is said to be very partial. Doubtless, however, it avails itself of other food, and probably, like the badger, devours flesh and roots. In the discovery of bees' nests it is said to be directed by the actions and voice of a bird termed the Honey-guide (*Indicator Vaillantii*). These insects, in South Africa, usually build their cells in the deserted excavations of the wild boar or the porcupine, and from these the ratel digs out its plunder. It preys chiefly in the evening, remaining during the greater portion of the day in its burrow. When taken young it is easily domesticated. The hide of the ratel is extremely tough and loose, and, according to Sparrman, if a person catches hold of it by the back

76.—Cape Ratel.



75.—Teeth of Ratel.

is smaller and narrower in proportion from its anterior to its posterior edge. (Fig. 75.)

The Cape ratel is a thickset clumsy animal, with short limbs, and a partially plantigrade walk. The claws are very robust, the muzzle is elongated, the eyes are small

and sunk, and the external ears nearly rudimentary; the general aspect is badger-like. The Cape ratel is a native of South Africa, and has been celebrated for the destruction it makes among the nests of the wild-bee, to the honey of which it is said to be very partial. Doubtless, however, it avails itself of other food, and probably, like the badger, devours flesh and roots. In the discovery of bees' nests it is said to be directed by the actions and voice of a bird termed the Honey-guide (*Indicator Vaillantii*). These insects, in South Africa, usually build their cells in the deserted excavations of the wild boar or the porcupine, and from these the ratel digs out its plunder. It preys chiefly in the evening, remaining during the greater portion of the day in its burrow. When taken young it is easily domesticated. The hide of the ratel is extremely tough and loose, and, according to Sparrman, if a person catches hold of it by the back

76.—Cape Ratel.

part of the neck, it is able to turn round, as it were, in its skin, and bite the arm that molests it.

The Cape ratel is about two feet six inches long, exclusive of the tail, which is about eight inches. The general colour above is gray, the under parts black, and a white line runs on each side from the ears to the origin of the tail, abruptly dividing these two colours. (Fig. 76.)

The Indian Ratel (*Ratelus Indicus*).

This species, though known to Pennant and Shaw (who termed it *Ursus Indicus*), has only been recently recognised as a distinct species. Lesson was not aware of the difference—nay, neither he nor Desmarest appears to have known of the existence of the Indian ratel; and General Hardwicke, who figured it in the 'Linn. Trans.,' vol. xi., makes no allusion to the Cape ratel, apparently overlooking their relationship. Mr. Bennett observes that the only difference he has been able to detect between the Asiatic and African animals consists in the absence of the white line dividing the two colours in the Indian species, and which are not so abrupt. The absence of this line we consider to have been an individual peculiarity. The Indian ratel is a native of various provinces of India, on the high banks of the Ganges and the Jumna, where it rarely comes forth from its burrow by day, but prowls at night about the houses of the natives, enters the cemeteries, and with extraordinary celerity works its way to the bodies recently interred, which it greedily devours. It feeds also upon rats, birds, &c. When taken young, the Indian ratel is easily tamed and becomes playful. It is fond of climbing, but its actions are clumsy, though it securely traverses the larger branches. Its voice is a deep hoarse guttural bark. (See 'Proceedings of the Zoological Society,' 1835, p. 113.) (Fig. 77.)

The following description of a specimen from Madras, in the Menagerie of the Zoological Society, is from the pen of Mr. Bennett:—"As far as its manners have yet

77.—Indian Ratel.

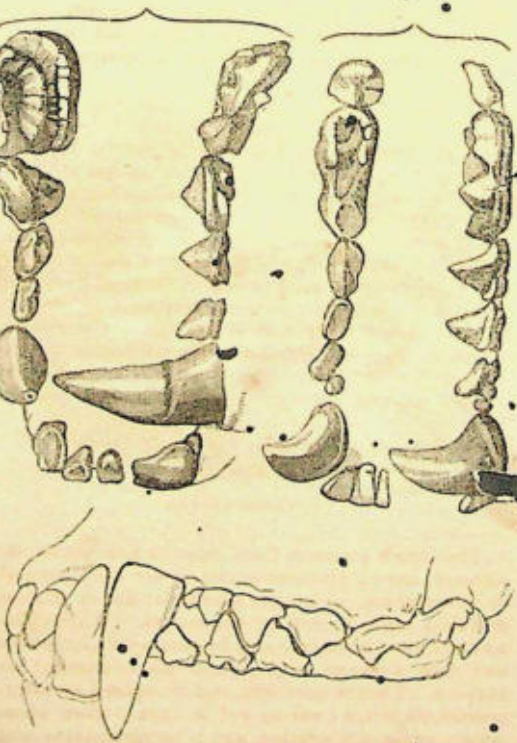
been developed, it appears to be, with regard to man at least, one of the most playful and good-tempered of beasts, soliciting the attention of almost every visitor by throwing its clumsy body into a variety of antic postures, and when noticed, tumbling head over heels with every symptom of delight. But towards animals it exhibits no such mildness of temper; and it is curious to observe the cat-like eagerness with which it watches the motions of any of the smaller among them that happen to pass before its den, and the instinctive dread manifested by the latter on perceiving it. Its food is of a mixed nature, consisting, like that of the bears and other less carnivorous beasts, of bread and milk in the morning, and flesh in the latter part of the day." ('Zoological Gardens.')

The Badger (*Meles vulgaris*).

The approximation of this animal to some of the Ursidæ is evident; yet is there still an important line of demarkation. All the Ursidæ have two true molars; in the true ursine group the posterior molar is long; in the aberrant group, including *Ailurus*, *Procyon*, *Nasua*, and *Cercoleptes*, the two molars are nearly equal in size. In the badger, the ratel, &c., as in the polecats, there is but one true molar. That of the upper jaw in the badger is very large (see Fig. 78, the teeth of the badger), and adapted for the mastication of vegetable aliment.

The badger is extensively spread through Europe and Asia; it is recluse and nocturnal in its habits, frequenting deep woods, where it makes a deep commodious burrow, for the excavation of which its short muscular limbs and powerful claws are well adapted. The burrow has only one entrance, leading into different chambers, and terminating in one of a circular form, which is comfortably lined with grass and hay. Here the animal spends the day in repose, moving out only at night, in search of food. It feeds upon roots, fruits, insects, frogs, young rabbits, field-mice, &c., as well as upon the eggs and young of partridges and pheasants, &c. It is said to attack the nests of the wild-bee, plundering the store of honey, and also devouring the larvæ, without dread of the stings of the enraged insects, which cannot penetrate its thick tough skin.

The badger measures about two feet three inches in the length of the head and body, that of the tail being seven inches and a half. The head is long and pointed, the ears close, the body broad, stout, and low, the hair trailing along the ground as the animal moves along. The fur is full, coarse, and deep; its general colour above is brownish gray, lighter on the sides and tail: the under parts are black, as are also the legs and feet. The head is white, with a black stripe extending from the shoulder over the ear and eye almost to the muzzle. (Fig. 79.) From its colour, this animal is in some parts called the gray; its old Anglo-Saxon name is Broc, a



78.—Teeth of Badger.

word still retained in Scotland and the adjacent counties of England. It has a glandular subcaudal pouch. The badger is by no means active or alert, and is generally observed to be very fat, as is the case with most animals that lead a tranquil indolent life, and feed upon vege-

table as well as animal diet. It is nowhere very common, especially in the more cultivated countries, where the woods are thinned and its solitudes invaded by the axe.

79.—Common Badger.

The female produces from three to five young in the summer, having prepared a nest in her deep burrow for their reception. They are nursed for five or six weeks, and then begin to shift for themselves. When taken at an early age, the badger may be tamed with little trouble, and soon becomes playful, and much attached to its keepers. Though harmless, and indisposed to enter unnecessarily into a combat, yet it shows when assaulted great spirit and resolution, and is no mean antagonist for a dog twice its own weight to grapple with; its general muscular power is great: its skin is loose and tough, and well protected by coarse shaggy fur, and its bite is dreadfully severe; indeed the jaws are endowed with astonishing strength, and the lower one at its joint or hinge with the skull is so locked as to be inseparable, the cavity into which the condyle is fitted being modified in such a

manner as to retain it permanently in its place. From its prowess and bodily qualifications the badger was formerly in much request for the brutal sport of baiting, a favourite and exciting pastime, gratifying to those who are indifferent to the pain they inflict and incapable of purer pleasures.

The skin of the badger is not without value in commerce. It makes excellent pistol-holsters, and the hair is used for painters' brushes and various other purposes. The flesh, or at least the hams of this animal are said to be palatable, and to resemble those of the bear, for which a relish has been felt or affected by sportsmen epicures. In China the badger, as "Honest John Bell" the traveller states, may be seen in the meat-markets by dozens. In America a species of badger, the *Meles Labradorica*, is widely spread; this species, according to some naturalists, forms the type of a distinct genus (*Taxidea*, Waterhouse; see 'Proceedings of the Zoological Society,' 1838, p. 153).

The Indian Badger

(*Arctonyx collaris*, F. Cuv.; *Meles collaris*; Balloo-soor, Hindustanee).

This animal was first described and figured by Bewick, in his 'History of Quadrupeds' (from a living specimen kept in the Tower about the year 1790), under the title of Sand-Bear. Bewick at once recognised its affinity to the badger, but ignorant of the country from which it was brought, suspected it to be the white badger of North America described by Brisson; a mistake we may readily pardon. Not aware that any English writer had described it, Duvaucel, who saw two individuals at Barrackpore, in the menagerie of the governor-general, considered the species as altogether new. Fred. Cuvier regarded it as the type of a distinct genus.

The size of the sand-hog, for such is the meaning of the term Balloo-soor (not Bali-saur, as Duvaucel writes it, nor Bhalloo-soor, which signifies bear-pig), is that of a badger, but it stands higher on the legs, and its snout is elongated and truncated at the extremity like that of a

hog. The ears are small, covered with hair, and surrounded by a circle of white. The muzzle is flesh-coloured, and nearly naked; two black bands run on each side of the head, and unite near the muzzle; the larger of these bands on each side passes round the eye to the ear, and along the neck and shoulder, to unite with the black colour prevailing on the fore-limbs. The general colour of the body above is yellowish white, the hairs on the back being coarse and tipped with black. The under surface is very thinly clothed, and the tail resembles that of a hog. The toes (five on each foot) are united together their whole length, and armed with large strong claws adapted for digging. (Fig. 80.) Of the habits of this

80.—Indian Badger.

animal in its natural condition little is known. The individuals, a male and female, observed in the menagerie of the governor-general at Barrackpore by Duvaucel, were remarkably shy and wild. The female, however, was less savage than the male, and showed a certain degree of intelligence, which gave reason to believe that, if taken young, this animal might be easily domesticated. They passed the greater part of the day buried beneath the straw of their den, in deep sleep. All their move-

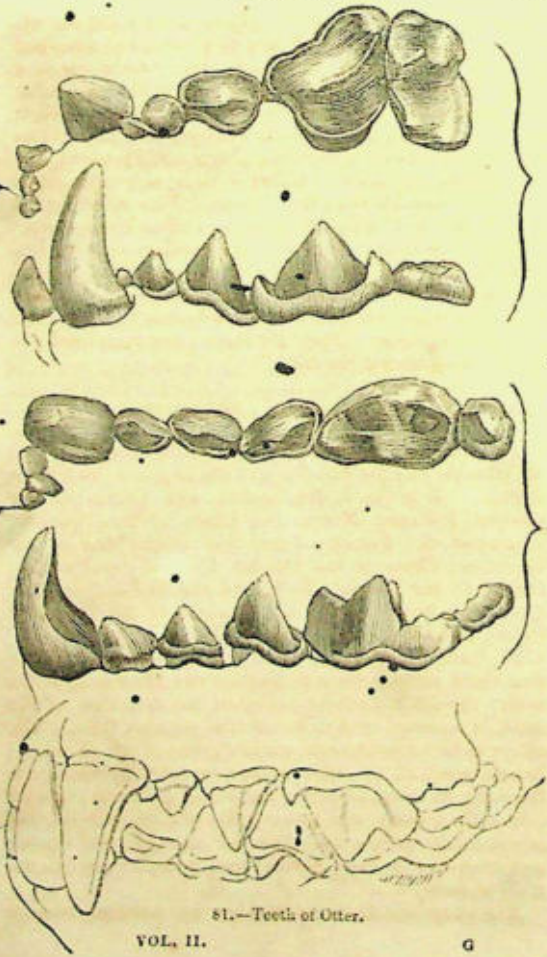
ments were remarkably slow. Though they did not altogether refuse animal food, yet they exhibited a marked predilection for bread, fruits, and other substances of a vegetable nature. When irritated, they uttered a peculiar kind of grunting noise, and bristled up the hair of their back: if still further tormented, they would raise themselves upon their hind-legs like a bear, and appeared, like that animal, to possess a power in their arms and claws not less formidable than their teeth. This is confirmed by Mr. Johnson, in his 'Sketches of Indian Field-sports.' "Badgers in India," says he, "are marked exactly like those in England, but they are larger and taller, are exceedingly fierce, and will attack a number of dogs. I have seen dogs that would attack a hyæna or wolf afraid to encounter them. They are scarce, but occasionally to be met with among the hills."

THE OTTER (*Lutra vulgaris*; *Mustela Lutra*, Linn.).

This, there can be little doubt, is the ἔνυδρις (Enhydris) of Aristotle and the Greeks, and the Lutra of the ancient Italians. It is the Lodra, Lodria, and Lontra of the modern Italians: Nutria and Lutra of the Spanish; Loutre of the French; Otter and Fisch-Otter of the Germans; Otter of the Dutch; Utter of the Swedes; Odder of the Danes; Dyfigi of the Welsh; Balgair, Cu-donn (Brown Dog), and Matadh of the Northern Celts; and Otter of the modern British.

On introducing the otter to notice, we may observe that these animals seem to conduct the *Mustelidæ* to the seals; though it must be confessed the dentition of the latter is modified on a different and peculiar type. The otters in fact constitute an aquatic group of the *Mustelæ*; indeed many of the true weasels resort occasionally to the water in quest of prey; the Vison of North America (*Mustela vison*), and a near ally, the *Mustela lutreola* of northern Europe and Asia, for example, are aquatic and otter-like in their habits; and approximate to the otter in form.

The otters are distinguished by the peculiar breadth

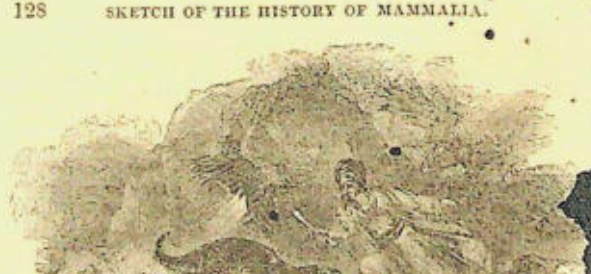


81.—Teeth of Otter.

and flatness of the head, and the rounded outline of the muzzle; the lips being large and fleshy, and furnished with strong whiskers, which are evidently the communicators of feeling; the ears are very small and close to the skull; and the eyes, of moderate size, are provided with a nictitating membrane as a defence to their surface. The tail, which in most aquatic mammalia is an important instrument, is long, but very stout and muscular at the base, somewhat compressed horizontally, and tapering gradually to the extremity. In swimming and diving it is used as a rudder, enabling the animal to turn rapidly and abruptly, and assisting it to perform its varied and graceful manœuvres while in chase of its finny prey. The tongue is somewhat rough. The body is elongated and flattened, and the limbs are short and stout: the toes (five on each foot) are webbed, and spreading; the soles are naked. On land the progression of the otter is plantigrade, and by no means free or rapid: hence it trusts to the water for safety, making to it when attacked or in any danger. The fur of these animals at once indicates their aquatic habits; it is close, short, and fine, consisting of a thick woolly undercoat and an upper layer of smooth glossy hairs. In their dentition (Fig. 81) the otters differ little from the polecats, martens, and skunks, the false molars being $\frac{3-3}{3-3}$; carnassières, $\frac{1-1}{1-1}$; tuberculous, $\frac{1-1}{1-1}$. Fig. 82 represents the skeleton of the common European Otter.

This well-known species is by no means confined to the lakes and rivers of Europe, but abounds also on many parts of the coast, and is common on the shores of Scotland and Ireland, as well as on the rocky Hebrides and Shetland Islands, where it dwells in hollows and caverns (Fig. 83), going out to sea to fish, or entering the mouths of rivers, and making sad havoc among the salmon, on which account, in Antrim, where it hides among the basaltic masses on the east coast, a price is set upon its head. The otter is nocturnal, night being the period in which

82.—Skeleton of European River-Otter.



83.—Otter in Cave.

it carries on its work of slaughter: sly and recluse, it lurks by day in its deep burrow, the mouth of which is concealed among masses of stone, the luxuriant herbage of some steep bank which overhangs the water, or beneath the twisted roots of an overshadowing tree.

The movements of the otter in the water are remarkably graceful, and it swims at every depth with great velocity; every now and then it comes for a moment to the surface to breathe, previously expelling the air pent up in its lungs, which rising in bubbles marks its subaquatic course. Having taken breath afresh, it dives noiselessly like a shot, and gives chase to its prey, which it follows through every turn and maze, till at length the exhausted victim can no longer evade the jaws of its rapacious foe. Whoever has witnessed the feeding of those which from time to time have been kept in the gardens of the Zoological Society cannot fail to have remarked the fine sweep of the body as the animal plunges into the water, its undulating movements while exploring its prey, the swiftness and pertinacity of the pursuit, and then the easy turn to the surface with the captured booty. This is generally devoured before the chase of another

fish is commenced; sometimes, however, instead of treating them thus separately, the otter contrives to bring up several at a time, managing not only to seize them, but to carry them hanging from its mouth. In eating them it commences with the head, which it crushes in an instant between its teeth. Eight or ten moderate-sized fish serve for a single meal, but it is well known that in a state of nature the otter slaughters a much larger number of fish than it devours: hence some idea may be formed of the havoc occasioned by a pair of otters in support of themselves and their young. Indeed, the animal seldom devours more of a fish than the head and upper portion of the body. When fish is scarce, the otter will feed on frogs and water-rats. Mr. Bell informs us that, "when driven by a scanty supply of fish, it has been known to resort far inland to the neighbourhood of the farm-yard, and attack lambs, sucking-pigs, and poultry, thus assuming for a time the habits of its more ter-

81.—Otter.

85.—Otter.

restrial congeners." In winter, when the smaller streams and ponds are frozen, the otter wanders in search of places in the river, the depth of which secures them against the effects of the frost, or travels down the smaller streams to the large river into which they merge, and there continues its work of destruction. (Figs. 84 and 85.)

It is during the spring and summer months, while the young of the otter are dependent upon the mother's care, that the destruction she makes among the fish is most considerable; she has not only her own wants, but those of her offspring, to provide for, and her exertions during the silent hours of night are unremitting. The track she leaves in the mud or the soft soil on the water's edge, as she goes to and from her retreat, witnesses the extent of her labours, and also their success: a fish-preserve, if near her haunt, at this season suffers immensely from her depredations, and is certain to be visited night after night until none but the smaller fry remain. The mill-dams of trout-streams are also favourite fishing-places of this

cunning animal, and are often sadly thinned of the finest fish. Nor is the injury done by the otter confined to the mere destruction of fish for food; its presence militates against their increase, inasmuch as they are scared by their enemy from their spawning-places, and prevented from depositing their spawn so as to secure the vivifaction of the ova, to the mortification of all "honest anglers." Izaak Walton says "an otter will sometimes go five or six or ten miles a-night to catch for her young ones, or glut herself with fish;" but it also as often happens that, where the otter finds a piece of water replete with prey, it there takes up its abode, and perhaps carries on for weeks, unsuspected, its depredations. Independently, however, of the footsteps of the otter betraying its residence in the vicinity, the circumstance of its always voiding its sprainc or dung, on one spot often leads to its discovery; the undigested remains of fish, their bones and scales, denote the nature of their devourer; and the alarm of an otter in the neighbourhood is soon followed by a search for the delinquent.

Otter-hunting was among the favourite field-sports of our ancestors, and is still eagerly carried on in the islands of Scotland, where the difficulties of the chase, from the rocky, broken nature of the shore, add to the excitement.

The otter is intelligent, and when taken young easily tamed, and may be taught to assist the fisherman, by driving shoals to the nets, or by catching salmon. Daniel, Bewick, Shaw, and Goldsmith record instances in which the otter has been domesticated, as do also Mr. Bell and Mr. Macgillivray; the late Bishop Heber noticed in India, on one occasion, a number of otters tethered by long strings to bamboo stakes on the water's edge, and was informed that it was customary to keep them tame in consequence of their utility in driving the shoals of fish into the nets, as well as of bringing out the larger fish with their teeth.

The common European otter measures about two feet two inches in the length of the head and body, the tail being one foot four inches. Its usual weight is from twenty to twenty-four pounds, but instances have been

known in which it has attained the weight of forty pounds. Those that frequent the sea-coast are generally larger and darker coloured than the otters of inland rivers or sheets of water. The female produces from three to five young, and is devoted to them, nursing them with the greatest assiduity.

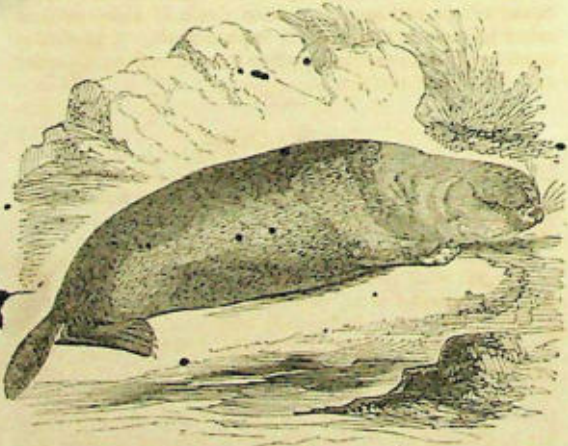
A variety, spotted with white, is sometimes seen; this is regarded by the Scotch peasantry as the king of the otters, and they hold that it bears a charmed life, and is never killed without the sudden death of some man or other animal at the instant it expires itself. The skin is considered as a sure preservative from infection, wounds, and dangers of the sea.

The Sea-Otter

(*Enhydra marina*, Fleming; *Lutra marina*, Steller; *Mustela Lutris*, Linn.; *Enhydris Stelleri*, Fischer; Kalan of the natives of Kamtchatka).

This remarkable animal in many respects approaches nearer the seals than the otters of the genus *Lutra*, and may be regarded as an immediate link between the two groups. We have fortunately been enabled to examine its skeleton (see 'Zool. Proceeds.,' 1836, p. 59), which to the comparative anatomist presents characters of great interest. The muzzle in the sea-otter is blunt and short, the ears are rounded, the body cylindrical, the fore limbs are extremely short, the paws small and impacted in skin to the end of the toes, the sole being naked and granular. The hind legs are short, but placed as far back as possible; the thigh-bone is thick, with a round head, destitute, as in the seals, of the ligamentum teres; the hind foot or paddle is of great length and breadth; and the toes (five in number) are regularly graduated from the inner, which is the smallest, to the outer toe, which is the longest and stoutest: they are all united by webs to the very tip. The claws are small. The dentition is as follows:—Incisors, $\frac{6}{4}$; canines, $\frac{1-1}{1-1}$; molars, $\frac{4-4}{5-5}$. Of

the molars above, the first is very small and conical; the second is larger; the third, or carnassière, is large and compressed, with three rounded tubercles on its surface; the last molar is still larger, flat, with a slightly elevated and rounded edge. Of the five molars below, the three first increase gradually in size; the fourth is large and flat, with three small and rounded tubercles; the last is small and flat (Fig. 86).



86.—Sea-Otter.

The tail is rather short, and, when the hinder paddles are stretched out in the act of swimming, this organ will appear placed between them almost as much as it is in the seals.

The sea-otter is a native of the north-west coast of America, from California to latitude 60°, and of the opposite coast of Asia, from the Yellow Sea to the north of Kamtchatka and the intermediate islands. Its fur, which is of a black colour, sometimes chestnut-brown, and oc-

casionally even yellow, is soft, full, and beautiful, and is an object of commerce, being procured by the Russians for the Chinese market, where it sells for a high price.

This animal haunts sea-washed rocks, and lives mostly in the water, where it procures its food, which consists of fish, and, as is indicated by the characters of the teeth, which are evidently formed for bruising hard substances, shelled mollusks, and crustacea. In summer the sea-otter often ascends the rivers to the inland lakes. The female produces on land a single cub. The average length of this species is three feet, exclusive of the tail, which measures about ten inches.

Order—INSECTIVORA.

The animals of this order, as the name implies, are specially appointed to check the overwhelming increase of the insect world, to assist in the work of warfare against hordes of beings individually insignificant, but which, if permitted to multiply uncontrolled, would render the labours of man fruitless. Insects, and especially their larvæ, with slugs, worms, and other creeping things, constitute their food. It is not among the Insectivora that we are to look for the powerful, the fierce, and the terrific. Timid little creatures, they neither alarm us by their presence, nor force themselves upon our notice by their powers or ferocity. Of unobtrusive habits, they elude our cursory observation. They flee from our approach, and they remain in concealment till man withdraws from his labours in the evening, and leaves field and woodland to their revels and enjoyments. Hence it is that their manners and instincts are neither very generally nor very definitely understood. It is true that the structure of their teeth, of which the molars are crowned with sharp elevations, declare the nature of their food, at least to the eye of the naturalist—and that of many, as the mole, their general organization would lead us to infer certain modes of life; but beyond these points the ob-

servation of the animals themselves, living and in the enjoyment of freedom, must instruct us, for by this alone can their nicer instinctive peculiarities be ascertained.

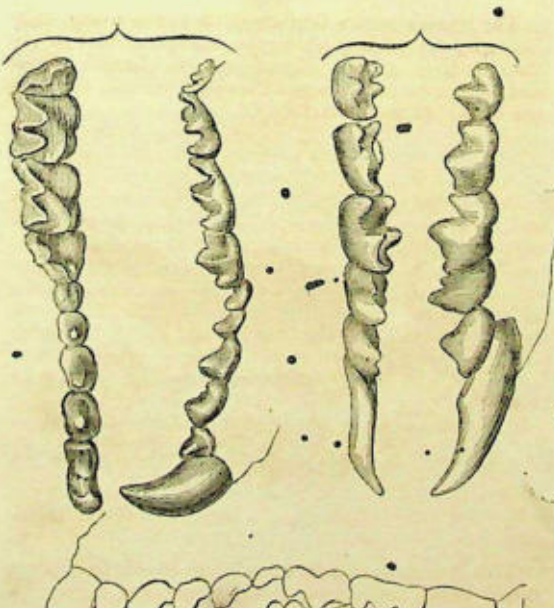
The Common Shrew

(*Sorex tetragonurus*). *Sorex araneus*, Bell; but not of the continental authors.

The Shrews (genus Sorex, divided by Duvernoy into three subgenera, viz. *Sorex*, *Hydrosorex*, *Amphisorex*) constitute a numerous group of little animals, still in much confusion, partly owing to the difficulty of determining the species, and partly to the contrary specific titles which have been given to many of the European species by British and continental naturalists; the latter points, indeed, have been recently cleared up by the Rev. L. Jenyns, who has also added some new species to the British list.

In the genus *Sorex*, including the subgenera, the dentition is as follows:—Middle incisors, $\frac{2}{2}$; lateral incisors, or false molars (in *Sorex*), $\frac{3-3}{3-3}$ or $\frac{4-4}{4-4}$; (in *Hydrosorex*), $\frac{5-5}{2-2}$; (in *Amphisorex*), $\frac{4-4}{2-2}$; canines, $\frac{0-0}{0-0}$; molars, $\frac{4-4}{3-3}$. The true or middle incisors are much produced; the upper ones are curved and notched at the base; the lower ones are almost horizontal, with a smooth edge in *Sorex*, a denticulated edge in *Hydrosorex*, and a smooth edge; but in this subgenus the two first false molars above are of equal size, while in *Sorex* they diminish rapidly in size from the first to the last. Fig. 87 represents the dentition of a species of shrew taken in the Mauritius, six times larger than nature.

The shrews may be known by their long, taper, moveable snout, their velvety fur, and their extremely minute eyes, almost hidden in the surrounding hairs; the ears are small and close; the tail moderately long; and a



87.—Teeth of Shrew.

musky odour is exhaled from small glandular orifices, surrounded by stiff close hairs, situated on the sides of the body. This odour renders the shrews distasteful to the cat (though the latter readily destroys them), but not to weasels, hawks, or owls, which are great enemies to these little nocturnal insectivora.

The common shrew is of a reddish mouse-colour, paler beneath; the tail is quadrangular in adults, rather shorter than the body, and not ciliated beneath. Length of head and body, two inches seven lines; of the tail, one inch ten lines. (Figs. 88 and 89.)

88.—Common Shrew.

This little animal is common in our island, frequenting tufted banks, hedgerows, thickets, gardens, farm-yards, &c., and feeding on worms, and insects, caterpillars, &c., after which it grubs with its long pointed snout among the close herbage or under the soft loose soil. It is very impatient of hunger, and extremely pugnacious, two seldom meeting without engaging in combat; and if two be confined together in a box, the weaker falls a prey to the stronger and is soon partially devoured. Many are killed and eaten by the mole, and in August numbers are often found dead in the lanes, and pathways across the fields, but to what cause their destruction is owing, at the season in question, is not very apparent. As was the case with the hedgehog and some other animals, superstition and ignorance have attributed the most baneful properties to the shrew; it was supposed by our an-

cestors to paralyze the limbs of cattle by merely creeping over them, afflicting them with excruciating torments, and to poison them by its bite. Aristotle, Pliny, and Agricola also attribute poisonous effects to the bite of the shrew, which, as they assert, produces tumours and ulcerations. Agricola states that the Latins called the animal *musaraneus* from its injecting venom into the wound it makes, as does the spider (*aranea*), and he notices the characters of the teeth, and quadrifid figure of the wound they inflict, adding that in warm regions the wound is generally pestiferous, but not in cold climates; his remedial prescription is to place the body of the shrew cut asunder on the injured part. Among our ancestors the remedies were to make the person or animal pass through the arch of a bramble rooted at both ends, or to

89.—Common Shrew.

apply to the limbs of suffering cattle the twigs or leaves of a shrew-ash, that is, an ash into the trunk of which a deep hole had been bored, and a poor devoted shrew plugged in alive.

The voice of the shrew is a shrill, feeble, chirring cry, which may be often heard when the animal is unseen: we have known persons whose ears were unable to catch it, however attentively they have listened, though of other tones they were perfectly susceptible.

The shrew makes long superficial burrows in banks and among the roots of trees and brushwood; the female makes a nest in her retreat of soft herbage, with an aperture at the sides; she breeds in the spring, producing from five to seven young.

The Water-Shrew.

The water-shrew is of a rich velvety brownish black above, and of a nearly pure white beneath, the colours being abruptly separated; the sides of the feet and the under surface of the tail are ciliated or fringed with long, stiff, white hairs. Length of head and body, three inches three lines; of the tail, two inches one line.

This elegant little animal is aquatic in its habits; frequenting clear fresh-water ditches and brooks, in the banks of which it makes extensive burrows; it swims and dives with great address, the sides being spread out, the belly flattened, and the tail extended as a rudder. When diving, the black velvety coat of the animal appears as if beautifully silvered, from the innumerable bubbles of air that cover it. These are pressed out of the fur, which repels the water, the animal being quite dry when it emerges. It has the power of completely closing the orifices of the ears, so as to exclude the water while beneath the surface. These little water-shrews form colonies in certain spots, making runs or tracks along the banks, leading from their subterranean dwellings to the water; when two meet in these, or while

swimming about, they utter their shrill, feeble, querulous cry, perhaps a token of recognition. The water-shrew, though only recognised as a native of our island within the last few years, is not uncommon in most of our counties, and has been captured in Scotland and Devonshire.

These shrews live for the most part "in the banks of rivulets and spring-water ditches, and appear to collect their food, which probably consists of the larvæ of the ephemeral flies, from among the loose mud. If cautiously watched, they may be seen crouching at the mouths of their holes, looking intently on the water. Should a shoal of minnows or stickle-backs pass near, the shrew plunges amongst them, but seldom succeeds in making a capture; and, retiring to his station, looks out for another chance. When pursued by the weasel, they drop into the water, and pass to the other side." These water-shrews are evidently gregarious in their habits, and are very lively and sportive; they feed on aquatic insects, and on such as are accidentally drowned; they root amidst the leaves and mud with their long noses, in search of food, with great earnestness and perseverance, or pursue their insect prey in the water, as the otter gives chase to fish, and with the same determination. They dwell in extensive shallow burrows, excavated in the bank sides. The female breeds in spring, producing from five to seven young at a birth. Their note is a short, shrill, feeble sibilation.

In the 'Magazine of Natural History' for March, 1840, is an interesting account of the water-shrew, by Dr. Barnard Clarke:—"Whilst walking," he says, "by the side of the river Gipping, in May, 1838, between Ipswich and the village of Sproughton, my attention was arrested by several water-shrews actively engaged in a dyke that runs parallel to the river. These little creatures were in such rapid motion on the water, that its surface was thrown into a state of quick undulation, though the dyke was at least four feet wide. At times they would be upon the surface, moving at a rapid rate between the blades of the aquatic plants, consisting

principally of *Sparganium ramosum* and *simplex*, that grew from the bottom. Then they would dive, and for a while remain beneath; but always, on returning to the top, displaying the greatest rapidity in their movements. Whilst above water, they were constantly repeating their faint though shrill tremulous squeak, which appeared as though expressive of pleasurable sensations. On visiting the spot the following evening, and secreting myself, I had the opportunity of remarking the movements of these little animals on land. I found beneath a slightly hanging bank, and close by the water-side, a long gallery, which, though in a great measure naturally formed, yet had been much laboured at by the shrews to render it a convenient viaduct between one hunting-place and another: the grasses and other plants had been removed, as well as here and there small portions of earth, in order to render this passage, in their movements from end to end, as commodious as possible. I observed the shrews continually passing backwards and forwards through this passage, which enabled them to travel with facility from one part of the ditch to another, and which was principally a little above the water-level, but at intervals there were depressions at which the water passes on to or over its floor. This passage was evidently the common property of many shrews, as several were continually running backwards and forwards along its whole extent, and ultimately taking to the water, swimming up and down the ditch, diving, and performing various evolutions in search of their insect prey.

* * * * * * *

* * * * * * *

On emerging from the water, the coat appears perfectly dry, but this is further insured by the little creature giving itself a sudden shake on arriving at its landing-place. I remarked that, in travelling along the above-mentioned gallery, the tremulous shriek is always heard when two shrews happen to pass each other, and the same thing occurs, though not so invariably, in their

movements in the water. When a shrew secured an insect, it quitted the water, and ascended a convenient stone, or the projecting root of a tree, a clod of earth, or some similar body, where at leisure it devoured its prize, steadying the insect with its fore paws, while it nibbled it with the greatest enjoyment. I once traced a pair of shrews into a small hole in a bank by the side of a ditch, where I had been in the habit of observing them; and in order to try and secure them, I carefully removed the earth, when I found that, although the entrance was scarcely larger than just to allow of two shrews passing together, it led into a very capacious vestibule, with galleries leading one into another, and so extensive that there was no possibility of ascertaining their full extent without removing the greater portion of the bank."

The Oared Shrew.

A species termed the Oared Shrew (*Sorex ciliatus*, Sowerby; *Sorex remifer*, Geoffroy) is by most naturalists regarded as distinct, though allied to the Water-Shrew, which it appears to resemble in habits. According to Mr. Yarrell ('Zoological Proceedings,' 1832) the Oared Shrew is distinguishable from the more common Water-Shrew by its greater size and uniform colour; the whole of the upper part of the head, the body, and sides are velvet black; the situation of the ear is marked by a tuft of white hairs, more conspicuous than in the Water-Shrew from the greater contrast of colour. There is a small patch of light brown under the lower jaw; the under surface of the body is rusty black, and the tail is black with a line of pendent grayish-white hairs along its under surface. Dr. Scougal, of Glasgow, states that the Oared Shrew is not uncommon in the neighbourhood of that city, and three specimens were recognised by Dr. Hooker as similar in every respect to the Water-Shrew which he had procured in Norfolk. But then, was not this Water-Shrew the *S. bicolor* or *fodiens?* In the

'Annals of Natural History' for June, 1841, the Reverend Mr. Jenyns observes, "I have seen so many intermediate specimens between this (the Oared Shrew) and the Water-Shrew, that I consider it extremely doubtful whether they be distinct." And he leaves the point as one requiring to be more fully investigated by anatomical comparisons.

Mr. Bell gives the measurement of the Oared Shrew as three inches two lines for the length of the head and body; for the tail two inches one line. Fig. 90 represents the under surface of the hinder feet of—*a*, the common shrew; *b*, the water-shrew; *c*, the oared shrew.

90.—Feet of Shrews.

It would appear that other species of Shrew, besides those we have described, are indigenous in our island. Of these, one which is common in Ireland is termed, by Mr. Jenyns, *Sorex Hibernicus*; to this he had previously applied the title of rusticus, having found it in England, while he regarded the Irish Shrew as distinct: but since they have been proved to be the same, he requests "that the name of *Hibernicus* be hereafter adopted for this species, which, though not confined to Ireland, seems to be the common species in that country, and is much more abundant there than in England, where it gives place in a great measure to the *S. tetragonurus*. It has been observed in different localities in Ireland, and one specimen, sent me by Mr. Thompson, was stated to have been taken in the county of Antrim, at an ele-

vation of 1200 feet above the level of the sea."—'Ann. and Mag. Zoology,' &c., June, 1841, p. 263.

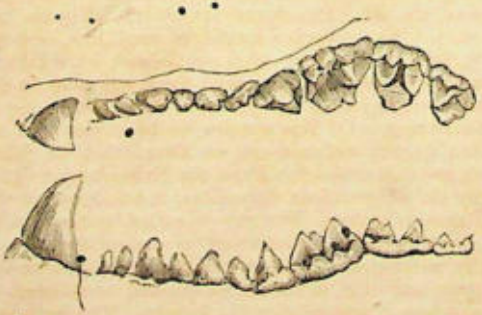
Another species is described by Mr. Jenyns as the Chestnut Shrew (*Sorex castaneus*), of a bright rufous colour: it is closely allied to the Common Shrew, and may perhaps be only a variety.

The number of foreign shrews is very great, but in habits and manners they resemble those of the British islands, their destined work being to thin, in conjunction with other insectivora, the innumerable hosts of insects and small "creeping things" which teem upon the surface of the earth. Was it from this cause that the shrew was among the consecrated animals of the ancient Egyptians? For, strange to say, the mummies of two distinct species have been, after the lapse of so many centuries, discovered in a good state of preservation in the crypts of Thebes and Memphis. Of these, one is the *Sorex giganteus* of Isidore Geoffroy, the *Grande Musaraigne* of Geoffroy, in the 'Catalogue raisonné de M. Passalaqua' (Olivier, 'Voyage en Egypte'). The other is a species of small size, termed, by M. Isidore Geoffroy, *Sorex religiosus*. Of this no fewer than twenty well-preserved specimens exist in the collection of Egyptian antiquities at Paris, belonging to M. Passalaqua. Of this species we have met with no detailed description, nor are we aware that its living prototype is ascertained. From the divine honours paid to it by the superstitious Egyptians, it has received the appellation religiosus. The Shrew, called by the Greeks Mygale, was, as we are informed by ancient authors, especially worshipped in the Athribitic nome (or district) of Egypt, and that it was sacred to, and considered as the mundane representation of, Latona. The supposed blindness of this animal is alleged to have been the cause of its dedication to one of the deities of darkness and concealment.

The Desman (*Mygale moschata*).

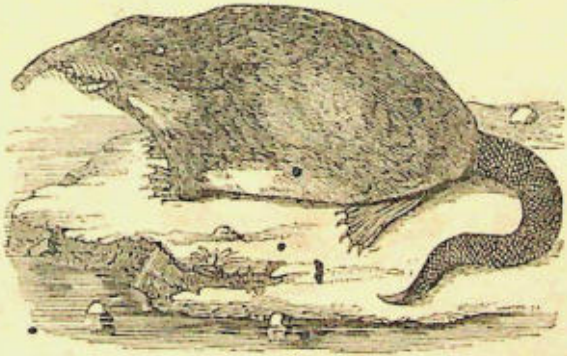
Biesamratze of the Germans; Wychozol of the Russians. The genus *Mygale*, Cuv. (*Myogalla*, Fischer; *Castor*

moschatus, Linn.), presents us with the following dental characters :—Incisors, $\frac{2}{8}$; canines, $\frac{0-0}{0-0}$; molars, $\frac{10-10}{7-7}$; of the molars, the first seven on each side above, and the first four below, are false; between the two large incisors below are two minute teeth, and the two upper incisors are flattened and triangular. See Fig. 91 for the teeth of the upper jaw. In these animals the snout is elongated into a flexible proboscis furrowed down the middle, which they are incessantly turning about; the tail is long, thick, scaly, and compressed at the sides; the eyes are very small; external ears wanting; the fur is full, deep, soft, and glossy, like that of the beaver; the feet are broad and completely webbed, toes five in number (Fig. 92). Two species are known, both aquatic in their habits; the one is the desman or musk-rat of Russia; the other, a smaller species, is found in the Pyrenees.



91.—Teeth of Desman.

The desman measures upwards of ten inches in the length of the head and body, that of the tail being seven (from specimen in Paris Museum). This beaver-like aquatic shrew is abundant in the lakes and rivers of Southern Russia, feeding on worms, aquatic insects, fish,



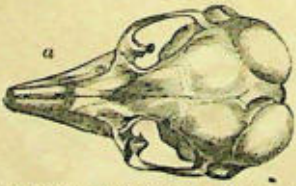
92.—Desman.

and especially leeches, which it searches for in the mud at the bottom of the water with its long flexible snout. Its burrow is deeply hollowed out in steep overhanging banks, the entrance being below the level of the water, whence it rises gradually, so as never to be filled during the highest floods. The desman seldom comes on shore voluntarily, but is often captured in the nets of the fishermen; and it is frequently seen swimming about or diving in pursuit of prey. It exhales a strong musky odour, the secretion of small glandular follicles at the root of the tail; and this flavour of musk it communicates to pikes and other fishes which prey upon it, rendering their flesh disgusting.

The Cape Elephant-Shrew (*Macroscelides typicus*).

Allied to the shrews are some little animals peculiar to Africa, constituting the genus *Macroscelides* of Dr. A. Smith. They are called elephant-mice or elephant-shrews, from the proboscis-like form of the snout; but the scientific name bears reference to the jerboa-like elongation of the hinder limbs. The dentition is as follows:—

Incisors, $\frac{2-2}{2-2}$; false molars (called canines by Dr. Smith), $\frac{4-4}{4-4}$; molars, $\frac{5-5}{5-5}$. We give the skull and teeth of *Macroscelides:*—Fig. 93 is the upper surface

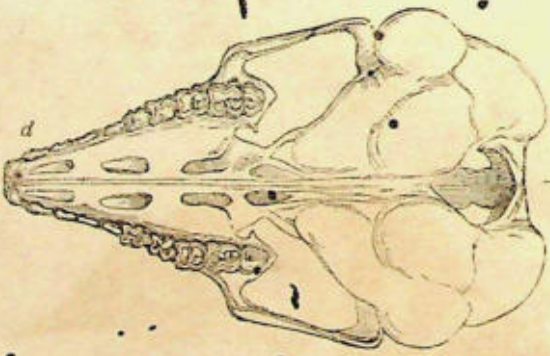


93.—Upper Surface of Skull of Cape Elephant-Shrew.

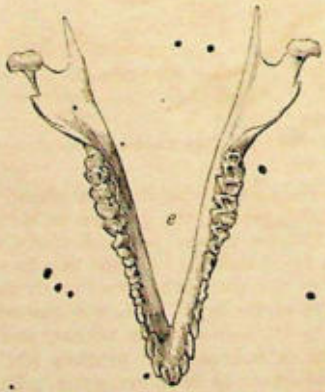
94.—Profile of Upper Part of Skull of Cape Elephant-Shrew.

95.—Lower Jaw of Cape Elephant-Shrew.

of the skull, natural size; 94, profile; 95, lower jaw; 96, under surface of the skull, twice the natural size; 97, the lower jaw, twice the natural size. The nostrils are at the apex of the proboscis; the eyes are moderate; the ears large and rounded; the tail rather long and like that of a mouse. Feet five-toed. The Cape elephant-shrew (*Macroscelides typicus*) is the *Sorex arancus maximus* of Petever. The fur is soft and long; the general colour



96.—Under Surface of Skull of Cape Elephant-Shrew.



97.—Lower Jaw of Cape Elephant-Shrew.

is reddish brown, clouded on the back with a darker tint, the under surface white; the ears nearly naked; whiskers long: length of head and body, three inches and three-quarters; of tail, three inches and a quarter (Fig. 98).

98.—Cape Elephant-Shrew.

This curious animal inhabits open plains, and lives in burrows under ground, the passage to which runs for for some distance almost perpendicularly downwards. During the day it seeks its food, and may be seen basking in the heat of the sun, sitting erect on its hinder legs in the full glare of the rays. When disturbed it flies immediately to its subterranean retreat, and with such velocity, that it is impossible to make out its form or general appearance as it skims along. It feeds upon insects. Six or seven species are known peculiar to South Africa; and one a native of Algiers.

The Solenodon (*Solenodon paradoxus*).

The genus *Solenodon* of Brandt ('Mém. de l'Acad. Impériale des Sciences de St. Pétersbourg,' tome ii.,

livr. 3ème, 1833) contains, as far as yet known, only one species, an animal peculiar to Hayti, where it is known under the name of Agouta. Allied in many respects to the genera *Sorex* and *Mygale*, in the character of the ears, the fur, and the tail it resembles the opossums (*Didelphis*). Its dentition approximates the most nearly to that of *Mygale*. In size the *Solenodon* exceeds a rat; its snout is lengthened into a slender naked proboscis, at the tip of which are the nostrils with a furrow between them; the ears are moderate and rounded; the fur is coarse and long, and of a yellowish red; from the lips and cheeks proceed slender whiskers of great length; the limbs are stout; the toes five on each foot, armed with large hooked claws; the tail is long, rat-like, and scaly, being destitute of hairs. Dentition as follows:—Incisors, $\frac{6}{6}$; false molars, $\frac{6-6}{6-6}$; true molars, $\frac{8-8}{8-8}$. The two middle incisors of the upper jaw are remarkable for their size and the distance between them and the succeeding incisors; they are compressed, pointed, and perpendicular. The zygomatic arch is incomplete, as in the shrews (*Sorex*), the Tenrecs (*Centetes*), the Echinops, &c. Fig. 99 represents the skull and dentition of the solenodon: *a*, skull of solenodon (profile); *b*, seen from above; *c*, seen from below; *d*, mandible or lower jaw; *e*, anterior part of the intermaxillary bone, with the two anterior incisor teeth; *f*, anterior surface of an anterior upper incisor tooth; *g*, anterior parts of the mandible, with the four anterior incisor teeth; *h*, the crown of a second or middle incisor tooth of the mandible, seen on its internal surface and exhibiting its triangular canal. The foregoing figures are nearly of the natural size. Fig. 100: *i*, teeth of the upper jaw seen laterally; 1, 1, nat. size; 2, 2, magnified. (Brandt.) Fig. 101: *a*, the fore foot of solenodon, upper surface; *b*, hind foot, upper surface.

Of the habits of the solenodon little is known: its strong claws and pointed snout, the base of which is sup-

bled, and the formalities which we have just described are gone through, the great body of travellers begin to move, the stations of the different parties of hadjis, according to their provinces and towns, being appointed, and rigidly observed throughout the march. This order is determined by the geographical proximity of the place from which each party comes. At Adjeroud, where the Egyptian caravan halts on the second day's march, it is supplied with water from Suez; and here it reposes a day and a night, to prepare for a forced march of three days and two nights, through a region where there is no water, the desert of El Tyh, which nearly extends from

19.—Camels watering.

the head of one gulf of the Red Sea to the other—that is, from Suez to Akaba. The Hadj route is circuitous. It is here that the privations both of men and quadrupeds commence. The splendid trappings of the camels, their velvets and their bells, have lost their attraction; but their power of endurance becomes the safety of the pilgrims—while the richly-caparisoned horse, impatient of thirst, and more easily subdued by fatigue, is more frequently a burthen to the caravan than an advantage. We may add here that the horse, until he is accustomed to the sight of the camel, is apt to be startled at its

20.—Camel and Horse.

appearance, of which Fig. 20 is a representation. The route of the Egyptian caravan, after it passes Akaba, lies by the shores of the Red Sea for nearly six hundred miles; and, therefore, it cannot properly be said at any time after the first ten days' march to be upon the desert, as the Syrian caravan is for thirty days. But its difficulties are more numerous; and it has to pass regions quite as arid and inhospitable. Every part of Arabia is covered with sandy plains; and when the mountain steeps are crossed, the long extended valleys rarely offer water. The Arabic language is rich in words expressing every variety of desert, differing from each other by very slight shades of meaning: thus, they have terms descriptive of a plain—a plain in the mountain—a plain covered with herbs—a naked sandy desert—a stony desert—a desert with little spots of pasturage—a desert without water.* Although the caravan route from Cairo to Mecca presents, with the exception of the desert El Tyh, none of those enormous wastes, like the great Southern Desert of Arabia, "where the Arabs have only the sun and the

* See Humboldt's Voyage, tom. vi., Note to p. 7.

stars to direct their way;" nor is, like the Libyan desert, "a sea without waters, an earth without solidity, disdaining to hold a foot-print as a testimony of subjection,"* there are many tracts, as well as the desert from Suez to Akaba, in the forty days' journey, which offer to the pilgrim abundance of fatigue and suffering. If water fail, as it sometimes does, even at the wells in particularly dry seasons—if the water-skins evaporate more quickly than they ordinarily do—the camel's power of endurance is severely tried, for his wants are the last attended to. Happy are the pilgrims if the rain of the mountains have filled the banks of some little river. Even the much-enduring camels, at the sight of water, after many days' abstinence, break the halters by which they are led, and in rushing or stumbling down the banks throw off their loads, and occasion infinite disorder.† Mr. Buckingham has however described a scene in which the patience of the camel is contrasted in a remarkable way with the eagerness of the horse:—"It was near midnight when we reached a marshy ground, in which a clear stream was flowing along, through beds of tall and thick rushes, but so hidden by these, that the noise of its flow was heard long before the stream itself could be seen. From the length of the march, and the exhausting heat of the atmosphere, even at night, the horses were exceedingly thirsty: their impatient restlessness, evinced by their tramping, neighing, and eager impatience to rush all to one particular point, gave us indeed the first indications of our approach to water, which was perceptible to their stronger scent long before it was even heard by us. On reaching the brink of this stream, for which purpose we had been forcibly turned aside, by the ungovernable fury of the animals, to the southward of our route, the banks were found to be so high above the surface of the water, that the horses could not reach it to drink. Some, more impatient than the rest, plunged themselves and their riders at once into the current; and, after being led swimming to a less

* Purchas. † Burckhardt's Nubia, p. 368.

elevated part of the bank over which they could mount, were extricated with considerable difficulty; while two of the horses of the caravan, who were more heavily laden than the others, by carrying the baggage as well as the persons of their riders, were drowned. The stream was narrow, but deep, and had a soft muddy bottom, in which another of the horses became so fastly stuck, that he was suffocated in a few minutes. The camels marched patiently along the edge of the bank, as well as those persons of the caravan who were provided with skins and other vessels containing small supplies of water; but the horses could not, by all the power of their riders, be kept from the stream, any more than the crowd of thirsty pilgrims, who, many of them having no small vessels to dip up the water from the brook, followed the example of the impatient horses, and plunged at once into the current. . . . This scene—which, amidst the obscurity of the night, the cries of the animals, the shouting and quarrelling of the people, and the indistinct and perhaps exaggerated apprehensions of danger from a totally unexpected cause, had assumed an almost awful character—lasted for upwards of an hour."*

Fig. 21 represents this scene with considerable spirit.

Of the sufferings endured on some occasions, particularly by the smaller caravans, Burckhardt relates an interesting story that happened in the Nubian desert, which beautifully illustrates the surprising instinct of the camel. It was told to him by a man who had himself suffered all the pangs of death:—

"In the month of August a small caravan prepared to set out from Berber to Daracu. They consisted of five merchants and about thirty slaves, with a proportionate number of camels. Afraid of the robber Naym, who at that time was in the habit of waylaying travellers about the well of Nedjeym, and who had constant intelligence of the departure of every caravan from Berber, they determined to take a more eastern road, by the well Owareyk. They had hired an Ababde guide, who

* Buckingham's Mesopotamia.

21.—Camels watering.

conducted them in safety to that place, but who lost his way from thence northward, the route being very unfrequented. After five days' march in the mountains their stock of water was exhausted, nor did they know where they were. They resolved, therefore, to direct their course towards the setting sun, hoping thus to reach the Nile. After two days' thirst, fifteen slaves and one of the merchants died; another of them, an Ababde, who had ten camels with him, thinking that the camels might know better than their masters where water was to be found, desired his comrades to tie him fast upon the saddle of his strongest camel, that he might not fall down from weakness; and thus he parted from them, permitting his camels to take their own way: but neither the man nor his camel were ever heard of afterwards. On the eighth day after leaving Owareyk, the survivors came in sight of the mountains of Shigre, which they immediately recognised; but their strength was quite exhausted, and neither men nor beasts were able to move any farther. Lying down under a rock they sent two of their servants, with the two strongest remaining camels, in search of water. Before these two men could reach the mountain, one of them dropped off his camel deprived of speech, and able only to move his hands to his comrade as a signal that he desired to be left to his fate. The survivor then continued his route; but such was the effect of thirst upon him that his eyes grew dim, and he lost the road, though he had often travelled over it before, and had been perfectly acquainted with it. Having wandered about for a long time, he alighted under the shade of a tree, and tied the camel to one of its branches; the beast, however, smelt the water (as the Arabs express it), and, wearied as it was, broke its halter, and set off galloping furiously in the direction of the spring, which, as it afterwards appeared, was at half an hour's distance. The man, well understanding the camel's action, endeavoured to follow its footsteps, but could only move a few yards; he fell exhausted on the ground, and was about to breathe his last, when Providence led that way, from a neighbouring encampment,

a Bisharye Bedouin, who, by throwing water upon the man's face, restored him to his senses. They then went hastily together to the water, filled the skins, and, returning to the caravan, had the good fortune to find the sufferers still alive. The Bisharye received a slave for his trouble. My informer, a native of Yembo, in Arabia, was the man whose camel discovered the spring; and he added the remarkable circumstance, that the youngest slaves bore the thirst better than the rest, and that, while the grown-up boys all died, the children reached Egypt in safety."

The phenomenon of the *mirage* excites in the pilgrim of the deserts those alternations of hope and disappointment which add to the miseries of his actual situation. He sees before him lakes of water, which are gone the instant he arrives at the spot where he fancied they offered their refreshment to his feverish lips. The Arabs are familiar with this remarkable appearance, and they are seldom deceived by it; although, if the mirage and a real stream could be seen at the same time, it would be difficult to distinguish the reality from the delusion.* The guides of the European traveller often amuse themselves by calling to him that water is in sight, when they are upon the most thirsty spots of a sandy or gravelly plain. Burckhardt has described the mirage with his usual felicity:†—"During the whole day's march we were surrounded on all sides by lakes of mirage, called by the Arabs serab. Its colour was of the purest azure, and so clear that the shadows of the mountains which bordered the horizon were reflected in it with the greatest precision, and the delusion of its being a sheet of water was thus rendered still more perfect. I had often seen the mirage in Syria and Egypt, but always found it of a whitish colour, rather resembling a morning mist, seldom lying steady on the plain, but in continual vibration; but here it was very different, and had the most perfect resemblance to water. The great dryness of the air and earth in this desert may be the cause of the difference.

* Lyon, p. 347. † Nubia, p. 193.

The appearance of water approached also much nearer than in Syria and Egypt, being often not more than two hundred paces from us, whereas I had never seen it before at a distance of less than half a mile. There were at one time about a dozen of these false lakes around us, each separated from the other, and for the most part in the low grounds." The mirage is caused by the extraordinary refraction which the rays of the sun undergo in passing through masses of air in contact with a surface greatly heated. These atmospheric delusions are not confined to the appearance of water in the desert. The traveller fainting beneath a burning sun sees a tree in the distance, sufficiently large for him to find a shade beneath its boughs. He quickens his pace, hoping to enjoy half an hour of refreshing coolness before his camels shall have passed. The tree is really a miserable shrub, that does not afford shade enough to shelter one of his hands. This magnifying of objects is produced by the slight vapour which rises when the heat is greatest. When the sun gleams on the sand-hills, they appear at an immense distance; the traveller hopes that his camels may be spared the pain of crossing these slippery ascents,—when in a few minutes he is close upon them, and sees a man or a camel, within a stone's throw, toiling to the top.* As the sun ascends towards the zenith, and the earth and the currents of air assume different temperatures, the phenomena of the mirage present numerous modifications. Humboldt states that in the plains of South America, where the air is very dry, he often saw the images of troops of wild oxen, suspended in the air, long before the eye could see the oxen themselves; and the small currents of air were of such a variable temperature, that the legs of some appeared to rest upon the ground, while others were elevated above it. In Arabia, Niebuhr observed the image of an animal reversed, before he saw the direct image. Sometimes towers and large masses of apparent buildings are seen upon the horizon, which disappear at intervals, without

* See Lyon, p. 347.

turesque landscape to charm the sight, not a tree to relieve the monotonous outline of the hills, nor sufficient verdure to clothe their rocky sides—where either we were lighted only by the stars, or scorched by the sun an hour after its rising—its tediousness may be easily conceived." And yet even the desert has its pleasures, —when the caravan reaches some wished-for fountain, and finds a patch of verdure, or a few shrubs, after many hours of privation. Major Denham has prettily described a scene of this nature:—"The day had been oppressively hot, my companions were sick and fatigued, and we dreaded the want of water. A fine dust, arising from a light clayey and sandy soil, had also increased our sufferings: the exclamations of the Arab who first discovered the wells were indeed music to our ears; and after satisfying my own thirst, with that of my weary animals, I laid me down by one of the distant wells, far from my companions; and these moments of tranquillity, the freshness of the air, with the melody of the hundred songsters that were perched amongst the creeping plants, whose flowers threw an aromatic odour all around, were a relief scarcely to be described." The happiness of such a contrast must naturally be great; and so many writers have described this pleasure, that the idea has passed from the poetical into the popular language even of the west—and thus the recollection of an interval of joy, amidst a life of suffering—

"The greenest spot
In memory's waste"—

is the oasis in the desert.

And yet to an imaginative mind, stored with knowledge, and ardent in the pursuit of new objects of research, even the dreariest wilds of the desert have their charm. Burckhardt, according to Captain Beechey, "has frequently been heard to declare that his most pleasant hours in travelling had been passed in the desert;" and Captain Beechey, himself an adventurous traveller, has well explained this:—"If the desert have terrors peculiar to itself, it has also its peculiar pleasures. There is

something imposing, we may say sublime, in the idea of unbounded space which it occasionally presents; and every trifling object which appears above its untenanted surface assumes an interest which we should not, on other occasions, attribute to objects of much greater importance. The little romance which its stillness and solitude encourage, is at the same time grateful to the feelings; and one may here dream delightfully of undisturbed tranquillity and independence, and of freedom from all the cares, the follies, and the vices of the world." A principal source of this calm of the mind, when surrounded by real hardships and cheerless solitudes, must spring from that feeling which is one of the most elevating of all the various trains of human thought,—the consciousness of an earnest determination to struggle with difficulties. Whether the privations of the uncivilized or the crosses of the social life are to be overcome, to meet the evil, whatever it be,—

> "Nor bate a jot
> Of heart or hope, but still bear up and steer
> Right onward;"—

this is in itself a triumph; and the world can give nothing better than those moments when a man feels that he has looked dangers and annoyances in the face, and that he shall surmount them.

The hot wind of the deserts has been described as producing the most fatal effects,—as suffocating men and beasts in an instant. This is one of the exaggerations which attach to such remarkable phenomena, they being generally described by persons who have only heard of their results. Burckhardt, who seldom relates anything but of his own knowledge, was very anxious to prove the truth of these relations; and, according to the accounts which he had from the Arabs, as well as from his own experience, the evil, though a serious one, is not so tremendous as travellers in general have pretended:—

"I again inquired, as I had often done before, whether my companions had often experienced the semoum (which we translate by the 'poisonous blast of

the desert,' but which is nothing more than a violent south-east wind). They answered in the affirmative, but none had ever known an instance of its having proved fatal. Its worst effect is, that it dries up the water in the skins, and so far it endangers the traveller's safety. In these southern countries, however, water-skins are made of very thick cow-leather, which are almost impenetrable to the semoum. In Arabia and Egypt, on the contrary, the skins of sheep or goats are used for this purpose; and I witnessed the effect of a semoum upon them, in going from Tor to Suez overland, in June, 1815, when in one morning a third of the contents of a full water-skin was evaporated. I have repeatedly been exposed to the hot wind in the Syrian and Arabian deserts, in Upper Egypt and Nubia. The hottest and most violent I ever experienced was at Suakin; yet, even there, I felt no particular inconvenience from it, although exposed to all its fury in the open plain. For my own part, I am perfectly convinced that all the stories which travellers or the inhabitants of the towns of Egypt and Syria relate of the semoum of the desert are greatly exaggerated, and I never could hear of a single well-authenticated instance of its having proved mortal either to man or beast. The fact is, that the Bedouins, when questioned on the subject, often frighten the townspeople with tales of men, and even of whole caravans, having perished by the effects of the wind: when, upon closer inquiry, made by some person whom they find not ignorant of the desert, they will state the plain truth. I never observed that the semoum blows close to the ground, as commonly supposed, but always observed the whole atmosphere appear as if in a state of combustion: the dust and sand are carried high into the air, which assumes a reddish, or bluish, or yellowish tint, according to the nature and colour of the ground from which the dust arises. The yellow, however, always, more or less, predominates. In looking through a glass of a light yellow colour, one may form a pretty correct idea of the appearance of the air, as I observed it during a stormy semoum at Esne, in Upper Egypt, in May, 1813. The

semoum is not always accompanied by whirlwinds; in its less violent degree it will blow for hours with little force, although with oppressive heat; when the whirlwind raises the dust, it then increases several degrees in heat. In the semoum at Esne the thermometer mounted to 121° in the shade; but the air seldom remains longer than a quarter of an hour in that state, or longer than the whirlwind lasts. The most disagreeable effect of the semoum on man is, that it stops perspiration, dries up the palate, and produces great restlessness. I never saw any person lie down flat upon his face to escape its pernicious blast, as Bruce describes himself to have done in crossing this desert; but during the whirlwinds the Arabs often hide their faces with their cloaks, and kneel down near their camels, to prevent the sand or dust from hurting their eyes. Camels are always much distressed, not by the heat, but by the dust blowing into their large, prominent eyes: they turn round and endeavour to screen themselves by holding down their heads; but this I never saw them do except in case of a whirlwind, however intense the heat of the atmosphere might be. In June, 1813, going from Esne to Siout, a violent semoum overtook me upon the plain between Farshyout and Berdys; I was quite alone, mounted upon a light-footed hedjin. When the whirlwind arose, neither house nor tree was in sight; and while I was endeavouring to cover my face with my handkerchief, the beast was made unruly by the quantity of dust blown into its eyes and the terrible noise of the wind, and set off at a furious gallop; I lost the reins, and received a heavy fall, and, not being able to see ten yards before me, I remained wrapped up in my cloak on the spot where I fell until the wind abated; when, pursuing my dromedary, I found it at a great distance, quietly standing near a low shrub, the branches of which afforded some shelter to its eyes.

"Bruce has mentioned the moving pillars of sand in this desert, but, although none such occurred during my passage, I do not presume to question his veracity on this head. The Arabs told me that there are often

whirlwinds of sand, and I have repeatedly passed through districts of moving sands, which the slightest wind can raise; I remember to have seen columns of sand moving about like waterspouts in the desert, on the banks of the Euphrates, and have seen at Jaka terrible effects from a sudden wind; I therefore very easily credit their occasional appearance on the Nubian desert, although I doubt of their endangering the safety of travellers."

In a subsequent part of his travels in Nubia, the same accurate observer, to whom we are under so many obligations in this account of the camel, has described the most tremendous hurricane of the desert which he ever witnessed:—"A dark blue cloud first appeared, extending to about 25° above the horizon; as it approached nearer and increased in height, it assumed an ash grey colour, with a tinge of yellow, striking every person in the caravan, who had not been accustomed to such phenomena, with amazement at its magnificent and terrific appearance. As the cloud approached still nearer, the yellow tinge became more general, while the horizon presented the brightest azure. At last, it burst upon us in its rapid course, and involved us in darkness and confusion: nothing could be distinguished at the distance of five or six feet: our eyes were filled with dust; our temporary sheds were blown down at the very first gust, and many of the more firmly fixed tents followed; the largest withstood for a time the force of the blast, but were at last obliged to yield, and the whole camp was levelled with the ground. In the mean time, the terrified camels arose, broke the cords by which they were fastened, and endeavoured to escape from the destruction which appeared to threaten them." Some writers state that camels, at the very first blast of the semoum, bury their noses in the sand.

Such are the dangers to which a caravan travelling through the deserts of Asia and Africa* is exposed;

* Humboldt has calculated, from maps constructed upon a large scale, that the great desert of Africa, without including Bornou and Darfour extends over 194,000 square

and, however splendidly appointed may be the caravans of the Hadj, they cannot escape these dangers, or materially diminish the privations of all those who pass over such dreary regions. It must be quite evident that, without the camel, the journey would be totally impossible. With this useful creature, whose value to the pilgrim is beyond all price, its difficulties are alleviated and its dangers averted; and if men can, in any degree, emulate the camel's endurance and abstinence, as the Arabs do by constant habit, there may be hunger, and thirst, and fatigue, but exhaustion and death will be battled with, and the weak, the faint of heart, and the luxurious only will fall in the struggle.

The camel is not only valuable as a beast of burden, its milk is in requisition: it is the milk used for ordinary purposes by the Arabs, that of goats and sheep being generally made into butter. The Arab feeds his colt with it, and even gives it to his mare. Flour made into a paste with sour camel's milk is a common dish among the Bedouins; it is called ayesh. Rice or flour boiled with sweet camel's milk is another: it is called behatta.

Though the flesh of the camel was among the meats prohibited to the Jews, it is not only eaten, but relished, by the Arabs: it is not often, however, that the Arab kills a camel in order to enjoy this luxury. When this does happen, the flesh is cut into large pieces: some part is boiled, and its grease mixed with borgoul (wheat boiled with some leaven and then dried in the sun); part is roasted, and, like the boiled, put upon the dish of borgoul. The whole tribe then partakes of the delicious feast. The grease of the camel is kept in goat-skins, and used like butter. The woolly hair of the camel, which towards the close of spring is loose and easily pulled away from the skin, is applied to various purposes and woven into coarse cloth used as tent-coverings. Even the dung of the camel is not neglected: it forms the chief material for fuel in Egypt, Arabia,

leagues. The immensity of this waste will be apparent, when it is considered that the Mediterranean sea only occupies 79,800 square leagues.

and Persia, and from the smoke, or rather soot, of this fuel is obtained sal-ammoniac, which was formerly procured almost exclusively from this source, and for the manufacturing of which there were, in 1720, laboratories at Cairo and other towns in Egypt.

At San Rossora the Tuscan government established a stud of camels for the purpose of carrying fagots, hay, straw, &c., from the domain of San Rossora to Pisa and other towns. It would appear that this establishment was founded about the middle of the seventeenth century, in the reign of the Grand-Duke Ferdinand de' Medici II. In 1789 it consisted of one hundred and ninety-six camels, male and female, and in 1810 of about one hundred and seventy. Of its actual state we have no recent authentic information.

M. Santi, professor of natural history at Pisa, published at Paris in 1811, in the 'Annales du Muséum d'Histoire Naturelle,' an interesting and scientific account of the natural history of the camel, as observed at Rossora. He says the female camel goes with young between eleven and twelve months, at the end of which time she has one foal. There has been no example at San Rossora of more than one being produced at a birth. The little one is at first unable to stand upon its legs; and, as the mother will not stoop so as to allow it to suck, it would perish with hunger if the keeper did not lift it up to receive the nourishment which nature has provided. This assistance is rendered to the helpless creature for five or six days, during which time it acquires strength to stand upon its legs. We can find no account of the camels of the East which mentions this circumstance: it may perhaps be an evidence of the degeneration of the species in Europe. It is probable, however, that the Arabs, who are distinguished for their extreme care of their camels and horses, may afford the same aid to the young, although the fact has not been noticed. In a wild state, it is evident that the dam must stoop, or the young camel stand up to suck; if otherwise, the race could not be continued.

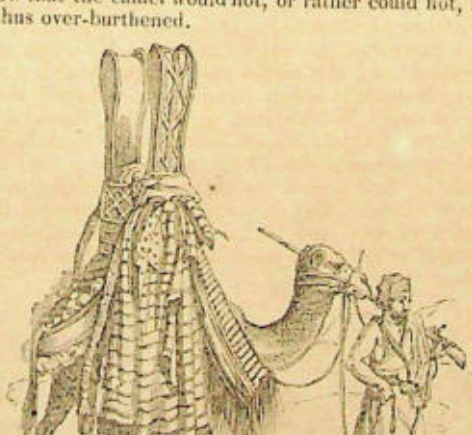
During the winter the working camels of Pisa are fed

with hay, in large stables; but during the remainder of the year they are turned out to pasture with the rest, who remain without shelter during all seasons. The green and tender grass, which other cattle eat with so much avidity, is neglected by these camels; but they greedily devour the leaves of the oak, of the cork-oak, and of the alder, and feed with manifest delight on every hard and dry substance which they can find, such as the thorn, the thistle, and the broom. They drink only once a-day.

Of the mode of breaking and training the camel by the people of the East we have no complete account. M. Santi supplies this information, with regard to those of Tuscany. At the age of four years a camel which is intended for labour is broken in. The trainers first double up one of his fore legs, which they tie fast with a cord; they then pull the cord, and thus usually compel the animal to fall upon his bent knee. If this does not succeed, they tie up both legs, and he falls upon both knees, and upon the callosity which is upon his breast. They often accompany this operation with a particular cry, and with a slight blow of a whip. At this cry and blow, with the addition of a sudden jerk downwards of his halter, the camel gradually learns to lie down upon his belly, with his legs doubled under him, at the command of his driver. The trainers then accustom him to a pack-saddle, and place on it a load, at first light, but increased by degrees as the animal increases in docility; till at last, when he readily lies down at the voice of his driver and as readily rises up with his load, his education is so far complete. The burthen of a full-grown camel of Pisa is sometimes four hundred kilogrammes (above 800 lbs.); but such a load, if we may judge by other accounts, is excessive.

He is accustomed, in the same gradual manner, to allow his driver to mount, and to obey all his orders, and even his motions, in the direction of his course. M. Santi says that it is neither a tedious nor a difficult task thus to subdue an animal of a timid and gentle nature, without defence, and whose spirit has been broken by a long course

of slavery. The camels of Pisa, he adds, do not complain with their voices if too heavily laden; but it would appear that the experience and humanity of the Tuscan guides prevent the necessity for this complaint, as they know that the camel would not, or rather could not, rise, if thus over-burthened.



22.—Camel carrying a Bride.

The Moors introduced the camel into Spain, and after the conquest of Granada, and the expulsion of the Moorish inhabitants, many of these animals remained in the southern districts; but the race was not kept up, and therefore Spain, where in various localities the camel would be peculiarly serviceable, no longer possesses this useful animal. We learn that camels have been lately imported into South America from the Canary Islands with a probability of success.

The camel has bred in the gardens of the Zoological Society.

The colour of this animal, as of most domestic animals, is subject to variety. The brown colour appears not to be esteemed; reddish or light gray is preferred. Occasionally black camels are seen. In Egypt the average price of one of these beasts of burden is from thirty to fifty dollars; but the swift Oman camels, which are much valued, sell at a higher rate, and Burckhardt mentions an instance in which three hundred dollars were given for one. When travelling in Nubia, Burckhardt saw the camel almost in a wild state, whole herds being left to pasture unattended by men: they were kept for the sake of their flesh and milk, few being employed as beasts of burden; they even appeared frightened at the approach of men and loaded camels—a circumstance this traveller had never before witnessed. The Nubian camels are generally white.

23.—Swift Camel, mounted.

21.—Malefactor paraded on Camel.

Many of our pictorial specimens of the camel are illustrative of scenes in its domestic life, and consequently of the manners of the people whose servant it is, and with whose history its own is intimately connected. Fig. 22,—Camel carrying a Bride. "One of the greatest solemnities of these simple Arab tribes is that of conducting a bride to her husband. The lady is placed in a frame on the back of a camel, and is housed over with carpets, shawls, and ostrich-feathers. The camel is led by a relation of the bride, preceded by dancing people, music, mounted and dismounted Arabs, who shout and fire their guns, running backward and forward in the procession. Captain Lyon made a drawing of the bridal camel and his trappings." Fig. 23—the Swift Camel, mounted. "The wandering Arab and his Maherry have an extraordinary appearance, which Captain Lyon has described. The saddle is placed on the withers, and confined by a band under the belly. It is very small and difficult to set, which is done by balancing the feet against the neck of the animal and holding a tight rein to steady the hand." Fig. 24—a Malefactor after punishment, paraded on a camel; his crime and sentence being proclaimed as he is led along. Fig. 25—an Attack, by Arab robbers, upon a Caravan in the Desert. Fig. 26—a Bedouin Encampment. "Those who are, from reading or travelled observation, conversant with the existing manners of the Asiatic pastoral tribes, as the Arabians and the Tartars, can easily form in their minds a picture of this great migrating party. Under the conduct of their venerable emir, and the active direction and control of his principal servants, we behold, from the distance, a lengthened dark line stretching across the plain, or winding among the valleys, or creeping down the narrow pathway on the mountain-side. That in this line there are hosts of camels we know afar off by the grotesque outline which the figures of these animals make, their tall shapes, and their length of neck; and that the less distinguishable mass which appears in motion on the surface of the ground is composed of flocks of sheep, and perhaps goats, we can only

23.—Attack by Arab Robbers.

infer from circumstances. On approaching nearer we find that all this is true, and that, moreover, many of the camels are laden with the tents, and with a few utensils and needments which the dwellers in tents require; and if the natural condition of the traversed country be such as to render the precaution necessary, some of the animals may be seen bearing provisions and skins of water. The baggage camels follow each other with steady and heavy tread, in files, the halter of those that follow being tied to the harness of those that precede, so that the foremost only needs a rider to direct his course; but nevertheless women, children, and old men are seen mounted on the other burdens which some of them bear. These are slaves, retainers, and other persons not actively engaged in the conduct of the party, and not of sufficient consequence to ride on saddled dromedaries. Such are reserved for the chiefs of the party, their women, children, relatives, and friends; and are not, unless it happen for convenience, strung together like the drudging animals which bear the heavier burdens."

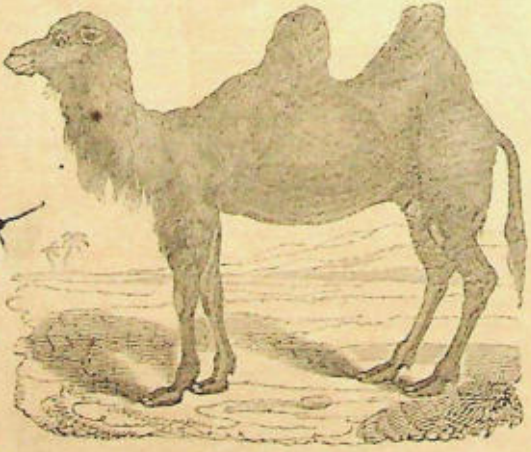
THE BACTRIAN CAMEL (*Camelus Bactrianus*).

This species is at once to be distinguished from the Arabian by the presence of two humps on the back. (Fig. 27.) It is comparatively rare, and limited in the extent of geographic range: it is spread, however, through central Asia, Thibet, and China, and is reported to exist in a wild state in Turkestan, anciently Bactriana. Pallas states that very large camels with two hunches occur wild in the deserts of Shamo, towards the frontiers of China; but as the Calmucks liberate all animals upon a principle of religion, we may conclude that these camels are the descendants of the domestic stock. Occasionally the Bactrian camel is seen in Egypt and Arabia: during his travels through the latter country Niebuhr saw three, and only three, specimens: and Mr. Mac Farlane met with only one in Asia Minor, which came from some remote province.

In 1829 a Bactrian camel was daily led about the

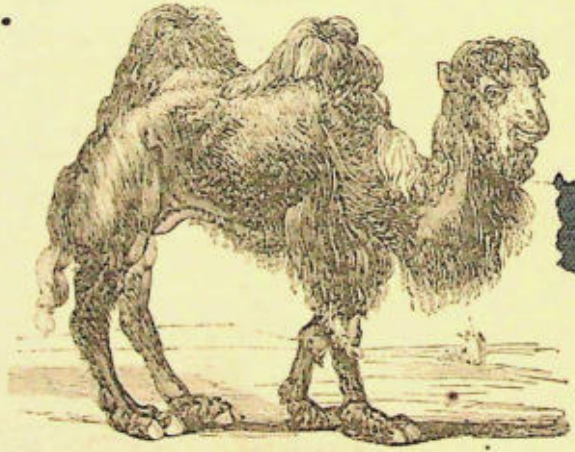
26.—Bedouin Encampment.

streets of London; it was a very fine male, of a dark rusty-brown colour, and very picturesque and striking in appearance, walking with a stately pace, and apparently well able to bear our climate. His hair was full, long, and shaggy, and hung like a fringe along his throat. (Fig. 28.) The natural country of this species, viz. the great middle zone of Asia, to the north of the Taurus and the Himalayah mountains, is very different in temperature from the hot regions of Arabia, whence it is probable that it might with due precautions become naturalized in Europe.



27.—Bactrian Camel.

The manners of the Bactrian camel are the same as those of the Arabian, and its utility is as great as that of the latter. It is the patient, laborious, and willing slave of man, travelling over sandy deserts, and administering to the wants of a wandering people.



28.—Bactrian Camel.

The height of this species is about eight feet between the two humps.

Here, then, we conclude our sketch of the history of the camel—an animal, in the countries for which it is specially organized, the most important and valuable to man, and one of the earliest which he reclaimed to his service. It is true that it has not spread, like the horse and the ox, over the whole globe, but the reason is evident: out of its own regions its value and importance are diminished; within them no other beast of burden can compete with it, and for ever will it remain, as it is and has been, the ship of the desert.

Genus Auchenia.

The Llama.

Under the general term Llama are comprehended three, if not more species, which belong to the same

section of the Ruminants as the camel (*Camelidæ*). Indeed the llama was referred by Linnæus, and other naturalists of the last century, to the genus *Camelus;* from which Illiger separated it, and assigned it to a genus which he established under the title of *Auchenia*, in allusion to the length and slenderness of the neck, for which the llamas are remarkable.

The llamas may be regarded as the analogues of the camel; and, in the Cordilleras of Peru and Chili, are the mountain representatives of that desert-born servant of man.

29.—Foot of Llama.

In outward form, excepting that there is no hump on the back, in the general structure and cellular apparatus of the stomach, with the concomitant power of enduring thirst or abstaining for a long season from water, in the expression of the large full overhung eye, in the mobility and division of the upper lip, the fissured nostrils, the slender neck, and meagre limbs, together

with the long woolly character of the clothing, the llama and the camel exhibit striking points of agreement. The foot of the camel, however, with its broad elastic pad, expressly adapted for traversing the sands of the desert, differs in its modification from that of the llama, destined to inhabit the rough and rocky Cordilleras, along the craggy sides of which the llama proceeds with a free and fearless step.

The foot of the llama (Fig. 29) consists of two springy toes, completely divided, each with a rough cushion beneath, and provided at the end with a strong short hoof; these hoofs are pointed at the tip, and hooked down somewhat like a claw; they are compressed laterally, and the upper surface represents an acute ridge; the under surface is linearly concave—a form well fitted for a mountain climber.

When the Spaniards first invaded Peru and Chili, they found the llama domesticated and used as a beast of burden, its flesh and wool being also in great request. (Fig. 30.) It was their only beast of burden: its flesh was eaten, its skin prepared into leather, and its wool spun and manufactured into cloth. One of the labours to which the llama was subjected was that of bringing down ore from the mines among the mountains: its ordinary load was eighty or one hundred pounds, and its average rate of travelling with its burden twelve to fifteen miles a-day, over rugged mountain-passes; but, like the camel, if too heavily laden it would lie down, and obstinately refuse to proceed, nor would it bear to be urged beyond its accustomed pace. Gregory de Bolivar estimated that in his day three hundred thousand were employed in the transport of the produce of the mines of Potosi alone, and four millions annually killed for food.

Augustin de Zerate, treasurer-general of Peru, in 1544, under the Spanish dominion, thus describes the llama, which he calls a sheep, though it is, he observes, camel-like in shape, but destitute of a hump:—"In places where there is no snow the natives want water, and to supply this they fill the skins of sheep with water,

30.—Tame Llama (white).

and make other living sheep carry them, for it must be remarked these sheep of Peru are large enough to serve as beasts of burden. They can carry about one hundred pounds or more, and the Spaniards used to ride them, and they would go four or five leagues a-day. When they are weary they lie down upon the ground, and, as there are no means of making them get up, either by

beating or assisting them, the load must of necessity be taken off. When there is a man on one of them, if the beast is tired, and urged to go on, he turns his head round, and discharges his saliva, which has an unpleasant odour, into the rider's face. These animals are of great use and profit to their masters, for their wool is very good and fine, particularly that of the species called Pacas, which have very long fleeces; and the expense of their food is trifling, as a handful of maize suffices them, and they can go four or five days without water. Their flesh is as good as that of the fat sheep of Castile. There are now public shambles for the sale of their flesh in all parts of Peru, which was not the case when the Spaniards came first; for when one Indian had killed a sheep his neighbours came and took what they wanted, and then another Indian killed a sheep in his turn."

D'Acosta gives nearly a similar testimony; and notices two kinds (species)—one which is woolly, and called Paco by the natives; the other covered with a slight fleece (*villis levibus*) only, and nearly naked, whence it is more fitted for carrying burthens, called Guanaco. Captain G. Shelvocke, an Englishman who sailed round the world in 1719-22, thus describes the llamas which he saw at Arica, in Peru:—

"For the carriage of the guana the people at Arica generally use that sort of little camels which the Indians of Peru call *llamas;* the Chilese, *chilihueque;* and the Spaniards, *carneros de la tierra*, or native sheep. The heads of these animals are small in proportion to their bodies, and are somewhat in shape between the head of a horse and that of a sheep, the upper lips being cleft, like that of a hare, through which they can spit to the distance of ten paces against any one who offends them; and if the spittle happens to fall on the face of a person, it causes a red itchy spot. Their necks are long and concavely bent downwards, like that of a camel, which animal they greatly resemble, except in having no hunch on their backs, and in being much smaller. Their ordinary height is from four feet to four and half, and their

ordinary burden does not exceed an hundredweight. They walk, holding up their heads, with wonderful gravity, and at so regular a pace as no beating can quicken. At night it is impossible to make them move with their loads, for they lie down till these are taken off, and then go to graze. Their ordinary food is a sort of grass called ycho, somewhat like a small rush, but finer, and has a sharp point, with which all the mountains are covered exclusively. They eat little, and never drink, so that they are easily maintained. They have cloven feet, like sheep, and are used at the mines to carry ore to the mills; and, as soon as loaded, they set off without any guide to the place where they are usually unloaded.

"They have a sort of spur above the foot, which renders them sure-footed among the rocks, as it serves as a sort of hook to hold by.* Their hair, or wool rather, is long, white, gray, and russet, in spots, and fine, but much inferior to that of the vicunna (*vigonia*), and has a strong and disagreeable scent.

"The vicuña is shaped much like the llama, but much smaller and lighter, their wool being extraordinarily fine, and much valued. These animals are often hunted after the following manner:—Many Indians gather together, and drive them into some narrow pass, across which they have previously extended cords about four feet from the ground, having bits of wool or cloth hanging to them at small distances. This so frightens them that they dare not pass, and they gather together in a string, when the Indians kill them with stones tied to the ends of leather thongs. Should any guanacos happen to be among the flock, these leap over the cords and are followed by all the vicunnas. These *guanacos* are larger and more corpulent, and are also called viscachas.

"There is yet another animal of this kind, called *alpagnes* (alpacas), having wool of extraordinary fineness; but their legs are shorter, and their snouts con-

* This is fabulous.

tracted in such a manner as to give them some resemblance to the human countenance.

"The Indians make several uses of these creatures; some of which carry burdens of about an hundredweight. Their wool serves to make stuffs, cords, and sacks; their bones are used for the construction of weavers' utensils; and their dung is employed as fuel for dressing meat and warming their huts."*

31.—Guanaco.

With respect to the distinct species of llama, we learn from De Laet that, besides the domestic race, there are in Peru and Chili various wild animals, of which some are called Guanaco, or Huanacu (Fig. 31), whence, from their resemblance to the tame breed, the latter have obtained the same appellation. Their flesh is good, but, according to Garcilaso, inferior to that of the do-

* Kerr's Collection of Voyages, vol. x., p. 462

32.—Male Brown Wild Llama or Guanaco.

mestic or Huanacu llamas. These animals inhabit the mountain-ranges, where the males keep watch above whilst the females are feeding in the alpine valleys. (Fig. 32). When the males observe men approaching in the distance, they utter a sort of neigh, not unlike that of a horse, to warn the females; and if the men advance nearer, they flee, driving the females before them. The wool of these animals is short and rough, but is notwithstanding used by the natives for making cloth. These animals are taken in traps and snares. Another kind are termed Vicuñas; excepting that they have no horns, they are not much unlike goats, but are

larger, and of a tawny or lion-like colour with a rufous tint: these live in the highest mountains, giving preference to the colder regions, and especially the bleak solitudes which the Peruvians designate by the common name of Punas. Frost and snow, so far from annoying, seem rather to invigorate them. They associate in flocks, and run with great swiftness. Such is their timidity that at the sight of men or wild beasts they instantly betake themselves into hidden and inaccessible fortresses. Formerly these animals were very numerous, but they are now become much more rare in consequence of the promiscuous licence for hunting. Their wool is very fine, and resembles silk, or rather the fur of the beaver, and the natives deservedly estimate it highly: besides other properties, it is said to resist heat and impart coolness, and consequently is especially used in the manufacture of caps. Besides these are the Tarugas or Tarucas, which are larger and more swift than the vicuñas, and of a more burnt colour, with pendulous and light ears; they rarely associate in flocks, but wander singly about the precipices: according to Garcilaso they are a species of deer, inferior in size to those of Europe. In the time of the Incas they were innumerable, and even entered the precincts of the towns, nor was there any deficiency of their fawns and does. All these animals, he adds, produce bezoar-stones.

A question here arises, what is the taruga described by De Laet? Is it identical with the paco (otherwise called paca or alpaca) of D'Acosta, who, it may be observed, does not mention the vicuña or vicugna? This question is not easily answered. With respect to the Chilihueque of Shelvocke, the Hueque or Hueco of Molina, it is evidently identical with the Huanacu of De Laet, which is the guanaco, and the words are the same, with trifling differences in orthography easily accounted for. We have then the domestic llama, the guanaco, the paco or alpaca, the taruga, and the vicugna.

Now it is generally believed by naturalists, and among them F. Cuvier, that there are really only three species,

viz. the llama, called, when wild, guanaco, the paco or alpaca, and the vicugna. Mr. Bennett, indeed, and Baron Cuvier, suspect there are but two species. The former expressly states that he should have little hesitation in proceeding still farther than F. Cuvier, being strongly inclined to agree with the Baron in regarding the paco as a mere variety of the llama with the wool more amply developed, and in considering the vicugna as the only animal of that group that deserves to be specifically distinguished from that animal. From our own personal observations we are inclined to believe that there are three species, as indicated by F. Cuvier; but we confess that we have our doubts as to whether De Laet's taruga with pendulous ears may not prove to be a fourth species—a point, however, on which we would not insist.

The Guanaco (*Auchenia llama*); in a domestic state, the Llama.—At what period the guanaco became domesticated, whether before the foundation of the ancient Peruvian empire while the natives were in the rudest state of savage life, or after Manco Capac had established over the Peruvians the reigning line of Incas, it is useless to inquire. All we know is, that the Spaniards on their invasion found the llama trained as a beast of burden, and, excepting as regards its milk, to them what the camel is to the native of the Arabian desert.

The guanaco, or wild llama, is more slender and has an aspect more expressive of energy and spirit than its domesticated relative, but it soon becomes familiar in captivity. (Fig. 33.) In its native regions, the highlands of Peru and Chili, it lives in herds, continuing among the mountains during the summer, but descending to the valleys on the approach of winter. At this latter season the Chilians hunt them with dogs, but it is only the young and the feeble that can be thus taken; the old ones are swift, active, and vigorous, and easily escape. During the chase they are said frequently to turn upon their pursuers, neigh loudly, and then take to their heels again. Indeed, when alarmed they often stop in their flight to gaze at the object of their fear, and again gallop off.

33.—Guanaco.

The guanaco feeds upon mountain herbage, and especially a species of rushy grass called ycho; and when there is sufficient of this green fodder for them, they are never known to drink. The same observation applies to the domestic breed and the paco and the vicugna. Mr. Bennett suggests as a probability that they may have the power of extracting from their food

sufficient liquid to satiate their thirst. It cannot have escaped notice that the secretion of saliva in these animals is remarkably abundant, even, as we have observed, in the hottest weather in England, and that upon the slightest offence, real or supposed, they discharge a copious shower of it over the person of the offender. May it not be that the naturally abundant flow of this saliva obviates the necessity of frequently drinking? This saliva was once supposed to possess acrid, irritating qualities, which certainly is not the case, though it must be confessed a sprinkling with rose-water would be more pleasant.

When assaulted and pushed to defend themselves, these animals strike with their fore-feet, and that with great energy, giving very severe blows: we have, indeed, seen them strike upon trifling provocation, though in general they are quiet and inoffensive.

The wool of the guanaco is in request, being of fine texture: the general colour is rich rufous brown, the head and ears being gray. The neck is peculiarly long; the tail a little raised and curved down. Height at the top of the shoulders about three feet and a half.

Mr. Darwin states, the guanaco "abounds over the whole of the temperate parts of South America from the wooded islands of Tierra del Fuego, through Patagonia, the hilly parts of La Plata, Chili, even to the Cordillera of Peru. Although preferring an elevated site, it yields in this respect to its near relative the vicugna; on the plains of Southern Patagonia we saw them in greater numbers than in any other part. Generally they go in small herds from half-a-dozen to thirty together, but on the banks of the St. Cruz we saw one herd which must have contained at least five hundred. On the northern shores of the Strait of Magellan they are also very numerous. Generally the guanacoes are wild and extremely wary. The sportsman frequently receives the first intimation of their presence by hearing from a distance the peculiar shrill neighing note of alarm. If he then looks attentively, he will perhaps see the herd standing in a line on some distant hill. On approaching them,

a few more squeals are given, and then off they set at an apparently slow, but really quick, canter along some narrow beaten track to a neighbouring hill. If, however, by chance he should abruptly meet a single animal, or several together, they will generally stand motionless and intently gaze at him; then, perhaps, move on a few yards, turn round, and look again. What is the cause of this difference in their shyness? Do they mistake a man in the distance for their chief enemy, the puma, or does curiosity overcome their timidity? That they are curious is certain; for if a person lies on the ground and plays strange antics, such as throwing up his feet in the air, they will almost always approach by degrees to reconnoitre him. It was an artifice that was frequently practised by our sportsmen with success; and it had, moreover, the advantage of allowing several shots to be fired, which were all taken as parts of the performance. On the mountains of Tierra del Fuego, and in other places, I have more than once seen a guanaco, on being approached, not only neigh and squeal, but prance and leap about in the most ridiculous manner, apparently in defiance as a challenge. These animals are very easily domesticated, and I have seen some thus kept near the houses, although at large, on their native plains. They are in this state very bold, and readily attack a man by striking him from behind with both knees. The wild guanacoes, however, have no idea of defence: even a single dog will secure one of these large animals till the huntsman can come up. In many of their habits they are like sheep in a flock. Thus, when they see men approaching in different directions on horseback, they soon become bewildered and know not which way to run. This greatly faciliates the Indian method of hunting, for they are thus easily driven to a central point and encompassed. The guanacoes readily take to the water; several times at Port Valdes they were seen swimming from island to island. Byron, in his Voyage, says he saw them drinking salt water. Some of our officers, likewise, saw a herd drinking the briny fluid from salina near Cape Blanca. I imagine, in several parts of the

country, if they do not drink salt water, they drink none at all. In the middle of the day they frequently roll in the dust in saucer-shaped hollows. The males fight together; two one day passed quite close to me, squealing, and trying to bite each other; and several were shot with their hides deeply scored. Herds sometimes appear to set out on exploring parties. At Bahia Blanca, where, within thirty miles of the coast, these animals are extremely unfrequent, I saw one day the tracks of thirty or forty which had come in a direct line to a muddy salt-water creek. They must then have perceived that they were approaching the sea, for they had wheeled with the regularity of cavalry, and had returned back in as straight a line as they had advanced. The guanacoes have one singular habit, which is to me inexplicable, namely, that on successive days they drop their dung in the same defined heap. I saw one of these heaps, which was eight feet in diameter, and necessarily was composed of a large quantity. D'Aubigny says that all the species of this genus have this habit; and Frezier remarks that it is very useful to the Indians, who use the dung for fuel, and are thus saved the trouble of collecting it. The guanacoes appear to have favourite spots for dying in. On the banks of the St. Cruz the ground was actually white with bones in certain circumscribed places, which were generally bushy, and all near the river. On one such spot I counted between ten and twenty heads. I particularly examined the bones; they did no appear, as some scattered ones which I have seen, gnawe and broken, as if dragged together by some beasts of prey. The animals must have crawled, before dying, beneath and amongst the bushes. Mr. Bynoe informs me that during the voyage he observed the same circumstance on the banks of the Rio Gallegos. I do not understand the reason for this, but I may observe that all the wounded guanacoes at St. Cruz invariably walked towards the river. At St. Jago, in the Cape de Verd islands, I remember having seen in a retired ravine a corner under a cliff where numerous goats' bones were collected: we at the time exclaimed

that it was the burial-ground of all the goats in the island. I mention these circumstances, because in certain cases they might explain the occurrence of a number of uninjured bones in a cave, or buried under alluvial accumulations, and likewise the cause why certain mammalia are more commonly imbedded than others in sedimentary deposits. Any great flood of the St. Cruz would wash down many bones of the guanaco, but probably not a single one of the puma, rhea, or fox." ('Voyage of the Beagle.')

34.—White Llama.

Like the elephant, the horse, the camel, and many others, the guanaco has its fossil prototypes. Mr. Darwin found at Port St. Julian (Patagonia) the fossil bones of a llama which must have fully equalled the camel in magnitude; and he observes that, "as the guanaco is the characteristic quadruped of Patagonia, and the vicugna of the snow-clad summits of the Cordilleras, so

in bygone days this gigantic species of the same family must have been conspicuous on the southern plains."

The domestic llama is more stoutly built than the guanaco, its limbs are thicker, its neck shorter, and its aspect more subdued. The wool is longer and fuller, but of a coarser quality. We have seen brown and white individuals, but the white seem to be the most common. (Fig. 34.)

When the Spaniards became acquainted with Peru and Chili, these animals were kept by the natives in vast numbers; but now the horse, the ass, and especially the mule, have superseded the llama as a beast of burthen; while the introduction of the sheep, the goat, and the ox has rendered it less necessary, either as contributing by its flesh or its fleece to the benefit of man. In some places, however, it still is, or was recently, employed as a beast of burthen.

THE PACO

(*Auchenia alpaca*, Desm.; *Camelus pacos*, Linn.).

The paco (Fig. 35) is as large as the guanaco, but proportionately shorter in the limbs; its forehead, instead of being regularly arched to the nose, rises abruptly prominent above the eyes; the wool is long, delicately fine, and silky, excepting on the head and limbs, and of a deep fawn colour; it is moreover disposed in long flakes or tassels. Black varieties also occur, of which a most beautiful specimen some years ago existed in the Gardens of the Zool. Soc. Lond.

The paco dwells in herds among the mountains of Peru and Chili; it is less fleet than the light-limbed guanaco, but its general habits are the same; it would appear, however, to frequent a higher and colder range of elevation, as it is said to be frequently seen with herds of vicugnas.

THE VICUGNA, OR VICUÑA (*Auchenia vicugna*),

is a smaller animal than either the guanaco or the paco, and more slender in its proportions. (Fig. 36.) Its

35.—Paco.

limbs are thin, its neck swanlike, the forehead is broad and also prominent, but not abruptly so, as in the paco; the muzzle is very narrow, and the head short. The eyes are large, and the ears long. The height of the animal at the shoulder is about two and a half feet.

The wool of the body is extremely delicate and soft, varying from an inch to three inches in length: on the breast it is of the latter measurement; on the head and limbs it is close. The colour is pale yellowish brown, passing into white on the under parts.

The vicugna lives in herds on the bleak and elevated parts of the mountain-range bordering the region of

perpetual snow, amidst rocks and precipices, where the chase is both toilsome and arduous. The Cordilleras of Copiapo, Coquimbo, and Peru are the principal seats of its abode, but it is also found in Chili. Its manners very much resemble those of the chamois of the European Alps, and it is as active, vigilant, wild, and timid. Its wool is highly valued, and for this alone thousands are annually killed, various means being employed in their wholesale destruction.

Holding, as the llamas do, especially the paco and vicugna, so conspicuous a place among wool-bearing animals, it is singular that, after Europeans became acquainted with them, and with the beautiful fabrics

36.—Vicugna.

manufactured by the native Peruvians, three centuries should have elapsed before any attention was paid in Europe to the importation of their produce as an article of commerce, or any attempts were instituted with regard to the naturalization of the animals in localities best fitted for their multiplication; and this more especially as the fineness of the wool had, from the first, attracted the notice both of the Spaniards and other Europeans. That no difficulty exists in the transportation of the llama to Europe, and that it bears our climate well, is abundantly proved by the numerous individuals which have lived both in the Gardens of the Zoological Society and in other places, and which, under the inevitable disadvantages of confinement, and perhaps too luxurious a diet, have continued long in health and vigour—as long, indeed, as animals indigenous to Europe under the same circumstances. There can be therefore no doubt but that, if suffered to wander at large, in situations resembling as nearly as possible those of their native regions —regions, be it remembered, of cold, and snow, and storms—these animals would thrive and multiply.

The coarse herbage of the mountains, and the rushy grass, called ycho, which covers the slopes of the hills, constitute the natural diet of the wild races; and in the mountains of Scotland, Wales, and Ireland herbage of a corresponding nature would meet their appetite, while, as far as temperature is concerned, there would be no impediment to their naturalization.

At the ninth Meeting (held at Birmingham 1839) for the Advancement of Science, the value of the silk wool of these animals, and the benefits which would result from their naturalization in our country, formed an interesting topic of discussion. The subject was introduced by Mr. W. Danson, who, in illustration of his views, exhibited samples of alpaca wools, and manufactured specimens in imitation of silk (and without dye) as black as jet. Mr. Danson urged that "the animals producing it ought to be propagated in England, Ireland, Scotland, and Wales, and stated that to the two latter places the alpaca is well suited, being an inhabitant of the Cordilleras, or

mountain district in Peru. Importations (of the wool) have already taken place to the extent of one million of pounds, and are likely to increase. There are five species of llamas: of these the alpaca has fine wool, six to twelve inches long, as shown by the specimens exhibited; the llama, coarse long hair; and the vicugna, a very short fine wool, more of the beaver cast. The Earl of Derby has propagated the alpaca in his private menagerie at Knowsley, and Mr. Danson understood that Mr. Stephenson, at Oban, in Scotland, has a few of these animals. The wool of these animals would not enter into competition with the wool of the sheep, but rather with silk. It is capable of the finest manufacture, and is especially suited to the fine shawl trade of Paisley and Glasgow, &c. The yarns spun from it are already sent to France in large quantities, at from 6*s.* to 12*s.* 6*d.* per pound, the price of the raw alpaca wool being now 2*s.* and 2*s.* 6*d.* per pound."

THE GIRAFFE

(*Camelopardalis giraffa*; Zarapha, Zerafet, and Zürafel of the Arabs; Sürnapa, Zürnapa, and Zürnepa of the Turks).

The genus *Camelopardalis* stands in a certain sense isolated among the Ruminants, and is the representative of a family group, intermediate, as Professor Owen's researches demonstrate, between the deer and the antelopes. Col. H. Smith, indeed, has observed that the characters of the giraffe offer a mixture of several genera, among which the followers of the quinary system may select whether to class it, with Illiger, among the camels, or, with other naturalists, among the cervine or antelopine animals; and he points out its assimilation with the camels, in the length of its neck, the callosities on the sternum and knees, and the want of spurious hoofs, adding that this approximation did not escape the notice of the ancients.

This extraordinary animal, of which at one period the very existence was almost doubted, has become now

familiar to us; and though we gaze with wonder upon its strange proportions, we no longer regard it as one of the monsters of a land which credulity pictured as tenanted by creatures which exist only in imagination. On beholding the giraffe we are at once struck with the shortness of its body, the length of its limbs, the elevation of its withers, and the elongation and slenderness of its neck, supporting a small and delicately modelled head. Its movements are no less strange than its figure; for, owing to the shortness of the body and the length of the limbs, the hind-hoofs are brought at each step as far forward as the spot the previous moment occupied by the fore-hoofs, but somewhat to the outside of it, for the hind-limbs diverge somewhat outward from the hock-joint. The legs of each side are in action nearly in unison together, those of the right side appearing to alternate with those of the left, and *vice versâ*.

The giraffe, however, is not really awkward, and is very far from being slow; indeed the swiftest coursers of the desert are scarcely equal to the chase, and among rugged and broken ground utterly unable to overtake it.

When walking along, the giraffe does not ordinarily carry its beautiful swan-like neck upright, but obliquely forwards in a line continued from the spine, over the withers, to the top of the head—an attitude scarcely consistent with grace; the animal, however, often wreaths it very gracefully, nor can anything produce a more imposing effect than the giraffe when its neck is stretched up to the full, while the animal gazes around with his large beaming eyes, or plucks the foliage from the branches of the trees, browsing beneath their shade.

It is scarcely necessary to state that the giraffe is exclusively confined to the continent of Africa. Its characters may be detailed as follows:—The head (Fig. 37) is small, and narrows to a slender elongated muzzle entirely covered with hair. The nostrils are longitudinal slits capable of being closed or opened at pleasure; the upper lip is endowed with great flexibility and muscular power, and projects beyond the lower; it is used as an organ of prehension in the acquisition of food. The

37.—Head of Giraffe.

tongue is an extraordinary instrument, and requires special notice. It is long, slender, pointed, and endowed with a surprising share of mobility. Nor is this all; it is capable of being greatly elongated, and in this state of being coiled round twigs or branches, and of drawing them to the mouth. (Figs. 38 and 39.) In this respect it is analogous to the proboscis of the elephant, and is at once a feeler, a grasper, and an organ of taste. It is

interesting to see with what address the giraffe uses this instrument, and how dexterously he applies it as a hook or holder. It is smooth, except when the papillæ are raised—its surface then becomes rough: its colour is black.

Sir Everard Home, whose notice of everything rare or curious in the animal world would naturally be excited by the presence of the giraffe, has published a very interesting memoir upon its tongue, which was originally read to the Royal Society, and now appears in the fifth volume of his 'Comparative Anatomy.' We shall select some passages; and shall further avail ourselves of his kind indulgence to copy two plates with which the memoir is illustrated:—

38.—Mode of procuring food.

"The tongue is to be considered as a congeries of muscles acting upon one another, and in this respect differing from muscles applied to bones and other solid substances; but that of the xariffa has so many peculi-

39.—Mode of procuring food.

arities, as, in my opinion, give it a claim to be considered separately from the tongues of other animals, and viewed as a construction in which a greater variety of actions are displayed than are to be met with in others. It not only performs the office of the organ of taste, but has besides nearly all the powers of the proboscis of the elephant, although not possessed of the same strength. They differ, indeed, in one being an elongation of the organ of smell—the other of the organ of taste. The

proboscis is restrained from elongation in extent beyond one inch, by means of the cartilaginous tubes it contains; but the xariffa's tongue, which, when extended after death, is seventeen inches long, can, in the living body, be so diminished in size as to be enclosed within the animal's mouth. For this alteration in bulk some peculiar mechanism is required, since we know from experiments recorded in the 'Philosophical Transactions' that a muscle, whether contracted or relaxed, occupies exactly the same space. The chameleon, it is true, has a power of darting the point of its tongue to the extent of twelve inches, and catching a fly at that distance; but there is a conical bone in the middle of a muscular tube, both to give direction, and by its form, when the circular fibres press upon it, making them slide forward.

"In the absence of an opportunity of examining the internal structure of the xariffa's tongue after death, I was led to the opinion that the change of size is effected by the organ containing a reservoir, out of the course of the circulation, which can be filled with blood at the will of the animal, so as to give it rigidity, and enable it to extend itself for the performance of the different actions in which it is employed, with the smallest possible degree of muscular exertion. It occurred to me at the same time, that whatever construction may be the means by which the xariffa's tongue is able to apply itself to such various purposes, whether that which appeared to me probable, or any other, something similar would be met with in other animals, particularly in the tongue of the deer, which, after death, readily admits of being drawn out to the extent of eight inches, although when immersed in rectified spirits it contracts to five inches.

"For the purpose of such an examination, a deer's tongue, recently after the animal's death, was injected with minute red injection, so as to distend the arteries and show the course of the circulation in them to the greatest advantage. This tongue was afterwards divided longitudinally in a perpendicular direction, also in a horizontal one, to show the muscles of which it is com-

posed, as well as the other parts that it contained. From this examination, the structure of the tongue of quadrupeds in general is as follows: —

"It is longitudinally divided into two equal portions by a middle line; the muscular structure occupies the whole of the interior substance, receiving a large supply of nerves and blood-vessels from a lateral nerve and artery that pass along the outer edge; these are imbedded in a very loose cellular tissue, the texture of which admits of the blood-vessels being distended to a very great degree, so as to enlarge the volume of the tongue; and beyond this tissue, surrounding and forming a case for the whole of the upper and lateral part of the organ, is a strong, very elastic covering of some thickness, which yields when the muscles and the trunks of the arteries are distended with blood, so as to give both extent and rigidity to the organ, and admits of the different actions in which it is employed.

"There can be no doubt of the structure of the xariffa's tongue being the same; its actions depending upon the combined powers of muscular contraction and elasticity; its increase and diminution of size arising from the blood-vessels being at one time loaded with blood, at another empty.

"It is deserving of observation that these peculiarities, found in the tongue of the xariffa for its elongation, are not extended to the camel and dromedary. These animals have a provision of another kind, enabling them to inhabit the sandy desert; this is, a reservoir connected with the stomach, in which they carry a supply of water, and which is probably wanting in the xariffa, or of a smaller size; and in lieu of it, this animal has a power at all times of feeding on plants that are alive and full of moisture, and therefore can subsist without drinking. As the sandy desert is deficient in trees, we have a proof of its not being the xariffa's native soil, and find that, instead of the padded hoofs, whose cushion is fitted for travelling in the sand, it has two toes separated from each other, which are defended by a strong horny covering, enabling it to climb the higher rocky ground with-

out stumbling. That it may have every facility in obtaining the branches and leaves of trees—its natural food—its neck is of a greater length than that of any animal of the same size, and is composed of only seven bones, exactly the same number that is met with in the human skeleton: this is evidently adapted for its reaching its food, and the smaller number of joints allows it to be kept erect at the smallest expense of muscular exertion. The tongue is everywhere smooth and slightly adhesive; it has spots upon it, but these are not raised above the surface. The application of this organ to the leaves, before they are carried into the mouth, enables the animal to reject those of noxious plants, only selecting such as have an agreeable taste.". . . . . .

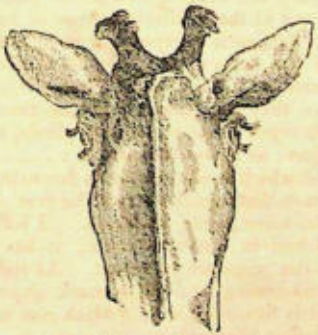
"The tree which is said to be its favourite food is an acacia, and now distinguished from the rest of the tribe by the trivial name acacia xariffiana. I have tasted it both boiled and in a natural state; it has a pleasant flavour, and the twigs are succulent. As the tongue, in procuring and tasting its food, is much exposed to the sun's rays, it is furnished with a black rete mucosum, to prevent its being blistered.

"The mode in which it lays hold of the succulent branches of trees, and many of its other motions, are shown in the sketch (Fig. 38) from the pencil of Mr. Agasse.

"In comparing the quantity of moisture in common grass, on which sheep feed, with that of the twigs and leaves of the acacia lophantha, which nearly resembles the acacia xariffiana, it is as follows: one ounce of the leaves and twigs in drying lost three-fourths; one ounce of common grass, or twenty-four scruples, lost ten, less than half by two scruples. When sheep are fed on hay, they are allowed four pounds a day and two pounds of water, which is a smaller quantity of fluid than is contained in the succulent food of the xariffa; so that this animal cannot require any drink for the purpose of digesting its food."

The eyes of the giraffe are full, dark, lustrous, and prominent, and the upper eyelid is furnished with a

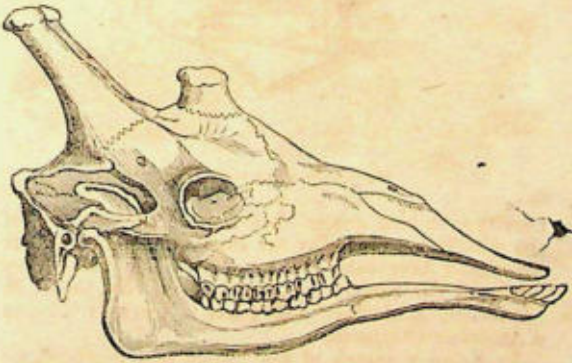
fringe of long lashes. So prominent indeed are the eyes, that they command, without the animal moving its head, a survey of the whole horizon, thus enabling it to see, without turning, what passes on each side and even behind it, and, from the elevation of the head, to discern its enemies at a great distance. Fig. 40 represents a



40.—Back view of Giraffe's Head.

back view of the giraffe's head, showing this advantageous position of the eyes. The ears are long, pointed, and moveable; and the sense of hearing is very acute. There are no suborbital sinuses. Both sexes have horns, if they can be so termed, for they are truly analogous to the pedunclcs of the horns in the Muntjak-deer, being in fact processes of bone covered with skin, having a tuft of black hairs at the top; but besides these substitutes for horns, a similar but shorter process projects from the forehead between the eyes, more developed in males than females, and in adults than in the young. According to Rüppell and Cuvier, this, like the other horns, is articulated by suture to the skull; but Professor Owen has demonstrated that this frontal protuberance is not a true horn articulated by a suture, but results from a singular thickening of the bone of the forehead. (Fig.

41.) The osseous peduncles, or horns as they are commonly called, continue for a long time united to the frontal bone only by means of a suture, and are not fairly anchylosed till at an advanced period. This indeed is the case with all the bones of the skull of the giraffe: it would appear that the process of ossification is carried on but slowly in this part of the frame-work, and, as it respects the horns, that Nature, having completed the first stage of her intentions, having in fact prepared the peduncles, was arrested in her operations and forbidden to add the antlers.



41.—Skull of Giraffe.

The long flexible neck of the giraffe is provided with a short mane extending from the withers to the top of the head: the elevation of the withers is remarkable, and from this part to the crupper there is a rapid descent, whence has arisen the idea that the fore-limbs are much longer than the hinder pair, which is not the case. The fore-knees are large, and when about to lie down the animal sinks upon them, and assumes an attitude by no means easy or graceful. (Fig. 42.)

The tail is rather long, slender, and tufted at the ex-

42.—Giraffe about to lie down.

tremity with long coarse black hairs. The skeleton of the giraffe is well worthy the attention of an anatomist; we cannot here enter into osteological minutiæ, but recommend our readers to Professor Owen's papers in 'Proceeds. Zool. Soc.' 1838; and to Cuvier's 'Leçons d'Anatomie Comparée.'

In giving a sketch of the history of the giraffe, we may commence by observing that some naturalists of the present day consider that there are two distinct species; one peculiar to Nubia, Abyssinia, and the adjacent districts, the other a native of the regions of Southern Africa. We regard them as mere varieties.

It is with the North African variety that the ancients were acquainted, and of which there are several delineations preserved to the present day. Among the most remarkable is one on the Prænestine pavement, where two of these animals are pictured: one in a straddling attitude endeavouring to reach the ground with his mouth; the other in the act of browsing on the trees.

It is supposed that this pavement, which was executed by the direction of Sulla, is the work of Egyptian Greeks. Belzoni notices the giraffe on the walls of the Sekos of the Memnonium and on the back of the temple of Erments. A giraffe led by Nubians is given in Rosellini's work on Egypt.

It is supposed by some that the word Zemer, translated Chamois in the book of Deuteronomy (ch. xiv., ver. 5), of which animal the flesh was forbidden, really refers to the giraffe, and there is certainly some affinity between the Hebrew zemer and the Arabic zurafa or zurafet. It is a point, however, not easily decided.

Though the Prænestine pavement was made by the orders of Sulla (born A.C. 138), the animal itself was not seen in Rome before the time of Julius Cæsar, who exhibited it at the Circensian games. It is described by Pliny (book viii.) from a specimen, as is conjectured, which Varro mentions as having been brought from Alexandria. Afterwards the giraffe became not unfrequent among the animals exhibited in the Roman games.* Oppian, who lived in the second century, notices this animal in the third book of his treatise on hunting. Gordian III., emperor of Rome from A.D. 239 to 244, is stated to have possessed ten of these animals. After the fall of the Roman empire we hear nothing of the giraffe for a considerable period. The first instance, after the darkness of the middle ages had passed, of a living giraffe in Europe, is that of one possessed by Frederick II., king of Germany (crowned 1215), which he received from the prince of Damas, now Damascus, and which was described by Albertus Magnus under the name of Anabula, with the synonyms Seraph, Oraflus, and Oras'us.

Towards the end of the fifteenth century the Soldan of Egypt presented one of these animals to Lorenzo de' Medici, grand-duke of Tuscany: it was a great favourite with the inhabitants of Florence, and was accustomed to

* "Diversum confusa genus Panthera Camelo."
Horace, *Epist.* ii. 195.

evinced at the sight of the skin of the giraffe; and he had run to say that he had just found in the neighbourhood one of these animals under a mimosa, the leaves of which he was browsing upon. In an instant, full of joy, I leapt upon my horse; I made Bernfry" (one of his men) "mount another, and, followed by my dogs, I flew towards the mimosa. The giraffe was no longer there. We saw her cross the plain towards the west, and we hastened to overtake her. She was proceeding at a smart trot, but did not appear to be at all hurried. We galloped after her, and occasionally fired our muskets; but she insensibly gained so much upon us, that, after having pursued her for three hours, we were forced to stop, because our horses were quite out of breath, and we entirely lost sight of her. . . . . The pursuit had led us far away from each other, and from the camp; and the giraffe having made many turns and doubles, I was unable to direct my course towards home. It was noon. I already began to feel hunger and thirst; and I found myself alone in a sterile and arid spot, exposed to a burning sun, without the least shelter from the heat, and destitute of food." The traveller, however, shot and cooked some birds of the partridge genus; and was fortunate to rejoin his companions in the evening. "The next morning my whole caravan joined me again. I saw five other giraffes, to which I gave chase; but they employed so many stratagems to escape, that, after having pursued them the whole day, we entirely lost them as the night came on. I was in despair at this ill success. . . . . The next day, the 10th of November, was the happiest of my life. By sunrise I was in pursuit of game, in the hope to obtain some provisions for my men. After several hours' fatigue we descried, at the turn of a hill, seven giraffes, which my pack instantly pursued. Six of them went off together; but the seventh, cut off by my dogs, took another way. Bernfry was walking by the side of his horse, but in the twinkling of an eye he was in the saddle, and pursued the six. For myself, I followed the single one at full speed; but, in

spite of the efforts of my horse, she got so much a-head of me, that, in turning a little hill, I lost sight of her altogether, and I gave up the pursuit. My dogs, however, were not so easily exhausted. They were soon so close upon her that she was obliged to stop to defend herself. From the place where I was I heard them give tongue with all their might; and, as their voices appeared all to come from the same spot, I conjectured that they had got the animal in a corner, and I again pushed forward. I had scarcely got round the hill, when I perceived her surrounded by the dogs, and endeavouring to drive them away by heavy kicks. In a moment I was on my feet, and a shot from my carbine brought her to the earth. Enchanted with my victory, I returned to call my people about me, that they might assist in skinning and cutting up the animal. Whilst I was looking for them, I saw Klaas Baster" (another of his men), "who kept making signals which I could not comprehend. At length I went the way he pointed, and, to my surprise, saw a giraffe standing under a large ebony tree, assailed by my dogs. It was the animal I had shot, who had staggered to this place; and it fell dead at the moment I was about to take a second shot.

"Who could have believed that a conquest like this would have excited me to a transport almost approaching to madness! Pains, fatigues, cruel privation, uncertainty as to the future, disgust sometimes as to the past—all these recollections and feelings fled at the sight of this new prey. I could not satisfy my desire to contemplate it. I measured its enormous height. I looked from the animal to the instrument which had destroyed it. I called and recalled my people about me. Although we had combated together the largest and the most dangerous animals, it was I alone who had killed the giraffe. I was now able to add to the riches of natural history: I was now able to destroy the romance which attached to this animal, and to establish a truth. My people congratulated me on my triumph. Bernfry alone was absent; but he came at last, walking at a slow pace, and holding

his horse by the bridle. He had fallen from his seat, and injured his shoulder. I heard not what he said to me. I saw not that he wanted assistance; I spoke to him only of my victory. He showed me his shoulder; I showed him my giraffe. I was intoxicated, and I should not have thought even of my own wounds."*

It is from this time that we may date our correct knowledge of this animal, of which several skins found their way from time to time into our island; that brought by Mr. Patterson, and ultimately deposited in the British Museum, being the first.† It was in the year 1827 that the first living giraffe visited our shores. The Pasha of Egypt destined four of these animals as presents to some of the European princes: of these, one died at Constantinople; one reached Venice, 1828; one was sent to Paris; and the fourth, which fell by lot to England, reached its destination safely in August, 1827, but died, worn out by illness, in 1829. Its preserved skin and skeleton were presented by George IV. to the Zoological Society, and now grace the museum of that Society.

In 1836 the arrival of four living giraffes at the gardens of the Zoological Society, procured in Kordofan by M. Thibaut, created a lively sensation in the world of science. From a letter of M. Thibaut to the secretary of the Zoological Society, in which he details his proceedings and manner of conducting the exhausting pursuit, we take the following extract:—"The first run of the giraffe is exceedingly rapid. The swiftest horse, if

* Second Voyage, tom. ii. p. 54.

† Mr. Patterson was sent to the Cape as botanist by Lady Strathmore, and he brought to this country the first entire skin of a giraffe on record. Lady Strathmore gave it to the celebrated John Hunter, in whose museum it was preserved. Afterwards the trustees of the Royal College of Surgeons transferred the skin to the British Museum. Its condition is very bad, the hair being almost all off the skin; yet, as a sort of historical monument in the department of Zoology, it is worthy of preservation.

unaccustomed to the desert, could not come up with it unless with extreme difficulty. The Arabs accustomed their coursers to hunger and to fatigue; milk generally serves them for food, and gives them power to continue their exertions during a very long run. If the giraffe reaches a mountain, it passes the heights with rapidity: its feet, which are like those of a goat, endow it with the dexterity of that animal: it bounds over ravines with incredible power; horses cannot, in such situations, compete with it. The giraffe is fond of a wooded country. The leaves of trees are its principal food. Its conformation allows of its reaching their tops. The one of which I have previously spoken as having been killed by the Arabs measured twenty-one French feet in height from the ears to the hoofs. Green herbs are also very agreeable to this animal; but its structure does not admit of its feeding on them in the same manner as our domestic animals, such as the ox and the horse. It is obliged to straddle widely; its two fore-feet are gradually stretched widely apart from each other, and, its neck being then bent into a semicircular form, the animal is thus enabled to collect the grass. But, on the instant that any noise interrupts its repast, the animal raises itself with rapidity, and has recourse to immediate flight. The giraffe eats with great delicacy, and takes its food leaf by leaf, collecting them from the trees by means of its long tongue. It rejects the thorns, and in this respect differs from the camel. As the grass on which it is now fed is cut for it, it takes the upper part only, and chews it until it perceives that the stem is too coarse for it. Great care is required for its preservation, and especially great cleanliness. It is extremely fond of society, and is very sensible. I have observed one of them shed tears when it no longer saw its companions or the persons who were in the habit of attending to it." ('Proceeds. Zool. Soc.,' 1836.) (Fig. 43.)

The efforts made by the spirited agent of the Zoological Society in Nubia, and the success of his arrangements for the transport of the animals from the interior

43.—Giraffe.

to the coast, not only encouraged others to make a similar attempt, but opened the way for them in which to proceed; and subsequently other living specimens were sent to Malta, and thence to England, so that at one time there were seven giraffes in London.

The giraffe with due care endures our climate well; the female in the gardens of the Zoological Society has bred twice; the first fawn died, but the second, which grew rapidly, is in excellent health and condition.

The giraffe, as its figure, the mobility of the lips, and the prehensile power of the tongue declare, is formed for browsing on the leaves of trees, those of the mimosa being especially relished. The first giraffe which Le Vaillant saw was under one of these trees, on the leaves of which it was making a repast: with his characteristic enthusiasm he began the pursuit, as he has detailed in the passage given at page 88. This one escaped him, but subsequently, as we have seen, he was more successful.

We have already alluded to the difficulty which the giraffe experiences in putting its lips to the ground, being obliged to set its fore-limbs wide apart; it is indeed an action which it seldom attempts unless induced by some tempting morsel, as, for instance, sugar, of which the giraffes in the gardens of the Zoological Society are very fond, and for which they will follow their attendants, trying to gain possession of it by insinuating their long slender tongue or upper lip into the hands of the person who holds it. In their play we have several times noticed that they strike out with the fore-limbs, and these, as well as the hind-limbs, they use in self-defence, lashing out with rapid and impetuous force. "His defence," says Le Vaillant, "consists in kicks, and his hinder limbs are so light and his blows so rapid, that the eye cannot follow them;" and "I know beyond a doubt that by its kicking it often tires out, discourages, and even beats off the lion." After his dogs had brought an individual to bay, they dared not make an attack, as it defended itself "with a succession of rapid kicks." Major Gordon notices the force with

which one which he killed spurned the ground in the agony of death.

Le Vaillant observes that the giraffe never uses its horns in resisting any attack; we have, however, often seen the gentle and beautiful animals in the gardens of the Zoological Society, while playing with each other, swing the head round and butt with the horns; but in earnest self-defence we may easily believe that this mode would never be adopted. While speaking of these individuals, we may state that they often take each other's mane between the lips, and appear to nibble it as they pass their mouth along its course. They are extremely confiding in disposition: the presence of strangers is far from giving them annoyance; they gaze with calmness on the crowd of admirers around them, and bend their necks down as if to contemplate them more closely, or in order to solicit some delicacy.

In its native wilds, man excepted, the lion is the only enemy to be feared by the giraffe; and from various sources we learn the lion often surprises the latter when he comes to drink at the pools or fountains, and springs from his ambush upon the tall and powerful beast, which, mad with terror and pain, rushes over the desert, bearing the "great destroyer," till, strength failing, he reels, sinks, and expires.

According to M. Thibaut, the Arabs of Nubia are very fond of the flesh of the giraffe; and he himself, partaking of the repast (viz. broiled slices), found it to be excellent. In South Africa its flesh is equally acceptable.

The height of the male giraffe to the top of the head is from fifteen to sixteen feet, of the female from thirteen to fourteen. The general colour is fawn-white, marked regularly with large angular spots of chocolate-brown, compacted rather closely together; the throat and legs are white; the tuft at the end of the tail black; the hair is close and glossy. (Fig. 44.) The South African variety is generally darker than the Nubian. The specimens presented by Mr. Burchell to the British Museum came from Kosi Fountain, and of these the female is

44.—Giraffe.

lighter coloured than the male. A specimen from Central Africa, presented by Colonel Denham, is young, and the spots are fawn-coloured on a white ground.

In the Museum at Paris is a very young giraffe, about four feet seven or eight inches in total height, of a uniform mouse-colour, the hair being remarkably close and fine, resembling the nap of velveteen; the place of each horn is indicated by a tuft of black hairs. The Nubian giraffes in the Zoological Gardens differ in the intensity of their colour, one of the males being of a lighter tint than the other.

The period of gestation is about sixteen months. (See 'Proceeds. Zool. Soc.,' 1839, p. 108.)

In a state of confinement the giraffe eats hay, carrots, and onions, to the latter of which it is very partial. We have never heard these animals utter any noise or cry, nor do travellers make any mention of their voice. The giraffe shot by Colonel Gordon, to which we have already alluded, when so wounded as to be incapable of rising from the ground, exhibited no signs of anger or resentment, nor is it stated to have made any moan. Hence we conclude that the giraffe is mute.

Family—MOSCHIDÆ.

Linnæus gave the title *Moschus* to a group of Ruminants, from the circumstance of one of the species producing that well-known substance called musk, the secretion of a peculiar glandular pouch in the abdomen of the male, for the sake of which the animal is eagerly hunted in the regions it frequents, namely, the high mountain-ranges in China, Thibet, Tonquin, Pegu, and also Southern Tartary. The musk-deer, however, is the only known species of this group in which this secretion is produced. The Moschidæ closely resemble the deer in general form and appearance; but they resemble them in miniature, for, with the exception of the true Musk (*M. moschiferus*), which equals a roebuck in size and stature, the rest are extremely small, some not exceeding a hare in magnitude. They are extremely

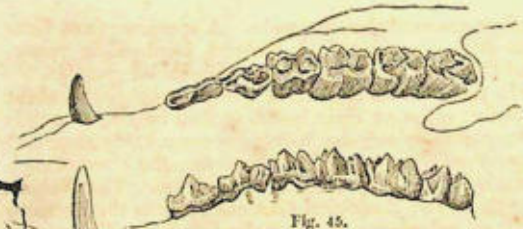


Fig. 45.

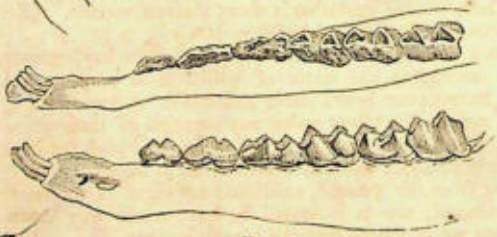


Fig. 46.

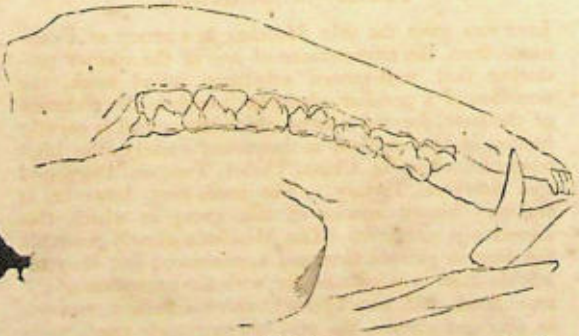


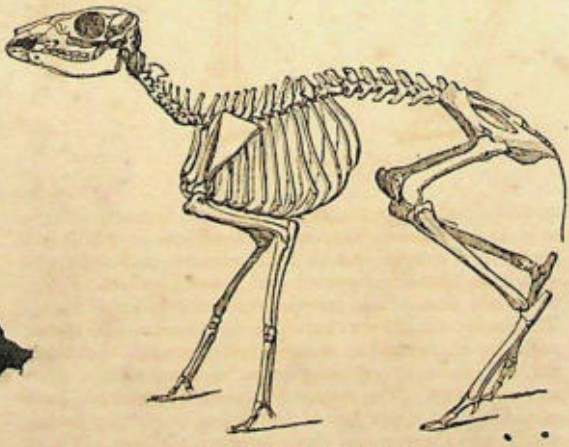
Fig. 47.

48.—Skeleton of Musk-Deer.

beautiful: the eyes are large, dark, and beaming with a mild and animated expression; the head is small and tapers to a slender muzzle; the ears are moderate and open; the haunch elevated and round; and the limbs delicately slender and tapering to narrow-pointed hoofs. The family characters consist in the absence of horns, and also of suborbital sinuses (pits beneath the inner angle of the eye), so conspicuous in many of the deer and antelopes. The muzzle is naked. There are long canines in the upper jaw of the males, projecting downwards, and coming out from between the lips. These

canines are compressed, pointed, arched backwards, and have a sharp posterior cutting edge. In the true musk they are at least three inches in length. The crowns of the molars are acutely tuberculated. Fig. 45 represents the teeth of the upper jaw in two views; Fig. 46, those of the lower; Fig. 47, a lateral view of teeth of both jaws together. Besides the two toes united to a single canon-bone, as usual, there are two accessory toes on each foot, each of which has its own slender metatarsal or metacarpal bone. See Fig. 48, the skeleton of the *Moschus moschiferus*, and Fig. 49, the skeleton of the *Meminna*, which are excellent illustrations of their osteology. There are no horns or antlers, nor even their rudiments.

Mr. Gray divides the Moschidæ into three genera, viz. *Moschus*, *Meminna*, and *Tragulus*. The last title, however, is applied by Mr. Ogilby to a species of antelope (*A. pigmæa*). Most authors, moreover, adopt the Linnæan genus Moschus, and we shall in this instance



49.—Skeleton of Meminna.

follow their example. Setting aside the true musk, the other members of the genus are termed Chevrotains, and till very recently were supposed to be respectively restricted to Java, Sumatra, Ceylon, and perhaps other adjacent islands: recently, however, to the surprise of naturalists, a species has been discovered in Sierra Leone, to which, from its aquatic habits, Mr. Ogilby has given the title of *Moschus aquaticus*. (See 'Proceeds. Zool. Soc.' 1840, p. 35.)

The Musk-Deer (*Moschus moschiferus*.)

The musk-deer, unlike its relatives which tenant the forests of Ceylon and Java, &c., inhabits the great mountain-range which belts the north of India, and branches out into Siberia, Thibet, and China, through a vast extent of which it ranges, preferring the bold precipitous crags and wild rocks on the borders of the line of snow to the valleys or the lower elevations. It is common to Nepal, Boutan, Thibet, and the adjacent districts of China. It also abounds in the Altaic range near Lake Baikal, where it was observed by Pallas on the mountains of Kouznetzk, near the lake Telet Kol. The texture and thickness of the fur of the musk-deer sufficiently demonstrate the animal to be the native of a cold and elevated region. The fur is not only full and long, but presents that peculiar harsh or rigid and inelastic texture which we observe in the chamois, or rather in the klip-springer of the mountains of South Africa. Instead of lying flat on the skin it grows erect, and is so closely set as to form a dense substantial covering. Common as is the musk-deer in the great alpine ranges of Asia, nevertheless it does not appear to have been known to the ancients, a circumstance doubtless to be attributed to the almost inaccessible nature of the regions it frequents. Neither Aristotle nor Pliny mention either the animal or its celebrated produce. It is from the male only that the drug and perfume termed musk is procured; it is the unctuous secretion of a certain glandular pouch, and when dry it becomes dark brown or

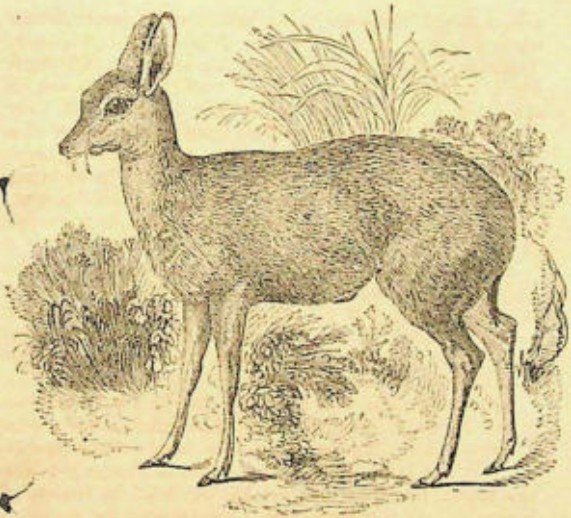
black, and somewhat granular. Its peculiar odour is well known. Formerly it was in high repute for its medicinal qualities, and still holds a place as an antispasmodic in the Materia Medica. It was first, as we learn, introduced into the practice of medicine among the Arabians, by whose writers the animal producing it is first distinctly mentioned, having, as Daubenton states, been described by Serapion in the eighth century: but we know not the time when this article first found its way to Europe; probably after the early Crusades. In Boutan, Tonquin, Thibet, &c., it appears from time immemorial to have been used as a medicine and perfume, and to have formed an article of trade amongst the inhabitants of those countries. Abusseid Serafi describes the musk-deer as an animal resembling the roe, but erroneously assigns to it horns, in which error he is followed by Aldrovandus. Among other Arabian writers who notice this animal is Avicenna, who refers to its musk-pouch and large bent canines. Kircher ('La Chine illustrée,' transl. Franc., 1610) gives an account of the musk-deer which is found in the provinces of Xensi and Chiamsi: he quotes several details respecting it from the Chinese Atlas, whence we learn that the Chinese term it Xe, which means odour; that its flesh is accounted delicate; and that it abounds in the provinces of Suchuen and Junnan. In some districts the musk-deer is very common, and multitudes are slaughtered for the sake of their costly perfume; which, however, is always greatly adulterated. To the practice of adulterating it the celebrated merchant-traveller Tavernier alludes, adding that the odour of the substance when recent is so powerful as to cause the blood to gush from the nose. Chardin says, "It is commonly believed that, when the musk-sac is cut from the animal, so powerful is the odour it exhales, that the hunter is obliged to have the mouth and nose stopped with folds of linen, and that often, in spite of this precaution, the pungency of the odour is such as to produce so violent an hæmorrhage as to end in death. I have," he adds, "gained accurate information respecting this circumstance; and as

I have heard the same thing talked of by some Armenians who had been to Boutan, I think that it is true. The odour is so powerful in the East Indies, that I could never support it; and when I trafficked for musk, I always kept in the open air, with a handkerchief over my face, and at a distance from those who handled the sacs, referring them to my broker; and hence I knew by experience that this musk is very apt to give headaches, and is altogether insupportable when quite recent. I add, that no drug is so easily adulterated, or more apt to be so."

These accounts must be taken, we suspect, with some allowance. Certain it is that, when procured in Europe, in the ordinary way of commerce, it produces no such violent effects. It must be confessed, however, that before arriving in Europe not only much of its strength is lost, but it has undergone several adulterations.

Tavernier states that the musk-deer is very numerous in 60° N. lat., among the wooded mountains, whence in February and March, when the snows have deeply covered the earth, hunger drives them southward into the lower lands, to 44° or 45° N. lat., in search of herbage. At this season the peasants wait for them on their passage, and catch them in snares, or kill them with clubs and arrows. At Patana he bought on one occasion 1673 musk-bags, weighing 2557½ ounces, and of pure musk 452 ounces.

In size the musk-deer is about equal to our European roebuck, standing two feet in height at the shoulders; the forehead is arched, the eyes large, the ears rather ample, and very moveable; the tail is a mere rudiment, concealed by the long, harsh, and almost spine-like hair with which the animal is universally covered. The general contour is compact, and displays great vigour, the limbs being robust, and well adapted for climbing and leaping among the rocks of the mountain-range. The hoofs are strong, broad, and expanded; and the posterior rudimentary hoofs are so developed as to touch with their points the surface on which the animal treads, so as to add to the security of its footing. (Fig. 50.)



50.—Musk-Deer.

The general colour of the musk-deer is brown, washed with gray and pale yellow, each hair being tipped with ferruginous; obscure gray or whitish marks often occur on the sides, especially in immature individuals; the shoulders and limbs are of a deeper tint than the body.

The female is less than the male, and is destitute of tusks or long canine teeth, and of a musk-sac. The teats are two in number. In its manners the musk-deer resembles the chamois: its favourite haunts are the pine-forests on the mountains, and its agility is very great, enabling it to spring from rock to rock with great ease and address. It is extremely wild and shy, and is said to be cautious and watchful against surprise, taking refuge, when pursued, among the crags and precipices of the more elevated peaks of the ranges it tenants; yet,

in despite of all its vigour and shyness, it falls a sacrifice to the energy and the contrivances of man.

In 1772 a male of this species was living in the park of Mons. de la Vaillière, at Versailles, in France; and Daubenton, who published a description of it, informs us that the odour it exhaled, and which was carried by the wind, was quite sufficient to guide to the spot where the animal was kept enclosed. "When I first saw it," he adds, "I recognised much resemblance in its figure and attitude to those of the roe, the gazelle, and the chevrotain. No animal of this (the deer) tribe has more activity, suppleness, and vivacity in its movements." It was extremely timid and wild; but, like all the species of the peculiar group to which it belongs, it is gentle and inoffensive. The chevrotains, as we well know, may be rendered very tame: and it is probable that if the musk-deer were taken while young, it might be easily domesticated, since the former animals are shy and timid in the extreme while in a state of natural freedom, but soon gain confidence, and have even bred in captivity in our uncongenial climate.

A good figure of the musk-deer is given by Buffon in the 6th vol. of his Supplement.

The Meminna (*Moschus meminna*).

This elegant little species is a native of Ceylon and Java, and is also found in considerable numbers in the dense woods of the Western Ghauts (but never on the plains), where it was seen by Colonel Sykes, who observes, that it readily reconciles itself to confinement: the flesh is excellent eating. In size it exceeds a large hare, being about one foot five inches long, and eight inches high. Its colour is olive-gray, spotted and streaked on the sides and haunches with white; the ears are large and open; the tail is very short. (Fig. 51.)

The Napu (*Moschus Javanicus*).

The species, constituting the little section of which the Napu is a representative, are characterised by having the

51.—Meminna.

hinder edge of the metatarsus bald and slightly callous; the throat is provided with a somewhat naked concave subglandular callous disc, from which a band extends to the fore part of the chin; and most of them have three diverging bands of white on the chest. The animals of this group are distinguished by their beauty and diminutive size, the largest not equalling a hare. Their limbs are very slender and delicate; their hoofs are long and narrow; the muzzle is acute; the eyes large and dark; the ears pointed. (Fig. 52.)

The species are enveloped in some degree of confusion; indeed they resemble each other so closely, that it requires some attention to discriminate between them. Mr. Bennett, who investigated these animals with the

greatest care, considered that three species were definable, viz. the Napu, the Kanchil, and the Pelandok; the former two of which are described by Sir T. S. Raffles, in the 'Linn. Trans.' vol. xiii. Mr. Gray considers the Pelandok to be in all probability identical with a species described by him under the specific title of *Rufiventer*, and adds another species to the group under the designation of *Stanleyanus:* of this species a pair bred in the gardens of the Zoological Society.

52.—Napu.

The napu is a native of Java and Sumatra, and is the largest of this section; its colour is ferruginous brown above and white beneath, the chest having two longitudinal dusky stripes, so as to produce a central and two diverging lateral lines of white, below which passes a transverse band of pale yellowish fawn. The muzzle, which is naked, is black, with a tinge of flesh colour, as are the ears, which are also nearly naked. The tail is rather short, and white at the tip. In its native regions

the napu gives preference to thickets and districts overgrown with brushwood, near the sea-shore, and feeds principally on the berries of a species of *ardisia*. It is said to be inferior to the kanchil in speed, activity, and cunning, and is therefore more exposed to danger from the assaults of wild beasts, which abound in the forest; and hence it prefers to lurk in coverts near the vicinity of man, from whose observation it can more easily conceal itself than from the watchful eyes of the feline race.

In its manners the napu is mild and gentle, and soon becomes reconciled to captivity: it bears our climate well, with care; though destitute of marked intelligence, its graceful form, agreeable colouring, and full dark eyes render it an interesting object.

THE KANCHIL (*Moschus kanchil*, Raffles).

The kanchil is lighter in form and more spirited than the napu, and considerably smaller. Independent of the difference in size, it is easily distinguished by its darker colour, by a broad stripe of dark chestnut verging upon black which runs down the back of the neck, and by the width of the band across its chest. (Fig. 53.) Of all the chevrotains this is the most active and elegant; indeed its address and resolution are the common theme of discourse in Java, its native country; and the most extraordinary instances are related of its cunning. Unlike the napu, it resides in the depths of the mighty forests which cover so large a portion of the island, feeding chiefly on the fruit of the kayo-briang (*Gmelina villosa*): and though it will live in confinement, it endures captivity with great impatience and restlessness, availing itself of the first opportunity of escape that offers, when it bounds away for the forest, the deep recesses of which afford it a welcome refuge. Such are its cunning and alertness, and so prompt is it with expedients when pressed by danger, that, as Sir S. Raffles informs us, "it is a common Malay proverb, to designate a great rogue to be as cunning as a kanchil;" and he adds, of this cunning many instances are related by the natives.

"If taken in a noose laid for it, the kanchil, when the hunter arrives, will stretch itself out motionless, and feign to be dead; and if, deceived by this manœuvre, he disengage the animal, it seizes the moment to start on its legs and disappears in an instant. A still more singular expedient is mentioned, viz. that, when closely pursued by dogs, the kanchil will sometimes make a bound upwards, hook itself on the branch of a tree by means of its bent tusks, and there remain suspended till the dogs have passed beneath." In vigilance, activity, and cunning, if these statements be but partially true, the kanchil surpasses the rest of the group; none indeed, excepting this, have gained a reputation for these qualities, though all are light-limbed, free, and vigorous.

53.—The Kanchil.

Among the species to be erased from the genus Moschus, are the Guevi, or pigmy antelope, of Senegal (*Antelope pigmæa*), regarded by Buffon as a chevrotain; and the *Moschus Americanus*, and *M. delicatulus* of

South America, which are the young of one of the deer of that country. The *Moschus pigmæus*, Linn., is the young of an antelope. The *Moschus guineensis*, Brisson and Gmelin, is also most probably the young of an antelope. As we have said, however, Africa produces one species at least of the genus Moschus, of which a perfect skin and skeleton are in the museum of the Zoological Society of London.

The African musk-deer (*Moschus aquaticus*, Ogilby, 'Proceeds. Zool. Soc.' 1840, p. 35) very much resembles the meminna, but is larger, being about midway in size between that species and the *Moschus moschiferus*. Its general colour is a deep rich brown, with white spots and markings, nearly similar to those of the meminna, but with the throat-marks as in the napu or kanchil. This interesting species is a native of Sierra Leone, where it lives on the borders of rivers, and takes freely to the water.

CERVIDÆ, OR THE DEER TRIBE.

The animals of this great group, celebrated for their beauty, vigour, and speed, are spread very extensively, each quarter of the globe having its own peculiar species. To this universality of distribution there are, however, certain exceptions: none are found in Australia, and none in the southern and central regions of Africa, their place in the latter regions being supplied by the giraffe and hosts of antelopes. Hills of moderate elevation, wide plains, and forests, are the localities to which these fleet-limbed creatures give preference; none tenant the peaked ridges of the mountain-top, where the chamois and musk-deer find a congenial abode. They delight in a wide range of country, and trust to their swiftness of flight for safety. Most herd together in troops; some few live singly. It may be observed that, in general, their body is round and stout; their limbs long, sinewy, and powerful; their neck long, but very muscular; their head small, and carried high; their eyes large and full; their ears ample.

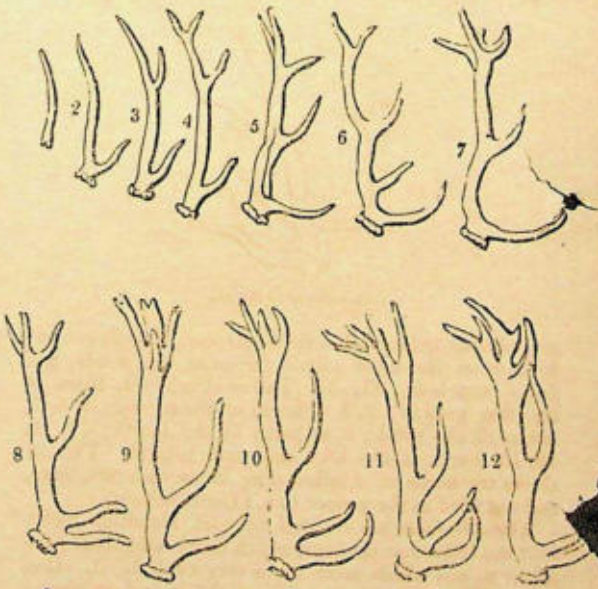
Many species have suborbital sinuses (or lachrymal sinuses), but not all. With respect to these sinuses, or fissures below the eyes, in so many both of the deer and antelopes, we may here remark that their use is not understood: they have nothing to do with respiration, being mere follicles or pits in the skin, having no communication with the interior of the nasal passages. They secrete a peculiar unctuous fluid, exuding more abundantly at certain seasons than at others, when their edges become very tumid, and are incapable of being closed together, as at other times. The animals often apply them to objects near them, widely opening them at the same moment, which they do also when irritated or under excitement. In several species they are greatly developed, and no doubt serve some important purpose in the animal economy. In most species the muzzle, which is small, is flat and naked; in some, as the elk and reindeer, it is large and hairy, and the upper lip is prehensile. The females have four teats.

Throughout all the species the males are furnished with antlers, commonly called horns, which are lost and renewed yearly, increasing in size, and the number of their branches, at each renewal until a certain period. They are seated upon an osseous peduncle or footstalk rising from each frontal bone, at its central point of ossification: these peduncles are enveloped in skin. It is not till the spring or beginning of the second year that the first pair of horns begin to make their appearance. At this epoch a new process commences; the skin enveloping the peduncles swells, its arteries enlarge, tides of blood rush to the head, and the whole system experiences a fresh stimulus. The antlers are now budding, for on the top of these footstalks the arteries are depositing layers of osseous matter, particle by particle, with great rapidity; as they increase the skin increases in an equal ratio, still covering the budding antlers, and continues so to do until they have acquired their due development and solidity. This skin is a tissue of blood-vessels, and the courses of the large arteries from the head to the end of the antlers are imprinted on the

latter in long furrows, which are never obliterated. In ordinary language, the skin investing the antlers is termed velvet, being covered with a fine pile of close short hair. Suppose, then, the antlers of the young deer now duly grown, and still invested with this vascular tissue; but the process is not yet completed. While this tender velvet remains the deer can make no use of his newly-acquired weapons, which are destined to bear the brunt of many a conflict with his compeers: it must therefore be removed, but without giving a sudden check to the current of blood rolling through this extent of skin, lest, by directing the tide to the brain, or some internal organ, death be the result. The process then is this:—as soon as the antlers are complete (according to the age of the individual), the arteries at their base, where they join the permanent footstalk (always covered with skin), begin to deposit around it a burr, or rough ring of bone, with notches, through which the great arteries still pass. Gradually, however, the diameter of these openings is contracted by the deposition of additional matter; till at length the great arteries are compressed as by a ligature, and the circulation is effectually stopped. The velvet now dies for want of the vital fluid; it shrivels, dries, and peels off in shreds, the animal assisting in getting rid of it by rubbing his antlers against the trees. They are now firm, hard, and white; and the stag bears them proudly, and brandishes them in defiance of his rivals. From the burr upwards, these antlers are now no longer part and parcel of the system; they are extraneous, and held only by their mechanical continuity with the footstalk on which they were placed: hence their deciduous character, for it is a vital law that the system shall throw off all parts no longer intrinsically entering into the integrity of the whole. An absorbent process soon begins to take place just beneath the burr, removing particle after particle, till at length the antlers are separated and fall by their own weight, or by the slightest touch, leaving the living end of the footstalk exposed and slightly bleeding. This is immediately covered with a pellicle of skin, which soon thickens, and all is well. The return of

spring brings with it a renewal of the whole process with renewed energy, and a finer pair of antlers branches forth.

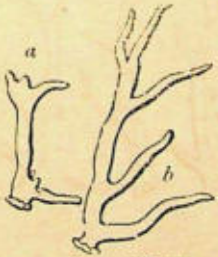
The common stag begins to acquire his antlers in the spring, and loses them early in the spring succeeding. His first antlers (second spring) are straight, small, and simple: he is now termed a Brocket. The next pair are larger, and have a brow antler directed forwards from the main stem, sometimes with one or two small branches above. The third pair of antlers has two forward stem branches besides the brow antlers, and one or two snags at the top: the fourth pair have the brow



54.—Stags' Horns.

and stem antlers increased, and more snags: the fifth and sixth pairs exhibit still greater development, and an increase in the number of snags. Any disturbance in the system produces a corresponding deterioration in the form and proportions of the horn. Our figures develop the progress of the successive annual horns in the stag or red-deer, and in the fallow-deer. The horns are from the left side.

Fig. 54 (Stag):—1, Horn of first growth; 2, 3, 4, ditto of second; 5, 6, of third and fourth; 7, of fifth; 8, 9, of the sixth growth; 10, 11, 12, the seventh and subsequent growths; the horns being at their maximum. Fig. 55 represents horns of the Wapiti-deer: *a*, horn



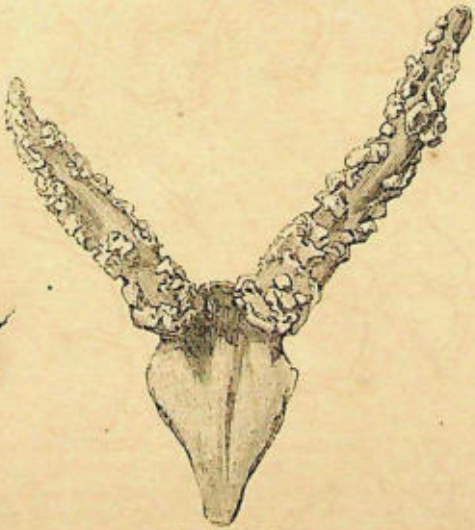
55.—Horns of Wapiti.

produced in unfavourable circumstances, in confinement; *b*, horn of the same animal the year afterwards, and finely branched. Fig. 56 (Fallow-deer):—1, Horn of the first growth; 2, 3, 4, horns of the second; 5, 6, 7, horns of the third; 8, 9, horns of the fourth; 10, 11, 12, 13, horns of the fifth and sixth growth. Fig. 57 shows the horns of a fallow-deer in an unnatural state, and not shed at the proper time (*Cervo evirato*).

The Cervidæ are divided by Col. Hamilton Smith into the following sections, which many naturalists have adopted, and which seem to us very natural. 1. *Alce*, or the Elk group; 2. *Rangifer*, or the Rein-deer group;

56.—Horns of Fallow-Deer.

3. *Dama*, or the Fallow-deer group; 4. *Elaphus*, or the Stag group; 5. *Rusa*, or the Sambur-deer group; 6. *Axis*, or the Axis-deer group; 7. *Capreolus*, or the Roebuck group; 8. *Mazama*, or the American Fallow group; 9. *Subulo*, or the Guazu or Brocket group of America; 10. *Styloceros*, or the Muntjacks.



57.—Horns of Fallow-Deer.

1. ALCE.—*Horns sessile, more or less subdivided, without either basilary or mesial antlers, but terminated by a vast palmation, digitated on its external border only.*

THE AMERICAN ELK, OR MOOSE-DEER

(*Alces Americanus*; *Cervus alces*, Linn.).

The elks are the largest of the Cervidæ, and are distinguished by the broad palmation of their antlers,

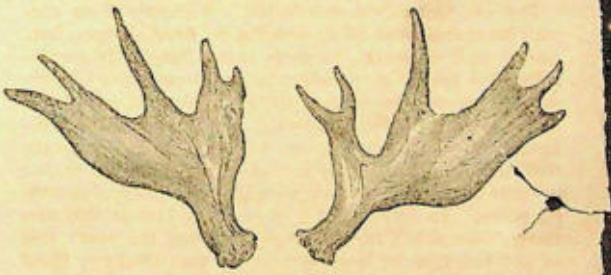
58.—American Elk.

furnished with numerous digitations on their outer edge only; a large isolated branch springs from the stem, which latter is thick and short, and begins immediately to expand; the head is heavy, the ears large and open, the eyes small and dull; the muzzle elongated, thick, projecting, pendulous, and flexible—it is covered with hair. Two small pendulous dewlaps of loose skin hang from the throat; the neck is short and thick, the body strong and short; the limbs are long and awkward; the toes are broad, and divided so high that they diverge as the animal presses them to the ground; the tail is extremely short; the hair is full, harsh, long, and produced on the neck and shoulders into a mane. (Fig. 58.)

It has been considered by many naturalists that the American elk and the European elk are specifically

identical; it is probable, however, that they are distinct. The European elk is spread but thinly through the wild forest-regions of Norway, Sweden, part of Prussia, Lithuania, and Russia, from the fifty-third to the sixty-third degree of north latitude. It extends also through Asiatic Tartary to the north of China. Buffon supposes that the Greeks were unacquainted with this animal, and it does not appear to have been noticed by Aristotle. That it was the Alce or Alces, of Pausanias, Cæsar, and Pliny, there can be no doubt. The word Alce or Alchis is merely the Celtic Elch or the Scandinavian Ælg modified. In book viii. ch. xvi. Pliny gives an account of the alce, which he distinguishes from the alchis, regarding them at the same time as allied animals: but it is easy to see through his error; his account of its walking backwards while feeding, in consequence of its overhanging lip, and his statement that there is no joint at the hock, we need scarcely say are fabulous. According to Mr. Lloyd ('Field-Sports of the North of Europe') the elk 'is far less common than formerly, and restricted to certain districts only. It frequently attains the height of seven and even eight feet, but does not attain to full growth till about the fourteenth year. A young elk two years old, in the possession of Mr. Wise, the Swedish consul-general, measured upwards of six feet at the shoulder. Mr. Lloyd thus describes the habits and uses of the European elk:—"The elk is a long-lived animal; he does not attain to his full growth until after his fourteenth year. At least so it is to be presumed, as up to that period his horns, which are of a flat form, are annually provided with an additional branch. He sheds his horns about the month of February in each year. The female elk, unlike the rein-deer of that sex, has no horns. The horns of the young male elk are perceptible nine months after its birth: for the first year they are cylindrical and short; the second year they are about a foot in length, but not branched; the third year two points are discernible; the fourth year, three; the fifth, they are full grown in length. From that time forward they yearly increase in breadth, and in the number of branches, until

there are as many as fourteen on each horn. By nature," adds Mr. Lloyd, "the elk is timorous, and he usually flies at the sight of man. At certain seasons, however, like other animals of the deer kind, he is at times rather dangerous. His weapons are his horns (Fig. 59) and hoofs; he strikes so forcibly with the latter as to annihilate a wolf or other large animal at a single blow. It is said that when the elk is incensed the hair on his neck bristles up like the mane of a lion, which gives him a wild and frightful appearance. The usual pace of the elk is a high shambling trot, and his strides are immense, but I have known him, when frightened, to go at a tre-

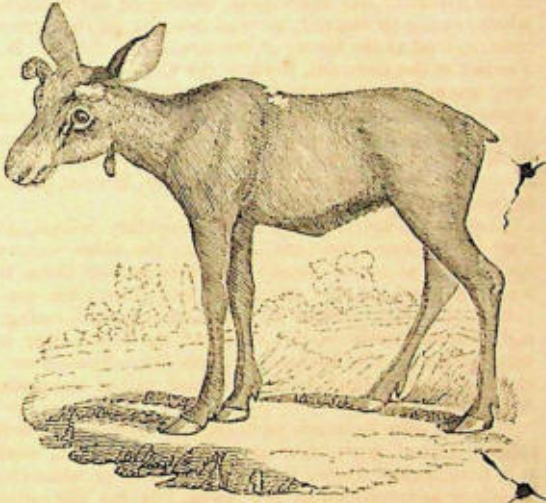


59.—Horns of Moose-Deer.

mendous gallop. In passing through thick woods he carries his horns horizontally, to prevent them from being entangled in the branches; from the formation of his hoofs, he makes a great clattering, like the rein-deer, when in rapid motion. In the summer season the elk usually resorts to morasses and low situations; for, like other animals of the deer kind, he frequently takes to the water in warm weather; he is an admirable swimmer. In the winter time he retires to the more sheltered parts of the forest, where willow, ash, &c., are to be found, as from the small boughs of these trees he obtains his sustenance during that period of the year. In the summer and autumn the elk is often to be met with in small herds,

but in the winter there are seldom more than two or three in company. At the latter season, indeed, he is frequently alone. The flesh of the elk, whether fresh or smoked, is very excellent: the young are particularly delicious. The tongue and the nose are thought to be great delicacies in Scandinavia as well as in America. Great virtue was once placed in the hoof of that animal; but this idle notion must, by this time, I should think, be nearly exploded. The skin is convertible to many purposes, and is very valuable." Mr. Grieff says, "It is not long since that a regiment was clothed with waistcoats made from the hides of those animals, which were so thick that a ball could scarcely penetrate them." "The elk is easily domesticated. Formerly these animals were made use of in Sweden to draw sledges, but, owing, as it was said, to their speed frequently accelerating the escape of people who had been guilty of murders or other crimes, the use of them was prohibited under great penalties. Though I apprehend these ordinances, if not abrogated, are obsolete, I am not aware that the elk is ever made use of in that kingdom at the present day, either to draw a sledge or for other domestic purposes. In Sweden, it is contrary to law at this particular time to kill the elk at any season of the year: this is not the case in Norway; for in that country, these animals may be destroyed, with certain limitations as to numbers, from the 1st of July to the 1st of November inclusive. The penalty however for killing an elk out of season, in Norway, is very much heavier than in Sweden; it amounts indeed, including legal expenses, &c., to about 20*l*., which is no inconsiderable sum in that kingdom." (Lloyd, 'Field-Sports of the North of Europe,' vol. ii., p. 329 et seq.)

Immediately following the passage above quoted there is a very interesting account of the mode of hunting the elk in Scandinavia, upon "skidor," or snow-skates, interspersed, as most of such narratives are, with notices of the habits of the animal; but as our limits will not permit its insertion, we refer the reader to the work, which is well worthy of his attention.



60.—Moose-Deer.

The American elk, or moose-deer (Mousöa of the Crees; Mongsoa of the Algonquins; Denyai of the Chippewyans), presents the same habits and manners as the elk of Scandinavia. (Fig. 60.) Formerly its range was more extensive than at present. Dr. Richardson, in his 'Fauna Boreali-Americana,' says, "Du Pratz informs us that in his time the moose-deer were found as far south as Ohio; and Denys says that they were once plentiful in the island of Cape Breton, though, at the time he wrote, they had been extirpated. At present, according to Dr. Godman, they are not known in the state of Maine; but they exist in considerable numbers in the Bay of Fundy. They frequent the woody tracts in the fur countries, to their most northern limit. Several were seen on Captain Franklin's last expedition,

at the mouth of the Mackenzie, feeding on the willows, which, owing to the rich alluvial deposits on that great river, extend to the shores of the Arctic Sea, lat. 69° N. Farther to the eastward, towards the Coppermine River, they are not found in a higher latitude than 65° N., on account of the scarcity on the Barren-grounds of the aspen and willow, which constitute their food. Mackenzie saw them high up on the eastern declivity of the Rocky Mountains, but I suspect they are rarely, if ever, found to the westward of the mountains."

The moose-deer appears to be a solitary animal, at least in the more northern latitudes; the older writers speak of it as being found in small herds, but there is room for suspicion that the moose and wapiti are confounded together. From its exquisite sense of hearing, and habitual wariness, the chace of the moose-deer is very difficult. Dr. Richardson gives the following succinct account of their habits and food, and of the mode of hunting them:—

"In the more northern parts the moose-deer is quite a solitary animal, more than one being very seldom seen at a time, unless during the rutting season, or when the female is accompanied by her fawns. It has the sense of hearing in very great perfection, and is the most shy and wary of all the deer species, and on this account the art of moose-hunting is looked upon as the greatest of an Indian's acquirements, particularly by the Crees, who take to themselves the credit of being able to instruct the hunters of every other tribe. The skill of a moose-hunter is most tried in the early part of the winter; for during the summer the moose, as well as other animals, are so much tormented by musquitoes, that they become regardless of the approach of man. In the winter the hunter tracks the moose by its foot-marks in the snow, and it is necessary that he should keep constantly to leeward of the chace, and make his advances with the utmost caution, for the rustling of a withered leaf or the cracking of a rotten twig is sufficient to alarm the watchful beast. The difficulty of approach is increased by a habit which the moose-deer has of making daily a sharp turn in its

route, and choosing a place of repose so near some part of its path, that it can hear the least noise made by one that attempts to track it. To avoid this, the judicious hunter, instead of walking in the animal's footsteps, forms his judgment, from the appearance of the country, of the direction it is likely to have taken, and makes a circuit to leeward until he again finds the track. This manœuvre is repeated until he discovers, by the softness of the snow in the foot-marks and other signs, that he is very near the chace. He then disencumbers himself of everything that might embarrass his motions, and makes his approach in the most cautious manner. If he gets close to the animal's lair without being seen, it is usual for him to break a small twig, which alarming the moose, it instantly starts up; but, not fully aware of the danger, squats on its hams, and voids its urine, preparatory to setting off. In this posture it presents the fairest mark, and the hunter's shot seldom fails to take effect in a mortal part. In the rutting season the bucks lay aside their timidity, and attack every animal that comes in their way, and even conquer their fear of man himself. The hunters then bring them within gun-shot by scraping on the blade-bone of a deer and by whistling, which, deceiving the male, he blindly hastens to the spot to assail his supposed rival. If the hunter fails in giving it a mortal wound as it approaches, he shelters himself from its fury behind a tree, and I have heard of several instances in which the enraged animal has completely stripped the bark from the trunk of a large tree by striking with its fore-feet. In the spring-time, when the snow is very deep, the hunters frequently run down the moose on snow-shoes." An instance is recorded in the narrative of Captain Franklin's second journey, where three hunters pursued a moose-deer for four successive days, until the footsteps of the chace were marked with blood, although they had not yet got a view of it. At this period of the pursuit the principal hunter had the misfortune to sprain his ankle, and the two others were tired out; but one of them, having rested for twelve hours, set out again, and succeeded in killing the animal after a further pursuit of

two days' continuance. Notwithstanding the lengthened chace which the moose can sustain when pursued in the snow, Hearne remarks that it is both tender-footed and short-winded; and that, were it found in a country free from underwood, and dry under foot, it would become an easy prey to horsemen and dogs. The same author informs us that in the summer moose-deer are often killed in the water by the Indians who have the fortune to surprise them while they are crossing rivers or lakes, and that at such times they are the most inoffensive of animals, never making any resistance.

"The young ones in particular," says he, "are so simple, that I remember to have seen an Indian paddle his canoe up to one of them, and take it by the poll, without experiencing the least opposition, the poor harmless animal seeming at the same time as contented alongside the canoe as if swimming by the side of its dam, and looking up in our faces with the same fearless innocence that a house-lamb would, making use of its fore-foot almost every instant to clear its eyes of mosquitoes, which at that time were remarkably numerous. The moose is the easiest to tame and domesticate of any of the deer kind."

With respect to the food of the moose, the same traveller says, "Their legs are so long, and their necks so short, that they cannot graze on the level ground like other animals, but are obliged to browse on the tops of large plants and the leaves of trees in the summer, and in winter they always feed on the tops of willows and the small branches of the birch-tree, on which account they are never found during that season but in such places as can afford them a plentiful supply of their favourite food; and although they have no fore-teeth in the upper jaw, yet I have often seen willows and small birch-trees cropped by them in the same manner as if they had been cut by a gardener's shears, though some of them were not smaller than a common pipe-stem; they seem particularly partial to red willows (*cornus alba*)." To the eastward of the Rocky Mountains the evergreen leaves of the *gualtheria shallon* form, according to Lewis and Clark, a favourite part of the food of the moose-deer.

The wooden pipe-stems above alluded to, and used in Hudson's Bay, are, says Dr. Richardson, about the thickness of a little finger.

Destitute as is the elk of the grace and compactness of form so conspicuous in the stag, it is nevertheless a noble and striking animal: those who have contemplated it amidst the wilds of its native regions describe the effect of its appearance as very imposing.

2. RANGIFER.—*Antlers flattened.*

THE REIN-DEER

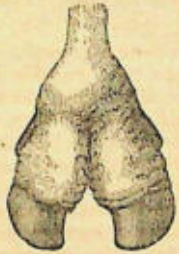
(*Rangifer tarandus, Cervus tarandus,* Linn.; *Cervus rangifer,* Brissot).

The rein-deer presents the following characteristics, which form good grounds of separation from the other sections. Both sexes possess horns and canine teeth; the muzzle is covered with hair, excepting that there is a small naked space between the nostrils, the indication, as it were, of the naked muzzle which we find in the succeeding groups. The nostrils are oblique and oval. The head is somewhat large and long, the neck is short and thick, and carried horizontally. The horns, especially in old males, are of great size, but present considerable variation of figure. They may be described, in general terms, as consisting each of a long slender compressed skin, inclined backwards with an outer and upward sweep; a brow antler, sometimes found only on one horn, sometimes on both, advances forward, assuming a vertical palmated form, and hanging over the muzzle: this plate usually terminates in digitations; sometimes, however, it is plain. A second antler rises at some distance above the brow antler, and ascends upwards, assuming at its extremity either a palmated form or dividing into two or three small branches. Besides these, one or two snags rise from the main stem, which generally terminates palmated with deep digitations.

The feet are deeply fissured; when pressed to the ground they spread—when raised up they close together,

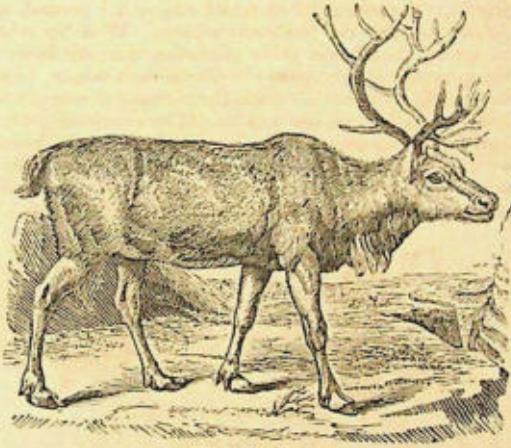
and, if the animal be in quick motion, with a smart snap. (Fig. 61 represents the hoof closed; Fig. 62, the hoof expanded.) The hoofs are round and very concave beneath, with sharp edges; the accessory toes are much developed. The fur consists of two sorts, a soft close under-wool, and an outer covering of close, harsh, brittle, erect hairs, which are elongated beneath the neck so as to hang down like a fringe. The limbs are short and muscular, the shoulders and neck very powerful, the body firmly built, and the whole contour of the frame is such as eminently qualifies the animal for the service of the Laplander. (Fig. 63.)

61.—Foot of Rein-Deer.



62.—Foot of Rein-Deer.

The rein-deer is spread throughout the Arctic regions of Europe, Asia, and America, the wilds of the polar circle being its congenial abode. The finest animals are those of Finmark, Lapland, and especially Spitzbergen; those of Norway and Sweden being inferior in strength and stature. In Asia it extends farther to the south than in Europe, ranging along the Ural chain to the foot of the Caucasian mountains; it is common through the northern latitudes of Siberia, and abounds in Kamtchatka. In America, where it is termed the Caribou, it is most numerous between the sixty-third and sixty-sixth degrees of latitude, its most southern limit being about 50° N.

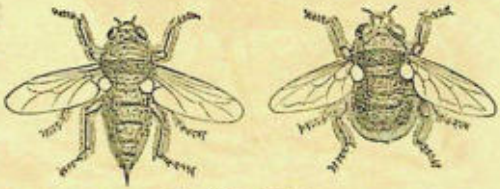


63.—Rein-Deer.

It has been a question whether the rein-deer of Europe, Asia, and America are specifically the same or distinct; we are inclined to regard them as varieties of one species; but are aware that in the opinion of some zoologists there are two distinct species, as indicated by the form of the skull, in the Old World; and that the American rein-deer is again distinct; indeed it is a question whether in America there be not two species; certainly there are two well-marked varieties. The decision of points like these is, however, alien to our present object.

The rein-deer (we allude more expressly to the European animal, though the remarks apply to that of Asia and America) is eminently migratory in its habits, and herds in troops, which travel from the woods to the open hills and back again according to the season. The woods are their winter refuge; here they subsist on the long pendent lichens which hang in festoons from the

trees, on the white lichen which covers the ground, and on the twigs of the birch and willow. With the return of spring they begin their migration from the forest to the mountain ranges, partly to obtain their favourite food, but chiefly in order to escape the myriads of mosquitoes; and especially from the gad-fly (*Œstrus arandi*), which now begins to appear: the latter being greatly dreaded by the rein-deer, the fly not only tormenting it with its sting (ovipositor), but placing its egg in every wound it makes. Fig. 64 represents this formidable insect. So



64.—Œstrus arandi.

imperative is the instinct that impels the Lapland rein-deer to these migratory movements, that it cannot be modified in the domestic race which constitutes the sole wealth of the Laplander, and on which he depends for existence; hence he is obliged to lead a semi-nomadic life, taking periodical journeys of no ordinary toil, from the interior of the country to the mountains which overhang the Norway and Lapland coasts, and back to the interior. (Fig. 65.)

Lapland, says Hoffberg, is divided into two tracts, called the Alpine and Woodland country. Those immense mountains called in Sweden Fjellen divide that country from Norway, extending towards the White Sea as far as Russia, and are frequently more than twelve miles in breadth. The other, called the Woodland division, lies to the east of this, and differs from the neighbouring provinces of Norway by its soil, which is exceedingly stony and barren, being covered with one continued tract of wood, of old pine-trees. This tract

65.—Rein-Deer and Laplanders.

has a very singular appearance. The trees above are covered over with great quantities of a black hanging lichen, growing in filaments resembling locks of hair, while the ground beneath appears like snow, being totally covered with white lichens. Between this wood and the Alps lies a region called the Woodland, or Desert Lapmark, of thirty or forty miles in breadth, of the most savage and horrid appearance, consisting of scattered uncultivated woods, and continued plains of dry barren sand, mixed with vast lakes and mountains. When the mosses on part of this desert tract have been burnt, either by lightning or any accidental fire, the barren soil immediately produces the white lichen which covers the lower parts of the Alps. The rein-deer in summer seek their highest parts, and there dwell amidst their storms and snows, not to fly the heat of the lower regions, but to avoid the gnat and gad-fly. In winter these intensely cold mountains, whose tops reach high into the atmosphere, can no longer support them, and they are obliged to return to the desert and subsist upon the lichens. Of

these, its principal food is the rein-deer lichen. There are, says Hoffberg, two varieties of this: the first is called *sylvestris*, which is extremely common in the barren deserts of Lapland, and more particularly in its sandy and gravelly fields, which it whitens over like snow; its vast marshes, full of tussocks of turf, and its dry rocks, are quite grown over by it. The second variety of this plant, which is less frequent than the former, is named the Alpine; this grows to a greater height, with its branches matted together: it has this name, because when those mountains are cleared of their wood the whole surface of the earth is covered with it; yet it is seldom to be found on their tops. When the woods become too luxuriant, the Laplander sets fire to them, as experience has taught him that when the vegetables are thus destroyed the lichen takes root in the barren soil and multiplies with facility, though it requires an interval of eight or ten years before it comes to a proper height. The Laplander esteems himself opulent who has extensive deserts producing this plant exuberantly; when it whitens over his fields, he is under no necessity of gathering in a crop of hay against the approach of winter, as the rein-deer eats no dried vegetable, unless perhaps the river horsetail (*Equisetum fluviatile*). They rout for this lichen under the snow like swine in a pasture. It sometimes happens (but very rarely) that the winter sets in with great rains, which the frost immediately congeals; the surface of the earth is then covered with a coating of ice before the snow falls, and the lichen is entirely incrusted and buried in it. Thus the rein-deer are sometimes starved, and famine attacks the Laplanders. In such an exigence they have no other resource but felling old fir-trees overgrown with the hairy liverworts. These afford a very inadequate supply, even for a small herd, but the greater part of a large one, in such a case, is sure to perish with hunger.

With the approach of winter the coat of the rein-deer begins to thicken, and, like that of most polar quadrupeds, to assume a lighter hue. In a domesticated state the animal is subject to a great variety of colour: many are

66.—White Rein-Deer.

white, and mottled individuals are by no means uncommon. (Fig. 66.) Sir Arthur Brooke and other writers notice the strange propensity to devour the lemming (*Arvicola Norvegicus; Mus lemnus*, Linn.) which this animal often exhibits; and Captain Franklin observes that the American rein-deer "are accustomed to gnaw their fallen antlers, and to devour mice." We cannot account for such an anomaly in the habits of a ruminating animal, otherwise than by attributing it to a morbid appetite. To the natives of Finmark, Lapland, and the shores of the Arctic Sea, the rein-deer is in every sense important; not only is it a beast of burden, but its flesh and milk are alike in requisition. In these countries

"Their rein-deer form their riches; these their tents,
Their robes, their beds, and all their homely wealth

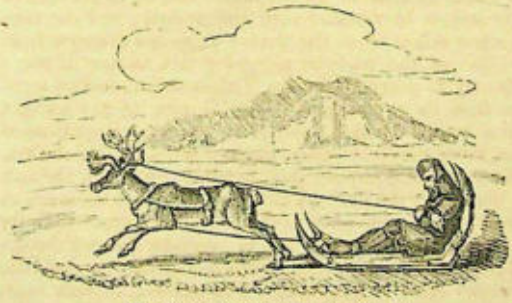
Supply—their wholesome fare, and cheerful cups;
Obsequious to their call, the docile tribe
Yield to the sled their necks, and whirl them swift
O'er hill and dale."

M. de Broke says, "The number of deer belonging to a herd is from three hundred to five hundred; with these a Laplander can do well, and live in tolerable comfort. He can make in summer a sufficient quantity of cheese for the year's consumption; and during the winter season can afford to kill deer enough to supply him and his family pretty constantly with venison. With two hundred deer, a man, if his family be but small, can manage to get on. If he have but one hundred, his subsistence is very precarious, and he cannot rely entirely upon them for support. Should he have but fifty, he is no longer independent, or able to keep a separate establishment, but generally joins his small herd with that of some richer Laplander, being then considered more in the light of a menial, undertaking the laborious office of attending upon and watching the herd, bringing them home to be milked, and other similar offices, in return for the subsistence afforded him."

Von Buch, a celebrated traveller, has well described the evening milking-time, in a Laplander's summer encampment on the mountains.

Early in September the herds and their owners commence their return from the coast in order to reach their winter-quarters before the fall of the snows; and it is when the winter is fairly set in that the peculiar value of the rein-deer is felt by the Laplander, and his powers called into operation. Without him communication would be almost utterly suspended. Harnessed to a sledge (Fig. 67) the rein-deer will draw about three hundred pounds: but the Laplanders generally limit the burden to two hundred and forty pounds. The trot of the rein-deer is about ten miles an hour; and the animal's power of endurance is such, that journeys of one hundred and fifty miles in nineteen hours are not uncommon. There is a portrait of a rein-deer in the palace of Drotningholm (Sweden), which is represented,

upon an occasion of emergency, to have drawn an officer with important despatches the incredible distance of eight hundred English miles in forty-eight hours. This event is stated to have happened in 1699, and the tradition adds, that the deer dropped down lifeless upon his arrival.



67.—Rein-Deer harnessed to a Sledge.

The obstinacy which the rein-deer sometimes displays is the preservation of his driver. The great difficulty is to separate him from his companions, or to prevent him joining the herds which he sees upon his track. This gregarious disposition is given him for his protection against the danger of a solitary state, and the Laplander avails himself of it when he loses his road, or is separated from those with whom he travels.

"In proceeding along the extensive and endless lakes of Lapland, if the number of deer be great, a close and lengthened procession is invariably formed; each deer following the foremost sledge so closely that the head of the animal is generally in contact with the shoulders of the driver before. Should the guide alter his direction, by making a bend to the right or left, the whole of the deer in the rear will continue their course, till they arrive at the spot where the turn was made. It thus frequently happens that, when the distance between

the foremost and hindmost deer is great, the guide making a bend, considerable saving might be obtained by cutting across. This, however, it is scarcely possible to do; for should the deer even be pulled by main force out of its former course, it will immediately turn aside from the new direction it is placed in, and regain the old track, in spite of all the driver can do to prevent it. It is useless to contend with the animal; and the time thus lost might leave the driver at such a distance from the rest of the party as to render it a matter of some difficulty to overtake them. This unwillingness to separate from its companions is one feature of the instinct given to this animal; and it is the very circumstance that, more than any other, ensures the safety of the traveller. Should any accident separate him from the rest of his party, the deer be fatigued, or other occurrences throw him considerably in the rear, if he trust entirely to his deer, it will enable him to overtake the rest though they should be some miles in advance, from the exquisite olfactory sense it possesses. The animal, in this case, holding its head close to the snow, keeps frequently smelling, as a dog would do to scent the footsteps of its master; and is thus enabled to follow with certainty the track the other deer have gone. Were it not for this property of the animal, travelling across Lapland would be not a little hazardous, particularly in those parts where the weather is the darkest, which is generally while crossing the mountains of Finmark. It often happens that the party is unavoidably scattered, and the sound of the bell enables them to rejoin each other. The bells, however, should the weather be very thick and stormy, can only be heard a short distance off; and it is then by the sagacity of the deer alone that the difficulty is surmounted."*

The mode of hunting the wild rein-deer by the Laplanders, the Esquimaux, and the Indians of North America, has been accurately described by various travellers. We select the following accounts from the interesting

* De Broke, p. 462.

narratives of Captain Lyon and Captain Franklin. Captain Lyon says,—

"The rein-deer visits the polar regions at the latter end of May or the early part of June, and remains until late in September. On his first arrival he is thin, and his flesh is tasteless, but the short summer is sufficient to fatten him to two or three inches on the haunches. When feeding on the level ground, an Esquimaux makes no attempt to approach him, but should a few rocks be near, the wary hunter feels secure of his prey. Behind one of these he cautiously creeps, and having laid himself very close, with his bow and arrow before him, imitates the bellow of the deer when calling to each other. Sometimes, for more complete deception, the hunter wears his deer-skin coat and hood so drawn over his head, as to resemble, in a great measure, the unsuspecting animals he is enticing. Though the bellow proves a considerable attraction, yet if a man has great patience he may do without it, and may be equally certain that his prey will ultimately come to examine him; the rein-deer being an inquisitive animal, and at the same time so silly, that, if he sees any suspicious object which is not actually chasing him, he will gradually, and after many caperings, and forming repeated circles, approach nearer and nearer to it. The Esquimaux rarely shoot until the creature is within twelve paces, and I have frequently been told of their being killed at a much shorter distance. It is to be observed, that the hunters never appear openly, but employ stratagem for their purpose; thus, by patience and ingenuity, rendering their rudely-formed bows, and still worse arrows, as effective as the rifles of Europeans. When two men hunt in company, they sometimes purposely show themselves to the deer, and when his attention is fully engaged, walk slowly away from him, one before the other. The deer follows, and when the hunters arrive near a stone, the foremost drops behind it and prepares his bow, while his companion continues walking steadily forward. This latter, the deer still follows unsuspectingly, and thus passes near the concealed man, who takes a deliberate aim and

kills the animal. When the deer assemble in herds, there are particular passes which they invariably take, and on being driven to them are killed by arrows by the men, while the women with shouts drive them to the water. Here they swim with the ease and activity of water-dogs, the people in kayaks chasing and easily spearing them; the carcases float, and the hunter then presses forward and kills as many as he finds in his track. No springs or traps are used in the capture of these animals, as is practised to the southward, in consequence of the total absence of standing wood."*

Captain Franklin describes the mode in which the Dog-rib Indians kill the rein-deer, which he had from Mr. Wentzel, who resided long amongst that people:—

"The hunters go in pairs, the foremost man carrying in one hand the horns and part of the skin of the head of a deer, and in the other a small bundle of twigs, against which he, from time to time, rubs the horns, imitating the gestures peculiar to the animal. His comrade follows, treading exactly in his footsteps, and holding the guns of both in a horizontal position, so that the muzzles project under the arms of him who carries the head. Both hunters have a fillet of white skin round their foreheads, and the foremost has a strip of the same round his wrists. They approach the herd by degrees, raising their legs very slowly, but setting them down somewhat suddenly, after the manner of a deer, and always taking care to lift their right or left feet simultaneously. If any of the herd leave off feeding to gaze upon this extraordinary phenomenon, it instantly stops, and the head begins to play its part by licking its shoulders, and performing other necessary movements. In this way the hunters attain the very centre of the herd without exciting suspicion, and have leisure to single out the fattest. The hindmost man then pushes forward his comrade's gun, the head is dropped, and they both fire nearly at the same instant. The deer scamper off, the hunters trot after them: in a short time the poor

* Private Journal.

animals halt, to ascertain the cause of their terror; their foes stop at the same moment, and, having loaded as they ran, greet the gazers with a second fatal discharge. The consternation of the deer increases; they run to and fro in the utmost confusion; and sometimes a great part of the herd is destroyed within the space of a few hundred yards."

In America the rein-deer appears to be as migratory as its Old World relative. Dr. Richardson describes two varieties of this animal inhabiting the northern regions of that continent: the one under the name of the Woodland Caribou (Var. *sylvestris*); the other under that of the Barren-ground Caribou (Var. *Arctica*).

The Woodland Caribou (Caribou of Theodat, La Hontan, Charlevoix, &c.; Rein-deer of Drage, Dobbs, &c.; Attekh of the Cree Indians; Tantseeah of the Copper Indians, Richardson).—This variety is much larger than the Barren-ground caribou, but inferior as an article of food. Its proper country is a stripe of low primitive rocks well clothed with wood, about 100 miles wide, and extending, at the distance of 80 or 100 miles from the shores of the Hudson's Bay, from Lake Athapescow to Lake Superior. "Contrary to the practice of the Barren-ground caribou, the Woodland variety travels to the southward in the spring. They cross the Nelson and Severn rivers in immense herds in the month of May, pass the summer on the low and marshy shores of James's Bay, and return to the northward and at the same time retire more inland in the month of September." The weight of the Woodland caribou varies from two hundred to two hundred and forty pounds.

The Barren-ground caribou (Common Deer of Hearne; Bedsee-awsch of the Copper Indians and Dogribs; Bedsee-choh (male), Tsootai (female), Tampeh (female with a fawn) of the same; Took-too of the Esquimaux, Took-took dual, Took-toot plural (Richardson); Tukta of the Greenlanders (Pangnek, male; Kollowak, female; Norak, young, Fabricius). This variety (species?) is of small stature, the buck weighing, exclusive of the offal, from ninety to one hundred and thirty

pounds, according to the animal's condition. The herds of the Barren-ground caribou spend the summer on the coast of the Arctic Sea, and in winter retire to the woods between the sixty-third and sixty-sixth degrees of latitude, where they feed on the *Usneæ*, *Alectariæ*, and other arboreal lichens, as well as on the long grass of the

68.—Horns of Caribou.

swamps. About the end of April they make short excursions from the woods, in order to obtain the terrestrial lichens (*Cetrariæ*, *Cornicularieæ*, and *Cenomyces*), which, now that the snows are partially melted, are both soft and easily to be collected. "In May the females pro-

ceed to the sea-coast, and towards the end of June the males are in full march in the same direction. At this period the sun has dried up the lichens on the Barren-grounds, and the caribou frequents the moist pastures which cover the bottoms of the narrow valleys on the coast and islands of the Arctic Sea, where they graze on the sprouting carices, and on the withered grass or hay of the preceding year, which at that period is still standing and retaining part of its sap. The spring journey is performed partly on the snow, and partly, after the snow has disappeared, on the ice covering the rivers and lakes, which have in general a northerly direction." Soon after their arrival on the coast, the females produce their young. In September the herds begin their return southwards to the forests, which they reach towards the end of October; and are then joined by the males. This retrograde journey is performed after the snows have fallen, but before the heavy frost has set in, so that they are able to procure the lichens, which are still tender and pulpy, by scratching up the snow with their feet, which are well adapted by the concavity of their rounded sharp-edged hoofs for this important purpose. Figs. 68 and 69 are copies of drawings, by Captain Back, of the horns of two old buck caribous, killed on the Barren-grounds in the neighbourhood of Fort Enterprise. They are distinguished by their palmations. Dr. Richardson states that he can confidently assert, after having seen many thousands of the Barren-ground caribou, "that the horns of the old males are as much if not more palmated than any antlers of the European rein-deer to be found in the British museums;" which is contrary to Colonel Smith's opinion, that the horns of the caribou are shorter, less concave, more robust, with a narrower palm, and fewer processes than those of the Lapland rein-deer. So numerous, however, are the varieties of form which the horns of the rein-deer assume, that little stress can be laid upon them as affording distinguishing characters.

It is not only the flesh of the caribou that is sought after by the Indians, its skin is of great value.

Dr. Richardson informs us, that the skin of the caribou dressed with the hair on it is so impervious to cold, that if clothed in a suit of this material, and wrapped in a mantle of the same, a person may bivouac all night in the snow with safety during the intensity of an Arctic winter.

69.—Horns of Caribou.

So closely indeed are the hairs set, that it is impossible, by separating them, to discern the skin from which they arise. To the tribes of the polar circle clothing of such material is inestimable.

The flesh, when in high condition, has several inches of fat on the haunches, and is equal to the best fallow-deer venison. The tongue is highly esteemed. A preparation called pemmican is made by pouring one-third

of melted fat over the pounded meat, and incorporating them well together. The Esquimaux and Greenlanders consider the paunch with its contents of lichen a great delicacy; and in Boothia, as Captain James Ross affirms, these contents form the only vegetable food which the natives ever taste.

3. DAMA.—*Antlers merging into broad digitated palmations.*

THE FALLOW-DEER.

This well-known ornament of our parks is the Hydd (Buck), Hyddes (Doe), Elain (Fawn), of the ancient British; Le Daim (Buck), La Daime (Doe), Faon (Fawn), of the French; Daino (Buck), Damma (Doe), Cerbietto, Cerbietta (Fawn), of the Italians; Gama, Corza (Buck), Venadito (Fawn), of the Spanish; Corza (Buck), Veado (Fawn), of the Portuguese; Damhirsch of the Germans; Dof, Dof Hjort, of the Swedes; Daae, Dijr, of the Danes; *Dama vulgaris* of Gesner; *Cervus palmatus* of Klein; *Cervus platyceros* of Ray; and *Cervus dama* of Linnæus.

Desmarest, who regards the fallow-deer as the *Platyceros* of Pliny, and the Ἔλαφος εὐρυκέρως of Oppian (as did also Pennant), observes that it is less extensively spread in Europe than the stag: it does not exist in Russia, but it would seem that it inhabits Lithuania, Moldavia, and Greece, the north of Persia and China, and also Abyssinia; it is abundant in England, but of rarer occurrence in France and Germany.

Cuvier, who remarks that the fallow-deer has become common in all the countries of Europe, adds, "but it appears to be originally a native of Barbary." And he subjoins in a note, that, "since the publication of his last edition of the 'Ossemens Fossiles,' he has received a wild fallow-deer killed in the woods to the south of Tunis." We have ourselves examined horns of the fallow-deer brought from the same territory. In Spain, according to Pennant, the breed is very large; and he goes on to state that, "in every country excepting our

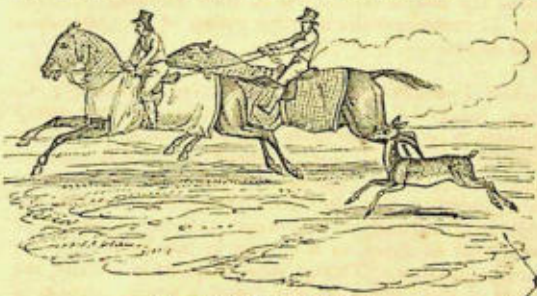
70.—Fallow-Deer.

own, these deer are in a state of nature, unconfined by man, but they are, and have been for some time, confined in parks on the Continent, as they are in England." We may observe that in England, at one period, before parks were enclosed and (as is necessary in our day) the herds were restricted within due bounds, the fallow-deer wandered in freedom, like the stag or roe; they tenanted the great forest which in the time of Henry II. stretched northwards from London, and which, as Fitz-Stephen says, was the covert of stags, deer (damarum), boars, and wild bulls. Pennant informs us that in the old Welsh laws a fallow-deer was valued at the price of a cow, or, as some say, a he-goat.

The fallow-deer is too well known to need describing in detail. (Fig. 70.) Its venison is far superior to that

of the stag or roe, and its horns and skin are valuable. Except during the pairing season, when the bucks associate with the does, and during the winter, when the troops mingle promiscuously together, the males and females form separate herds.

The female goes eight months with young, and produces one, sometimes two, at a birth, concealing them among the tall fern or dense underwood of the park; they afterwards associate with the herds of does.



71.—Fallow-Deer and Horses.

The buck acquires a different name, in the language of "venerie," every year to the sixth. The first year he is a *fawn*—the second, when the simple horns appear, a *pricket*—the third, a *sorrel*—the fourth, a *soare*—the fifth, a *buck of the first head*—the sixth, a *buck complete*. In Shakspere's play of 'Love's Labour 's Lost,' the "extemporal epitaph on the death of the deer," in which Holofernes "something affects the letter," and in which three of the above terms are employed, is familiar to all. During the pairing season, which takes place at the end of summer or in autumn, the males utter a deep tremulous cry, and engage with each other in obstinate battles, which are continued day after day, till the mastery is completely established. We do not, however, believe that at this season they are dangerous to persons approaching them; the stag has been known to make a

furious attack, but we never heard of similar instances with respect to the fallow-deer.

The fallow-deer may be easily rendered tame and familiar, as we ourselves have often seen. It is said, when thus tamed and brought up in the stable-yard, to delight in the company of the horse; and in proof thereof it may be observed, that at Newmarket (1828) there was a deer which was accustomed regularly to exercise with the racehorses, and the creature delighted to gallop round the course with them in their morning training. Fig. 71 represents the morning gallop of the associated deer and horses.

The Fossil Elk of Ireland (*Cervus megaceros; C. giganteus*, Goldf.).—To the Platycerine or Dama group appears to belong that noble species commonly called the fossil elk of Ireland, from its abundance in that country, where its remains occur in bogs and marl-pits, and that so abundantly, that they have ceased to be regarded as objects of curiosity. The huge antlers, indeed, have been used as gates, as stop-gaps in the fields, and for similar purposes. Though most frequent in Ireland, the bones of this species are also found in similar deposits in the Isle of Man, as well as in England; and have been dug up in France, Germany, and Italy, where, according to Cuvier, they occur in the same strata with bones of elephants. Ireland was perhaps the last stronghold of the species, which appears to have once thronged that island. It is very seldom, however, that an entire skeleton has been discovered, the remains consisting for the most part of skulls, with the horns attached, and various separate bones disposed without any order. They generally occur in a deposit of shell-marl, covered by a layer of peat, and resting on clay. In this situation, one of the few entire skeletons discovered is stated to have occurred. "Most of the bones," says Archdeacon Maunsell, "and heads, eight in number, were found in the marl; many of them, however, appeared to rest on the clay, and to be merely covered with the marl." It is worthy of remark, that the fossil remains of no other

animals are mingled with them. Of the skeleton to which we have alluded, and which graces the museum of the Royal Dublin Society, Mr. Hart drew up a Memoir. "This magnificent skeleton," he observes, "is perfect in every single bone of the framework which contributes to form a part of its general outline; the spine, the chest, the pelvis, and the extremities are all complete in this respect; and when surmounted by the head and beautifully expanded antlers, which extend out to a distance of nearly six feet on either side, forms a splendid display of the reliques of the former grandeur of the animal kingdom, and carries back the imagination to a period when whole herds of this noble animal wandered at large over the face of the country." The following are a few points of its admeasurement:—

	ft.	in.
Length of the head	1	8¾
Breadth between the orbits	0	10½
Distance between the tips of the horns, measured by the skull	11	10
Ditto, in a straight line across	9	2
Length of each horn	5	9
Greatest breadth of palm	2	9
Circumference of the beam at the root of the brow-antler	1	0¾
Length of spine	10	10
Height to the top of the back	6	6
Ditto, to the highest point of the tip of the horn	10	4

None of the deer tribe of the present day, excepting the Scandinavian elk, can at all be compared for magnitude to this fossil species; and, until Cuvier pointed out the differences, the antlers were generally regarded as identical with those of that animal or of the moose of North America. Independently of size, however, they differ in many essential points: for example, in the moose-deer the horn has two palms, a lesser one growing forward from the front of the beam where the principal palm begins to expand: the palm of the moose-deer's horn is directed backwards, and is broadest next the beam. In the fossil animal the palm increases in breadth as it

proceeds, which it does in a lateral direction; nor are there fewer differential characters in the skull and general skeleton.

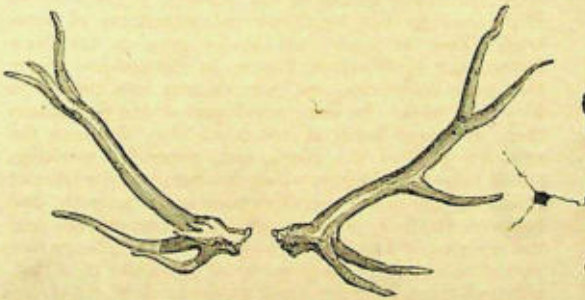
Of the habits of the *Cervus megaceros* we can only form a conjecture. The size and lateral direction of its spreading antlers must have prevented its inhabiting the dense forest—it must have dwelt on the heath-clad hills: there, armed with the most powerful weapons of self-defence, it ranged secure from the assault of any single aggressor, capable of dashing down the wolf or hyæna with a blow. Did man exist coeval with this animal in its native land? Most probably—yes. A head of the fossil elk, together with several urns and stone hatchets, was discovered in Germany in the same drain. "In the 'Archæologia Britannica' is a letter of the Countess of Moira, giving an account of a human body in gravel under eleven feet of peat, soaked in the bog-water: it was in good preservation, and completely clothed in antique garments of hair," conjectured to be that of the fossil elk. But what is still more conclusive, there exists a rib in the Royal Dublin Society, evidently bearing token of having been wounded by some sharp instrument, which remained long fixed in the wound, but had not penetrated so deep as to destroy the creature's life: it was such a wound as the head of an arrow would produce.

Of the causes which involved the fossil elk in destruction—whether one general catastrophe universally affected the whole race wherever existing—whether local causes, operating at different epochs, have successively extinguished the species, which might have lingered the longest in Ireland—or whether its extermination has been effected by the hand of man, whose agency upon the animal creation is everywhere apparent, no decided opinion can yet be given. We know it existed, and that is all: its history and its fate are buried beneath the shadow of years gone by.

4. Elaphus, or Stag Group.

The common stag of Europe, with its allied species the Barbary stag and the Persian stag, the wapiti of

America, and among others the *Cervus elaphoïdes*, Hodgson, and *Cervus wallichii*, Cuvier, both natives of Nepál, may be adduced as examples of this section. The characters consist in the form of the horns, which have three antlers produced from the beam, viz. the brow-antler, the bez-antler, and the antler-royal, besides the snags, or crown (*surroyal*), in which the beam terminates; in the nakedness of the muzzle; and in the possession of large suborbital sinuses. The males have canine teeth, and in old animals the brow-antler is often double. A fine specimen of the horns of the wapiti in the museum of the Zoological Society exhibits this luxuriance of growth. (Fig. 72.)



72.—Horns of Wapiti.

The Common Stag, or Red-Deer

(*Cervus elaphus*). Carw (Stag), Ewig (Hind), Elain (Young or Calf), of the ancient British; Le Cerf (Stag), La Biche (Hind,) Faon (Young or Calf), of the French; Cervio, Cervia, of the Italians; Ciervo, Cierva, of the Spanish; Cervo, Cerva, of the Portuguese; Hirsch or Edelhirsch (Stag), Hirschkuh (Hind,) Hirschkalb (Calf) of the Germans; Hart (Stag), and Hinde, of the Dutch; Hjort, Kronhjort (Stag), and Hind, of the Swedes; Kronhjort, Hind, Kid or Hind Kalv, of the Danes.

The red-deer is a native of our island and of the temperate portions of Europe, and considerably exceeds the fallow-deer in size, standing about four feet in height at the shoulders. The hind or female is smaller; the young is spotted with white on the back and sides. (Fig. 73.) During the pairing season, which commences in August, the stags fight desperately with each other, and are even dangerous to persons venturing near their haunts. Formerly the stag was very abundant on the wild hills and in the extensive forests of our island, but the disforesting of vast woodland tracts and the extension of agriculture have limited the range of this noble animal to the larger parks and chaces of our country, to the Cheviot Hills, and to the heath-covered mountains of Scotland. Few or none are to be seen in the New Forest, nor in Woolmer Forest, in Hampshire, where they were once numerous, nor do any now remain in Epping Forest. In the central part of the Grampians there are large herds of red-deer: they frequent the southern part of the bleak and, generally speaking, naked ridge of Minigny, which lies between the Glen of Athol on the south and Badenach on the north, and between the lofty summits of Ben-y-glac on the east and the pass of Dalnavardoch on the west. The greater part of this ridge is the property of the Duke of Athol, although many deer are found on the lands of the Duke of Gordon and others towards the east.

The deer are seldom on the summits; but generally in the glens of the Tilt and Bruar. These deer are often seen in herds of upwards of a thousand; and when, in a track where there is no human abode for twenty or thirty miles, a long line of bucks appear on a height with their branching horns relieved upon a clear mountain sky, the sight is very imposing.

The forest of Athol, consisting of a hundred thousand acres, is devoted to red-deer; they exist in Mar Forest and Glenartney, and in the west districts of Ross and Sutherland. The chace of the red-deer has ever been, from its excitement, a favourite diversion, and formerly was

74.—Red-Deer.

conducted in a style of great magnificence, vast herds being driven "with hound and horn" to where the hunters were stationed with guns (formerly bows and arrows), and who dealt havoc among their numbers. The deer moved forwards in close array, guided by a leader, and often in despair broke through the circle of their foes, and made their escape. We may imagine the danger resulting from the rush of perhaps a thousand deer determined to break through the line of their assailants.

The spirited description of a similar scene in Sir W. Scott's novel of 'Waverley' is familiar to all. This

mode of driving the deer is now never practised, at least on the great scale. The present plan, that of deer-stalking, is to proceed cautiously within due distance of the herd, and, being concealed, to bring them down with the rifle: when wounded and brought to bay, the stag often rushes on his assailant, whose life is in imminent danger. The red-deer is too well known to require a detailed description. He swims vigorously, and will cross lakes, and pass from islet to islet at considerable distances apart. (Fig. 74.)

The Wapiti (*Cervus wapiti*, Mitchell).

C. strongyloceros, Schreber; *C. Canadensis*, Briss.; American Elk, Bewick; Waskeesews of Hutchins; Wawaskeesho, Awaskees, and Moostosh of the Cree Indians. The wapiti has been confounded with the elk, this name being given to it in Lewis and Clark's Voyages. It is the red-deer of the Hudson's Bay traders. This American representative of our European stag differs from the latter, in being much larger and more powerful, and also of a darker colour; his form is more heavy, and the limbs more robust; the neck is of vast thickness and strength. (Fig. 75.)

The wapiti does not extend its range higher north than the fifty-seventh parallel of north latitude, nor is it found to the eastward of a line drawn from the north end of Lake Winnipeg in 103° W. long., and from thence till it strikes the Elk River in 111° W. long.

It is common among the clumps of wood that skirt the plains of the Saskatchewan, where it lives in small herds of six or seven individuals. They feed, says Dr. Richardson, on grass, on the young shoots of willows and poplars, and are very fond of the hips of the *Rosa blanda*, which forms much of the underwood of the districts which they frequent. Their voice is a shrill whistling, quivering noise, nothing resembling the "bell" of our stag. Hearne considers the wapiti as more stupid than any other species of the deer tribe.

The horns of this species (Fig. 72) attain to a vast

75.—Wapiti.

size and weight (fifty-three or fifty-four pounds the pair), and are most formidable weapons: nor is the male thus armed to be approached without caution; his temper being vicious and irascible, and his strength prodigious. A few years since, one of the male wapitis in the gardens of the Zoological Society, London, in a fit of rage drove his brow-antlers into the body of a female of the same species, lifted her up, and threw her down dead.

The male wapiti stands upwards of four feet and a half at the shoulders. The general colour is yellowish brown, a black mark extending from the angle of the mouth along the lower jaw; the tail is short and en-

circled (as in the red-deer and others of this section) by a pale yellowish haunch-mark.

5. Rusa.

This group consists of deer peculiar to India, several species being large and formidable. The horns are rugged and cylindrical, with a large sharp brow-antler, but no bez-antler, the beam bifurcating at the top into a sharp anterior and posterior snag: the muzzle is broad and naked, the suborbital sinuses are deep and large, and the males possess canine teeth; a mane of long coarse hairs runs down the neck. Of six or seven species belonging to this section, we may notice the Sambur.

The Sambur (*Cervus hippelaphus*).

Several specimens of this deer are in the gardens of the Zoological Society, London; and the males when armed with their antlers are noted for their vicious temper. In size the male sambur exceeds our common stag, but is inferior to the huge and heavy wapiti; and if less powerful, is more active and alert. The hair is close, harsh, and of a dusky or grayish brown; a band of black surrounds the muzzle, but the edges of the upper lip and the tip of the under are white; the hairs of the throat are long and bristly, forming a full fringe; a mane of similar hair runs along the back of the neck: the crupper-mark round the tail is very circumscribed, and yellowish. (Fig. 76.) The sambur is found in the Ghauts of the Deccan, in Kandeish, and the lower hills of Nepál. It occurs also in other districts of India. In common with the rest of the Rusa tribe it is fond of the water, and resides in wooded situations.

Another species of this section is the *Cervus Aristotelis*, Cuvier, a native of Bengal and the low hills of Nepál. It is termed elk by the British sportsman, and is said to be extremely powerful and vicious. Mr. Hodgson notices a black deer in the Nepál hills belonging to the Rusa tribe, but undescribed. ('Zool. Proceeds.' 1834, p. 99.)

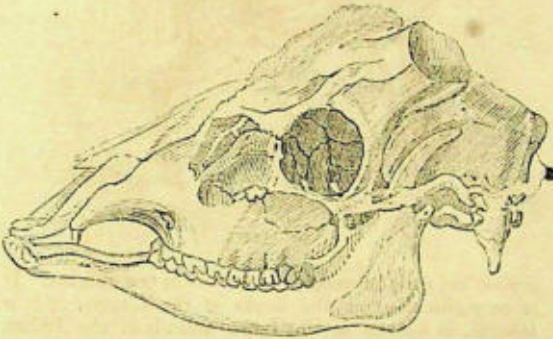
76.—Sambur-Deer

Of the other species to be referred to this group, and described by various authors, we may mention the *Cervus equinus*, Cuvier, found in Sumatra and the lower hills of Nepâl; the *C. unicolor*, Smith, a native of the dense forests of Ceylon; the *C. Peronii*, Cuvier; and the *C. Mariannus*, Quoy and Gaimard—the former a native of Timor, the latter of the Marianne Islands, or Ladrones.

Mr. Hodgson observes that a new species of deer, to which he has given the name of *C. bahrainja*, serves, with *C. wallichii*, to connect the Elaphine and Rusan groups. Fig. 77 represents the skull of the sambur-deer.

6. Axis.

The characters of this section differ but little from those of Rusa; the horns have a brow-antler, and bifurcate at the top; the suborbital sinuses are moderate, and the males are destitute of canines. It is, however, in size, contour, and disposition that the greatest contrast exists between the Axine and Rusan groups. In the Axine group the limbs are delicate, the general form is more graceful than robust, and none in size much exceed our fallow-deer, to which the common axis especially (excepting as respects the antlers) bears a near resemblance; the females, indeed, of both species being,



77.—Skull of Sambur-Deer.

on a superficial view, scarcely distinguishable. The hair is short, smooth, and close; the expression of the physiognomy is gentle, yet animated, and agrees with the disposition. In captivity these deer are quiet and inoffensive.

The Axis-Deer (*Cervus axis*, Erxl.).

The spotted axis is, perhaps, the best known of all the Indian deer: it thrives well not only in our mena-

78.—Axis.

geries, but even in parks, and breeds in our climate. It is very abundant on the banks of the Ganges and in Bengal, as well as in the larger islands of the Indian Archipelago, where it lives in herds, the luxuriant vegetation of the jungles (its favourite localities) affording abundance of food. The general colour of this species is fawn-yellow, a black stripe running down the spine of the back: the sides are beautifully and regularly spotted with white; a row forming an almost continuous line passes along each side of the belly. (Fig. 78.)

The Hog-deer (*C. porcinus*) is another species belonging to this section: it is lower on the limbs and stouter in the body than the spotted axis: its colour is yellowish-gray, spotted slightly on the back and flanks.

A new species from the Ganges is described by Mr. Ogilby in the 'Zool. Proceeds.' 1831, p. 136, under the title of *C. Nudipalpebra*. A specimen exists in the museum of the Zoological Society.

7. Capreolus.—The Roes.

The roes or roebucks are distinguished by the following characters:—The horns are small, cylindrical, and rugged; and when fully developed are divided above into three snags, of which the largest is seated anteriorly. The muzzle is naked, and there are neither canines nor suborbital sinuses. The tail is extremely short, the body compact, the limbs slender but vigorous.

The Common Roebuck (*Cervus capreolus*).

This species is the *Caprea*, *Capreolus dorcas*, of Gesner; *Capreolus* of Ray and of Sibbald; *Cervus capreolus* of Linnæus; *Cervus minimus*, of Klein; Iwreh (male), Iyrcheli (female), of the ancient British; Le Chevreuil of the French; Capriolo of the Italians; Zorlito, Cabronzillo montes, of the Spanish; Cabra montes of the Portuguese; Rehbock (male), Rehgees, of the Germans; Radiur, Rabock, of the Swedes; Raaedijr, Raaebuk, of the Danes.

The roebuck was formerly common throughout the whole of our island, but is now almost exclusively confined to the wooded hills of Scotland north of the Forth. South of that river it is very rare, one or two wild parks only possessing a few; but in the rugged woods of Westmorland and Cumberland it is tolerably abundant. It is widely spread throughout the temperate latitudes of continental Europe, wherever extensive forests and wild uncultivated districts covered with brushwood afford it an asylum.

The roebuck is the least, and one of the most active and beautiful, of our European deer; wild, shy, and cautious, it does not herd in troops, but lives singly, or in small companies consisting of the male, female, and

79.—Roebuck.

young; the latter being generally two, sometimes three, in number. These remain for eight or nine months with their parents, which continue attached for life. The roe is more cunning than the stag, and when hunted will endeavour, by various subtle artifices, to elude its pursuers. It will wind and double on its track, then take bounds of surprising extent, and lie close amongst the herbage of its covert till the dogs, having lost the scent, pass off to a distance. The flesh of this animal is not in high estimation.

The roe stands about two feet three inches in height at the shoulder. In the winter the hair on the body is long, the lower part of each hair is ash-coloured; there is a narrow bar of black near the end, and the tip is yellow. On the face the hair is black, tipped with yellow. The ears are long, of a pale yellow on the in-

side, and covered with long hair. In summer the coat is short and smooth, and of a bright reddish colour. The chest, belly, legs, and inside of the thighs, are yellowish white; the rump is pure white; and the tail very short. On the outside of the hind-leg, below the joint, is a tuft of long hair. (Fig. 79.)

A specimen of the roe of Tartary (*C. pygargus*, Pallas), the tailless roe of Pennant, once fell under our notice. In size it equals the fallow-deer; it inhabits the mountain districts of Hyrcania and other parts of Northern Siberia, and also the snowy range of Central Asia.

8. Mazama, or American Fallow-Deer.

The elegant deer composing this section are all confined to the American continent. The horns are rough, with a cylindrical stem, and slightly compressed branches, which have a tendency to form arches or segments of a circle. Of these an anterior branch projects somewhat forwards; the stem sweeps outwards, curving inwards and forwards at its extremity, which divides into two or three branches. There are no canines. The suborbital sinuses are small, and appear like a fold of the skin. The ears are long and open; the tail is long, and inclining to be bushy; the muzzle is naked. The species belonging to this section are numerous. The Virginian deer is the best known. This beautiful species is spread very extensively, ranging from Canada to Cayenne: it tenants the woods in small herds, and its chase is everywhere followed with ardour, so that in a few years the rifle will exterminate it in many districts where it is still common. The three modes of "Still-hunting," "Fire-light hunting," and "Driving," are amusingly described by Audubon in the first vol. of his 'Ornithological Biography.'

In the museum of the Zoological Society, London, there is a fine specimen of the black-tailed deer (*Cervus macrotis*, Say), which inhabits the plains of the Missouri, Saskatchewan, and Columbia; it is numerous in the Quamash Flats which border the Kooskookee river.

It is remarkable for the size of its ears, and the length and fulness of the tail, which is white with a tinge of brown, and largely tipped with black. The general colour is brownish gray. It exceeds the Virginian deer; its height at the shoulders being two feet six inches.

The *Cervus leucurus* is another allied species, which, from its size, form, and habits, has obtained the name of roebuck from the Scottish Highlanders employed by the Hudson's Bay Company, and that of Chevreuil from the French Canadians. It is common in the districts adjoining the river Columbia, and especially the fertile prairies of the Cowalidske and Multnomah rivers. The young are spotted until the middle of the first winter, when they assume the uniform colour of the adults.

Azara describes two species belonging to this section, under the terms Gouazoupoucou (*Cervus paludosus*, Desm.) and Gouazouti (*C. campestris*, F. Cuv.), both natives of Paraguay.

The gouazouti (or guazuti, *Cervus campestris*) inhabits the open Pampas, where it is more than a match for a horse in speed. It stands about two feet six inches in height at the shoulder. The hair is rough, close, and of a reddish bay, the space round the eyes and the under parts of the head and body being white; the hairs of the back are of a leaden gray colour at the base, the tips only being red. The fawns are spotted with white. A most powerful and disgusting odour of garlic proceeds from the males, especially when their horns are in perfection: this odour is not lost in the preserved skin, as we can personally testify. "Frequently," says Mr. Darwin, "when passing at the distance of half a mile to the leeward of a herd, I have perceived the whole air tainted with the effluvium." "This deer," says the same clever author, "is exceedingly abundant throughout the countries bordering on the Plata. It is found in northern Patagonia as far south as the Rio Negro (41° N. lat.), but farther southward none were seen by the officers employed in surveying the coast. It appears to prefer a hilly country. I saw many small herds, containing from five to seven animals each, near the Sierra

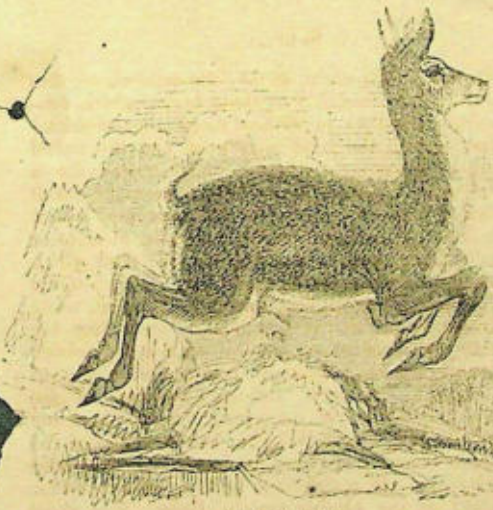
Ventana, and among the hills north of Maldonado. If a person crawling close along the ground advances towards a herd, the deer, frequently out of curiosity, approach to reconnoitre him. I have by this means killed from one spot three out of the same herd. Though so tame and inquisitive, yet when approached on horseback they are exceedingly wary. In this country nobody goes on foot, and the deer knows man as its enemy only when he is mounted and armed with the bolas. At Bahia Blanca, a recent establishment in northern Patagonia, I was surprised to find how little the deer cared for the noise of a gun: one day I fired ten times from within eighty yards at one animal, and it was much more startled at the ball cutting up the ground than at the report of my rifle. My powder being exhausted, I was obliged (to my shame as a sportsman be it spoken) to get up and halloo till the deer ran away."

9. Subulo.

The Guazus, or Brockets, as they are termed, are distinguished by the simplicity of their horns, which consist of a single slender stem without snags; the suborbital sinuses are small; the nose is pointed, and the naked muzzle small, extending at the side of the nostrils into a glandular spot. The species of this section are small and delicately formed; they inhabit the swampy woods of South America, in small families consisting of eight or ten females, in company with a single male; from which circumstance arose the mistaken idea that this part of the globe possessed deer entirely destitute of horns, while their simple form in the few males seen (for the females are far more numerous) led to the supposition that these were young animals with their first or brocket horns. Hence the term Brocket, adopted as the descriptive appellation of the group. In the museum of the Zoological Society, London, is a specimen of the female of a deer which most probably belongs to the present section. It is described in the 'Proceeds.' for 1831, p. 27, as the *Cervus humilis*, Benn.: it is about

a foot and a half in height at the shoulders, and of a rufous colour, the fore parts having a blackish tinge. The body is stout; the limbs short; the face broad. Mr. Bennett, by whom this species was characterized, "was informed by Captain P. P. King, R.N., that a second skin of the same species had been brought to England by him; that the young was spotted with yellow, and had a yellow stripe on each side of the back; and that the animal was plentiful at Concepcion, and found even as far south as the archipelago of Chiloe, living, he believed, in small herds." Until the horns of the male be known, this species stands only provisionally where we have placed it.

The other known species of this section are the Guazupita (*Cervus rufus*, F. Cuv.), the Guazu-bira (*Cervus nemorivagus*, F. Cuv.), and the Apara Brocket (*Cervus simplicicornis*, H. Smith).



84.—Guazu-pita.

The Guazu-pita (*Cervus rufus*).

The Guazu-pita is somewhat larger than a roebuck: its general colour is rufous, with a dusky tint on the face and legs; the lips and chin being white. (Fig. 80.) Azara states that the proportion of males to females in this species is one to ten; and that the fawns are spotted with white. It frequents dense forests, in which it remains concealed during the day, but at night or during the dusk of the evening it ventures into the open lands bordering the woods, and often invades the cultivated fields or gardens of the natives, for the sake of obtaining French-beans, which are a favourite food. Although not destitute of activity, it is soon exhausted, and easily taken, either by dogs or by means of the lasso.

The Guazu-bira (*Cervus nemorivagus*)

is smaller and more delicately formed than the preceding species, which, however, it resembles in general habits and manners, inhabiting also the low moist woods of South America. The colour of this little deer is dusky gray, passing into white on the under parts. (Fig. 81.)

The *Cervus simplicicornis* is a native of Brazil: its colour is rich fulvous, with a dusky ring round the orbits and a spot of the same tint at the angle of the mouth.

10. Stylocéros, or the Muntjaks.

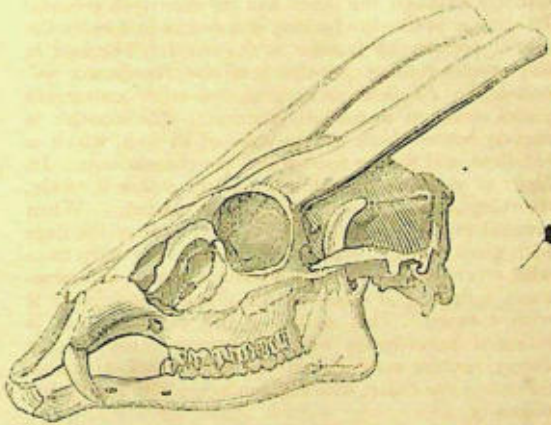
The species of this section are natives of India and the Indian islands, and there is something so peculiar in their physiognomy and appearance, that a glance serves to discriminate between them and all others of the deer tribe. Setting aside the horns, with which the males only are furnished, they remind one strongly of the musk-deer, or chevrotains, though of larger stature. The body, as in the musk-deer, is rounded; the head triangular, and tapering to a fine muzzle; their limbs slender and delicately turned, and their tongue long and flexible. The males, moreover, have long canines in the upper jaw, which protrude beyond the lips. In

81.—Guazu-birs.

manners they are timid and gentle, but are easily domesticated, and soon become familiar.

One remarkable character in the muntjaks consists in the form of the horns, and the manner in which they rise from the forehead, supported on long slender pedunicles covered with skin, and turned obliquely outwards, with a tuft of hair along their anterior aspect, becoming very full round the burr of the horn; the hair on the back part and sides of these peduncles is close. These supports for the small horns do not rise abruptly, but are continued from two prominent ridges beginning below the angle of each eye, running obliquely upwards, diverging as they proceed, and constituting an abrupt outline to the flat triangular forehead. (See Fig. 82, the skull of the Muntjak.) These ridges are covered

with the skin of the forehead, which, for the space of nearly an inch on the inner side of each ridge, parallel to the eyes, forms a narrow naked fold, or kind of sinus, capable of being opened or closed at pleasure, and evidently of a glandular nature. When closed these sinuses are hidden by the hair. The horns scarcely, if at all, exceed the peduncles in length; they are pointed, converge at their points, and have a small rudimentary snag at their base anteriorly. The suborbital sinuses are large and deep, the muzzle is small and naked, the eyes are large and animated, the ears large and open.



82.—Skull of Muntjak.

The first horns obtained are simple, and it is said that there is only one renewal, the second pair being permanent (a doubtful circumstance). As the females want horns, the peduncles and their continuation as ridges down the forehead are absent, but a tuft of hair indicates their situation.

The species composing the present section are but imperfectly known. Colonel H. Smith enumerates five, of

which two at least are doubtful. The most familiar example of the group is the muntjak of Java and Sumatra, the kidang of Horsfield.

The Kidang, or Common Muntjak

(Cervus muntjak).

This most elegant and beautiful animal equals a roe-buck in size. According to Dr. Horsfield, its favourite haunts in Java are hills covered with brushwood, and elevated grounds adjacent to wild forests, or shrubby districts between the latter and the cultivated grounds. Its voice is so like the barking of a dog as to deceive the ears of persons not familiar to the sound. The food of this species consists principally of the *Saccharum spicatum*, the *Phyllanthus emblica*, and other malvaceous plants abundant in the hilly districts. The muntjak is eagerly hunted, both for the sake of its flesh, which is excellent, and for the sport which the chace affords. Its flight is very rapid, but it generally makes a circle, returning to the spot whence it started. When brought to bay, the male defends itself against the dogs with great courage, using its horns and long sharp tusks with severe effect. It is often taken in snares, and sometimes by riding it down on horseback, and striking it with a sword. This mode is highly dangerous, but is followed nevertheless with the utmost enthusiasm by daring hunters mounted on the naked back of horses trained to the chace, which is conducted with frantic impetuosity.

Dr. Horsfield states that "the muntjak selects for its retreat certain districts, to which it forms a peculiar attachment, and which it never voluntarily deserts. Many of these are known as the favourite resort of our animal for several generations. They consist of moderately elevated grounds, diversified by ridges and valleys, tending towards the acclivities of the more considerable mountains, or approaching the confines of extensive forests. Such districts are by no means uncommon in Java: they are covered with long grass, and shrubs

and trees of moderate size, growing in groups or small thickets, and they generally intervene between cultivated tracts and the deep forests. Their vegetation is peculiarly adapted to afford to our animal a very abundant supply of nourishment; their surface is covered with long grass, *Saccharum spicatum*, well known to persons who have visited the interior of Java by the name of *Allang-Allang*, and the groves and thickets abound with *Phyllanthus emblica*, Linn.; these two plants constitute its principal food. They also produce many species of *Hibiscus*, *Grewia*, *Urena*, and other malvaceous plants, all which are greedily eaten by the kidang. About the middle of the dry season, in the Javanese winter, just before the foliage is renewed, the shrubs and herbaceous plants covering the plains and small woods are, according to an old and universal custom in Java, set on fire; and thus these tracts are prepared for a new vegetation, which appears shortly before the annual rains, in a period that may be compared with an European spring. After the lapse of a few weeks, the ground and shrubs are covered with fresh verdure, and a most abundant supply of food is ready for the kidang. These districts, being in most cases sparingly supplied with water, do not invite an extensive population; the kidang is not molested by a few solitary hamlets, but the leaves of the *Convolvulus batatas*, and of many leguminous and cucurbitaceous plants, which always surround the dwellings of the natives, afford it an occasional repast. Many of these hamlets might be enumerated, which would afford a pleasant recollection to those persons who have visited the native courts or the eastern capitals. Jebres, Kayu-urib, and Pring-ombo near Surakarta, and Kali-wungu near Samarang, are among the most favourite. The native inhabitants of the hamlets dispersed through the districts in which the kidang is found do not possess means to undertake the chace; but it affords amusement both to Europeans and natives of rank, who engage in it in different modes with great ardour. The *Cervus muntjak* has a strong scent, and is easily tracked by dogs. When pursued, it does not go off, like the stag, in any acci-

dental direction: its flight indeed is very swift at first, but it soon relaxes, and, taking a circular course, returns to the spot from which it was started. The natives, acquainted with the character of our animal, describe it as possessing a great portion of craftiness, combined with much indolence. After several circular returns, if the pursuit be continued, the kidang thrusts it head into a thicket, and in this situation remains fixed and motionless, as in a place of security, and regardless of the approach of the sportsmen. If it remains unobserved, it is still unwilling to quit its haunts; and experienced hunters, acquainted with its natural disposition, after an unsuccessful pursuit, return the following day, and in many cases find the kidang near the same spot. The chace of the kidang, by means of dogs, affords occasionally a favourite amusement to the natives of rank in Java. Many of these, especially in the more distant provinces, keep large packs for this purpose, which are regularly trained. The dogs, vulgarly denominated pariahs, are the indigenous breed of the island, in a state of imperfect domestication: there are several varieties; one of these greatly resembles the Sumatran dog, of which a description, accompanied by a figure, is given by General Hardwicke, in the 13th volume of the Transactions of the Linnæan Society. The body is lank, and the ears erect: they are ferocious in their disposition, and rarely show any attachment to their masters. The natives of Java, like other Mahommedans, entertain prejudices unfavourable to dogs: they rarely treat them with kindness, or allow them to approach their persons; and it is only in extraordinary instances, or when they contribute to their amusement, that they feed or care for them; generally they are ill-treated, and left to provide for themselves, so that their famishing condition is disgusting to Europeans. Many of these dogs are extremely ardent and courageous in the pursuit of the kidang: when the chace commences, they are led with a line by an attendant to the spot: the peculiar exhalations soon discover the kidang; the dogs are discharged, and commence the pursuit with great ardour, while the sportsman fol-

lows more deliberately, and generally finds the dogs at bay with the kidang. The male animal possesses a great share of courage, and with its tusks makes a most vigorous defence: many dogs are wounded in the attack. The sportsmen uniformly are provided with remedies and applications, and by a simple suture attempt to unite those wounds which are not immediately fatal. In this operation they frequently succeed, and preserve their most valuable dogs; but in many cases the kidang makes fatal lacerations in the neck and breast, or lays open the abdomen. But although possessed of great courage, the life of the kidang is not tenacious, and the sportsman, on arriving at the spot, generally despatches it with small shot. The natives of the most distant districts are in the habit of bringing their best dogs to the capitals, on occasion of their half-yearly attendance, to perform the feudal services to the sovereigns, when their sports afford an occasional amusement to the European inhabitants. Other modes of chace are also employed by the natives of rank. One in particular is common in the western parts of the island: a district is surrounded by a line of hunters, and the kidang is driven in towards a central spot: forty or fifty animals are in this manner often obtained at a single pursuit. Many of the hunters are mounted, and the horses are trained to the chace. The sportsman endeavours to overtake the animal, and to kill it by a stroke with a sword. The inhabitants of Pugar and Blambangan, two provinces at the eastern extremity of Java, possessing a small population, but abounding in extensive plains and acclivities, which afford an ample range and abundant pasture to the kidang, are particularly skilled in this sport. The best horses are trained for it: the sportsman, without a saddle, mounts on the naked back, and carries on the pursuit with a frantic impetuosity, at the risk of his limbs and neck. During my visit to these districts, I was frequently entertained by aged natives with narratives of their favourite sport, and of the dangers and accidents they had encountered on many occasions; but these had not diminished their ardour for this amusement. The

native stag of Java is pursued in the same manner. In Banka a less arduous but more destructive method is employed to take the kidang; a long rope of rattan is suspended, at a proper height above the ground, between two trees; numerous nooses, of the same material, hang from this, in a close and continued series, and the kidang, driven towards it, pursued by dogs and blinded by fear, does not perceive the slender rattan, and, thrusting his head into a noose, is strangled on the spot. The kidang has other enemies and pursuers besides man: the tiger and leopard also approach its retreat, and many are annually destroyed by them. But in a mild climate a constant and regular supply of food abounds, and no

83.—Muntjak.

great variation or decrease is observed in their number. The kidang is impatient of confinement, and is not fitted for the same degree of domestication as the stag. It is however occasionally found in the enclosures of natives and Europeans, but requires a considerable range to live comfortably: it is cleanly in its habits, and delicate in its choice of food. The flesh affords an excellent venison, which is often found on the tables of Europeans. The natives eat the males, and always present them in a conspicuous place in their feasts; but in consequence of some peculiarities in the habits of the females, they have an aversion to them as food."

The general colour of this species is bright reddish brown, the under parts being white. (Fig. 83.)

Colonel Sykes observed a species of muntjak in the Ghauts of the Deccan, which he states to be never seen on the plains. It is termed Baiker by the Mahrattas. Mr. Hodgson notices a species called Kátwa, proper to the central region of Nepál, but occasionally occurring in the lower valleys of Kachar. A species from China is described by Mr. Ogilby under the title of *Cervus Reevesii*.

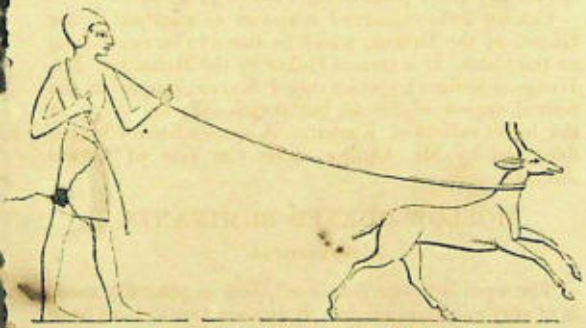
HOLLOW-HORNED RUMINANTS.

1. Antelopes.

The word antelope (*antilope*), now so generally used, is of very uncertain origin. It appears first to have been adopted as the designation of a species, but was subsequently given by Pallas as the title of a genus. The first occurrence of the word Ανθολοψ is in the 'Hexameron' of Eustathius (fourth century), as the name of an apparently fabulous animal. Bochart supposes it to be derived from the Coptic Panthalops, which signifies the unicorn; but it may be derived from the Greek Ανθος, a flower, and Ωψ, the eye, or οπτομαι, to see, in allusion to the brightness and beauty of the full beaming eyes which are so remarkable in most of these animals, and which have often rendered the gazelle the theme of the Persian and Arabian poets. The name of the

gazelle, *dorcas*, from δερκω, or δερκομαι, to see, was a common name for women among the Greeks and Romans.

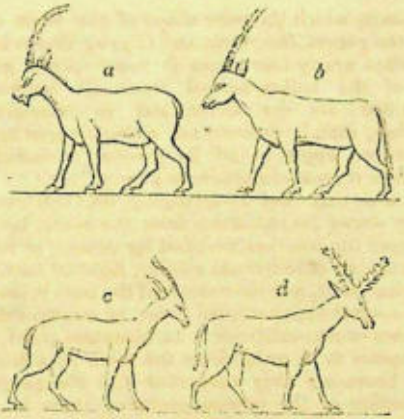
It is interesting to trace the acquaintance which the ancients had with objects of natural history, as demonstrated by their drawings or sculptured representations: nor is the examination of them unimportant; they often supply us with a hint as to the ancient geographical distribution of animals, or as to facts connected with their history, and prove that many hundred years past the species existed with the same forms and characters as at the present time. It is therefore not out of place to draw our readers' attention to some figures in outline from the Egyptian sculptures. Fig. 84 represents a gazelle caught



84.—Gazelle caught in lasso. (Egyptian.)

by the noose or lasso, an instrument used by the ancient Egyptians and by the modern Gauchos of South America. Fig. 85: *a*, Ibex; *b*, *Antelope leucoryx*; *c*, Gazelle; *d*, a species of Stag. Fig. 86: *a*, Antelope; *b*, Goat; *c*, Aoudad or Kebsch (*Ovis Tragelaphus*, Desm.), found in the mountains along the Nile, and on the northern coast of Africa.

The section or family to which the title of Antelope (*Antilope*) is ordinarily given embraces, it must be confessed, a somewhat ill-assorted assemblage, requiring to



85.—Animals from Egyptian Sculptures.

86.—Animals from Egyptian Sculptures

be distributed into several distinct genera. The fact is that every hollow-horned ruminant, which is neither one of the sheep, goats, nor oxen, has been assigned to the antelopes, and hence the diversities of form and habits which we see among the members of this extensive group. Mr. Ogilby ('Zool. Proceeds.,' 1836, p. 132) makes the remark, that "the genus Antelope has become a kind of zoological refuge for the destitute, and forms an incongruous assemblage of all the hollow-horned

ruminants, which the mere shape of the horns excluded from the genera *Bos*, *Ovis*, and *Capra*; thus it has come to contain nearly four times as many species as all the rest of the hollow-horned ruminants together. So diversified are its forms, and so incongruous its materials, that it presents not a single character which will either apply to all its species, or suffice to differentiate it from conterminous genera."

In analyzing and re-arranging the antelopes, Mr. Ogilby draws his characters from the horns, the form of the upper lip, whether modified for grazing or browsing, the existence of lachrymal sinuses, inguinal sacs, and interdigital pores, and the number of the teats in the female. With respect to interdigital pores, he observes that their existence or non-existence is an important point, as their use appears to be to lubricate the hoofs by a fluid secretion: hence are they connected with the geographical distribution of the species, confining them to the rich savannah or the moist forest, or enabling them to roam over the arid mountain, the parched karroo, and the burning desert. Among the antelopes, then, there are, on the one hand, species allied to the goats and sheep; on the other, to the oxen; and as widely differing in form and appearance from the gazelle or the Indian antelope as does the wild bull or the ibex.

But we must not forget, nor do we forget, that our object is not to enter into the minutiæ of scientific disquisitions, fit only for the pages of works devoted to the more abstruse departments of Zoology. Were we to follow our feelings, we should expatiate on this part of the subject more perhaps to our own gratification than that of our reader: we shall therefore forbear; and, allowing the family termed Antelope to remain as it does, we shall merely divide it for the sake of perspicuity into four subdivisions, namely:—True Antelopes, Bush Antelopes, Capriform Antelopes, and Boviform Antelopes.

The antelopes differ essentially from the deer in the structure of the horns. In the deer the horns, or more properly antlers, are deciduous; but in the antelopes,

and the same observation applies to the goat and ox, these organs consist of a horny sheath, investing a conical support of bone; their increase is gradual, and they are not yearly shed and renewed. The bony central support, or core, is a process from the frontal bone: in most antelopes it is solid, or nearly so; it commences small at first, and assumes various directions in the various species. One antelope has four horns. The horny sheath consists of fibres analogous to those of whalebone, or rather hair, running longitudinally or spirally, and agglutinated into one uniform mass. If this sheath be stripped from its bony core, the latter will be found covered by a highly vascular periosteum, from which the fibres in question are secreted. They are formed in regular succession as the bone grows, so that the horn which covered the whole process or core in the young animal will in due time be thrown to its summit. The outermost layer was once in contact with the core, but was gradually pushed outwards and upwards. In some groups of antelopes both sexes are furnished with horns, in others only the male: and it is difficult in many cases to discriminate between the hornless females of one of the antelope and of one of the deer tribe. It is chiefly to the warmer latitudes that the antelopes are confined, and Africa may be regarded as their great nursery; many, however, are Asiatic; the Saiga and the Chamois are natives of Europe; the Prongbuck and a closely-allied species (if they can be called antelopes) are natives of America.

True Antelopes (*Gazella*, Ogilby).

Horns in both sexes; lachrymal sinuses distinct and moveable. Interdigital pits and inguinal pores large. Female with two teats. Horns lyrate.

The Ariel Gazelle (*Antilope Arabica*).

This beautiful species inhabits Arabia and Syria, where it is seen in large herds (Fig. 87), bounding over the desert with amazing fleetness. Its eyes are peculiarly

and the same observation applies to the goat and ox, these organs consist of a horny sheath, investing a conical support of bone; their increase is gradual, and they are not yearly shed and renewed. The bony central support, or core, is a process from the frontal bone: in most antelopes it is solid, or nearly so; it commences small at first, and assumes various directions in the various species. One antelope has four horns. The horny sheath consists of fibres analogous to those of whalebone, or rather hair, running longitudinally or spirally, and agglutinated into one uniform mass. If this sheath be stripped from its bony core, the latter will be found covered by a highly vascular periosteum, from which the fibres in question are secreted. They are formed in regular succession as the bone grows, so that the horn which covered the whole process or core in the young animal will in due time be thrown to its summit. The outermost layer was once in contact with the core, but was gradually pushed outwards and upwards. In some groups of antelopes both sexes are furnished with horns, in others only the male: and it is difficult in many cases to discriminate between the hornless females of one of the antelope and of one of the deer tribe. It is chiefly to the warmer latitudes that the antelopes are confined, and Africa may be regarded as their great nursery; many, however, are Asiatic; the Saiga and the Chamois are natives of Europe; the Prongbuck and a closely-allied species (if they can be called antelopes) are natives of America.

True Antelopes (*Gazella*, Ogilby).

Horns in both sexes; lachrymal sinuses distinct and moveable. Interdigital pits and inguinal pores large. Female with two teats. Horns lyrate.

The Ariel Gazelle (*Antilope Arabica*).

This beautiful species inhabits Arabia and Syria, where it is seen in large herds (Fig. 87), bounding over the desert with amazing fleetness. Its eyes are peculiarly

87.—Group of Ariel Gazelles.

large, dark, and lustrous, and have supplied a simile to the Oriental poets and orators; indeed, to say of a woman "she has the eyes of a gazelle," is a most flattering commendation. The Ariel antelope is an object of the chace in Arabia, as it was among the ancient Egyptians, whose delineations of it are abundant. Its flesh is said to be excellent. So swift are these animals, that the greyhound unaided cannot overtake them; the falcon, therefore, is brought into service. The huntsman advances as near as possible to the herd, the dogs are then slipped, and the falcon thrown off; the individual which the dogs have singled is attacked by the falcon, which is trained to strike at the head and eyes, so as to confuse the game, and check its speed, thereby enabling the dogs to come

88.—Tame Gazelle.

up to it. It is a common practice to shoot the gazelle. Burckhardt informs us that on the eastern frontier of Syria are several places allotted for the hunting of this animal, or rather for its entrapment and destruction. An open space on the plain, about one mile and a half square, is enclosed on three sides by a wall of loose stones, too high for the gazelle to leap over. Gaps are left in different parts of the wall, and at each gap a deep ditch is sunk on the outside. The inclosure is situated near some

89.—Ariel Gazelle, with the Jerboa and Syrian Goat.

rivulet or spring to which the gazelles resort in summer. When the sport is to begin, many peasants assemble and watch till they see a herd of gazelles advancing from a distance towards the enclosure, into which they drive them. The gazelles, frightened by the shouts of the people and the discharge of the fire-arms, endeavour to leap over the wall, but can only effect this at the gaps, where they fall into the ditch outside and are easily taken, sometimes by hundreds. The chief of the herd always leaps first, and the others follow him one by one. The

90.—Ariel Gazelle.

gazelles thus captured are immediately killed, and their flesh sold to the Arabs and neighbouring Fellahs. Of the skin a kind of parchment is made, and used to cover the small drum with which the Syrians accompany some musical instruments or the voice. When taken young, wild and timid as the gazelle is, it is readily tamed, and becomes familiar and quite at ease. (Fig. 88.) Tame gazelles are frequently seen at large in the courtyards of houses in Syria, and their beauty, exquisite form, and

91.—Ariel Gazelles.

playfulness render them great favourites. The Ariel gazelle is about one foot nine inches high at the shoulder; its limbs are slender, but vigorous; and all its actions are light and spirited. (Fig. 89.) In full flight it lays the horns back almost on the shoulders, and seems to skim over the level plain, almost without touching it.

The general colour above is dark fawn or yellowish brown; the under parts are white, divided from the colour of the upper parts by a black or deep brown band along the flanks; the nose has a broad mark of dark brown, and on each side of the face a broad stripe of white passes from the horns over the eyes to the nose, while a narrow stripe of black, from the inner angle of the eye to the nose, separates the white streak from the fawn-colour of the cheeks; the knees are furnished with dark brushes of hair. (Figs. 90 and 91.)

A closely allied species, the Ahu or Tseyran (*A. subgutturosa*) is common in Persia and the country round Lake Baikal. Whether it be truly a distinct species or only a mere variety of the Ariel gazelle remains to be decided. It is hunted in Persia with greyhounds and falcons, which mutually assist each other.

92.—Dorcas Gazelle.

93.—Dorcas Gazelle.

The Dorcas Gazelle (*A. Dorcas*).

This species differs from the Ariel gazelle chiefly in being of a much lighter colour, presenting, however, the same markings and arrangement of tints. It is a native of Northern Africa, and lives in large herds upon the borders of the Tell, or cultivated country, and the Sahara, or desert. When a troop of these gazelles are pursued, they fly to some distance, then stop, turn round and gaze at the hunter, and again take to flight. If hard pressed they disperse in different directions, but soon reunite; and when surrounded and brought to bay, they defend

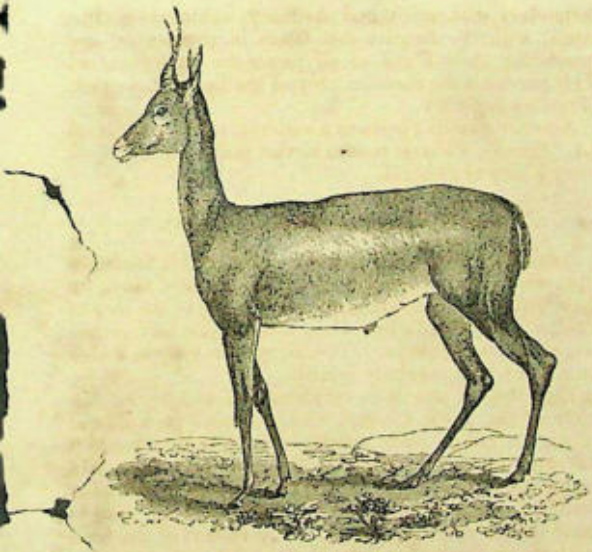
themselves with spirit and obstinacy, uniting in a close circle, with the females and fawns in the centre, and presenting their horns at all points to their enemies. This gazelle is the common prey of the lion and panther. (Figs. 92 and 93.)

Another gazelle (perhaps a variety), called the Kevel (*A. Kevella*, Pallas), resides in vast flocks on the open stony plains of Senegal.

The Blessbok (*Antilope Pygarga*).

Southern Africa is the native country of this fine antelope, which is also called Bontebok, or Painted Goat, by the Dutch colonists. It is superior in size to the stag of Europe, exceeding, when adult, three and a half feet in height at the shoulder. The horns are sixteen inches long, large, and regularly lyrated.

The blessbok was once very common within the districts of the Cape Colony, where in some parts it still exists, but not in such multitudes as formerly; when it was said to cover the plains in troops of thousands. In the country beyond the colonial borders it is tolerably abundant. The blessbok is fleet and active; and its markings are very ornamental. The colours of the head and body are most singularly disposed; the whole animal appears as if it had been artificially painted with different shades, laid on in separate masses. The head and neck are of a brilliant brownish bay, so deep as to resemble the colour of arterial blood: this is particularly visible upon the cheeks and about the root of the horns, from the central point between which descends a narrow stripe of the purest white as far as the orbits, immediately above which it expands and covers the whole face and nose down to the muzzle, forming a broad mark, or, as it is called in horses, a blaze, and giving origin to the name of blessbok, or blazebuck, by which this species is known among the Cape colonists. The back is of a brownish bay, thickly overlaid, or, as it were, glazed or japanned with dull purplish white, and there is a very broad purplish brown band on the flanks passing from the fore-arm



94.—Blessbok.

backwards, and extending obliquely over the outer face of the thighs. The breast, belly, and interior of the fore-arms and thighs are white, and this colour also shows itself on the posterior face of the hips and thighs, and passes in a small crescent over the rear of the croup, forming a white disc around the tail, and giving origin to the specific name of *Pygarga*, which has been rather arbitrarily bestowed upon this animal, the real Pygarga of the ancients being certainly a different species, and an inhabitant of Northern Africa. The tail is long and switched, nearly naked at the root, and terminated by a tuft of very long black hair. The knees are without brushes. The young are at first of a brownish red colour on the body, partially glazed, as in the adults; but what is most remarkable of

all is, that the face, instead of being white as in the grown animal, is of a very deep brownish black colour, slightly mixed with scattered gray hairs.

It was from a young animal that our engraving (Fig 94) was taken.

Sœmmering's Antelope (*Antilope Sœmmeringii*).

This light and graceful antelope, which exceeds the Ariel gazelle in size, is a native of Abyssinia, where it was discovered by Rüppel during his journey through the northern provinces of that country, and afterwards described by Cretzchmar in the zoological portion of Rüppel's account of his travels.

It frequents hilly districts, but is not gregarious, like the common gazelle: it lives in pairs, and is fleet and vigorous. Beyond these points we know nothing of its history. The horns of this elegant antelope are regularly lyrated, bending boldly outwards towards the points, and then suddenly turning inwards towards one another, with a very sharp and well defined curve; they are annulated with fifteen or sixteen prominent and complete rings, which reach from the base to the inward curvature within about two inches and a quarter of the points. The general colour is a beautiful clear Isabel or yellowish dun, the hair being extremely short, and appearing almost as if it had been clipped or shorn. It does not lie close and smooth upon the hide, nor does it all follow the same direction, as in the generality of animals, but is disposed in innumerable small waves, pointing in different directions, as if it had been regularly shaded and parted on each side, and appearing glossy or glazed along their ridges with a shining dun shade, more or less intense according to the light in which it is observed. All the under parts of the body are abruptly of the most pure and brilliant white, and a large disc of the same colour surrounds the tail and passes over the rump and croup. The tail is small and slender, nearly naked at the root, and furnished at the extremity with a tuft of mixed brown and gray hairs. The outsides of the legs are very

95.—Sœmmering's Antelope.

pale fawn colour, the insides white, and the knee-brushes white and fawn mixed. The ears are pretty long, and brown, with a narrow black border surrounding their outer edge. The face is dark brown in some specimens, and pure black in others, curiously mixed with wavy red on the forehead; on each side of this a broad white band passes from the root of the horns over the eyes to the nose, and there is an indication of a small black one from the anterior angle of the eye to the corner of the mouth, separating this white band from the cheeks and sides of the lower jaw, which are uniform fawn colour. The horns of the female have nearly the same curvature as

those of the male, and are fully as long, but they are much more slender, and have not such prominent annuli. (Fig. 95.)

The M'horr (*A. Mhorr*, Bennett).

The M'horr is a native of Wednoon, twelve days' journey inland from Mogadore, whence some years since two living specimens were sent to the gardens of the Zoological Society, London. The species is described and figured by Mr. Bennett in the 'Zool. Transactions.' Of its habits we have no account. Its general colour is deep fulvous or reddish brown, becoming paler on the sides of the face and passing into white about the eyes,

96.—M'horr.

nose, lips, and lower jaw; an irregular black mark between the eyes and the mouth. A square mark midway on the front of the neck; the under parts, croup, back of the thighs, tail, and inside the limbs are abruptly white; the tail has a fringe of black hairs at its termination; the horns are somewhat lyrate, and strongly annulated, and after bending back suddenly curve forwards, the points being hooked. Height at the shoulder two feet six inches. (Fig. 96.)

THE SPRINGBUCK (*Antilope Euchore*).

Among the true antelopes this species is one of the most graceful and beautiful; and its movements are light and rapid. It is a native of the wild karroos of South Africa, where it lives in vast troops, which are irregularly migratory. Its name springbuck (springbok) is given in allusion to its singular habit of leaping perpendicularly when alarmed or as it scours the plain, and that to the height of several feet. Mr. Burchell well describes the effect produced by large herds of these interesting creatures spread over an extensive plain, intermingled with troops of gnus and quaggas. Two thousand springbucks seen at one view must, indeed, have been a noble spectacle. The plain, he says, "afforded no other object to fix the attention, and even if it had presented many, I should not readily have ceased admiring these elegant animals, or have been diverted from watching their manners. It was only occasionally that they took those remarkable leaps which have been the origin of their name; but when grazing or moving at leisure they walked and trotted like other antelopes or the common deer. When pursued or hastening their pace, they frequently took an extraordinary bound, rising, with curved or elevated backs, high into the air, generally to the height of eight feet, and appearing as if about to take flight. Some of the herds moved by us almost within musket-shot, and I observed that in crossing the beaten road the greater number cleared it by one of those flying leaps." The most remarkable point in the histoy of the springbuck

relates to its habits of migration. The karroos, or vast wilds in the interior of Southern Africa, where this animal resides in almost incredible multitudes, are subject to seasons of drought, in which the pools are dried up, the pasturage burnt by excessive heat, and every green leaf or blade withered. Driven by necessity, all the animals hurry from this scene of barrenness; and of these the springbucks are in myriads. They literally inundate the fertile districts, over which swarm after swarm passes like wave after wave, destroying the hopes of the colonists. The grazier drives his flocks and herds to a distant pasturage, dispossessed of his lands till the heavy rains set in; the corn-lands are ruined for the season, and the line of their march is one broad track of desolation. It is not with impunity, however, that the springbucks make these forced incursions. The gun of the colonists thins their numbers: and lions, hyænas, and jackals follow in their train, and prey incessantly upon them. When the rains begin to fall, the horde, thinned by man and beast, begins to return to the interior, and in a few days the whole have disappeared. These migratory swarms are called by the Dutch colonist trek-bokken. Mr. Pringle once passed through one of them, near the Little Fish river; he could not profess to estimate their numbers: they whitened, or rather speckled, the country as far as the eye could reach; there could not have been less in view than twenty-five or thirty thousand. The springbuck is shot in great numbers by the Dutch boors. This sport is usually pursued on horseback, and in the heat of the day. The animal is then lying in its habitual lair, and on being disturbed by the sportsman, springs away with a succession of bounds, than which nothing can be more beautiful or graceful. The Dutch boor is generally an unerring shot; but in case the antelope should be only wounded, the buck-dog (a species of large mongrel) is always at the heels of his master's horse, and, at the report of his gun, darts forward and secures the animal. It is then placed behind the saddle, and conveyed away.

The general colour of the springbuck is light cinnamon-red, a band of deep reddish brown passing along

the sides and edging the pure white of the under surface. On the croup is a large patch of long white hairs enclosed by a fold of skin on each side, the edges of which approximate when the animal is quiet, so as to reduce the white to a mere line. In the act of leaping these folds are widely opened, and the long white hairs spread beautifully out, so as to cover the whole of the haunch, producing a striking effect. When taken young the springbuck is easily tamed, and becomes playful and familiar, displaying the confidence and even petulance of the goat, and using its horns in butting, either sportively or in earnest.

ANTILOPE, Ogilby.—*Horns in the male only; lachrymal sinuses mobile and distinct; interdigital pores large; inguinal pores large; teats in the female, two; horns annulated and spiral.*

THE INDIAN ANTELOPE (*Antilope Cervicapra*).

The saisin, or common antelope of India, is spread over almost every part of that country, residing on the open plains in large herds of females and young, under the guidance of a single old male. They are extremely wary and cautious, and when feeding or lying down to ruminate are guarded by sentinels (young bucks), who give the alarm on the slightest appearance of danger. Their fleetness and activity are such, that greyhounds are useless in the chace. Captain Williamson assures us that he has seen a buck antelope lead a herd of females over a net at least eleven feet high, and that they frequently vault to the height of twelve or thirteen feet, and pass over ten or twelve yards at a single bound. The flesh of this species is dry and unsavoury, but the animal is often hunted, for the sake of the sport, by means of trained chetahs, as described in the history of the latter. (See *Felidæ*, vol. i, p. 55.)

The Indian Antelope is about two feet and a half in height at the shoulder, and is lightly formed, but endowed with great vigour. The adult males are of a

97.—Indian Antelope.

blackish brown above, and white beneath, the nose, lips, and a large circle round each eye being likewise white; the hair is short and close; the knees are furnished with tufts or brushes. (Fig. 97.) The horns have two or more spiral turns, and are strongly annulated; the Fakirs and Dervishes polish them and form them into offensive weapons by uniting them at the base, so that they are pointed at each end; these they wear in their girdles instead of swords and daggers, which their vows and religious character prevent them from using. The young males, and also the females, are of a tawny brown, with a streak of silvery gray along each side.

The Pallah (*Antilope Melampus*).

This magnificent antelope is a native of South Africa, where it was discovered by Lichtenstein. It inhabits Caffraria and the country of the Bachapins, never descending farther south than the Koosges valley in one direction and the Kamhanni mountains in the other. This species associates in families of six or eight individuals, always residing on the open plains: their swiftness is astonishing, and they leap with great vigour and much in the manner of the springbuck. They are very numerous on the elevated plains in the neighbourhood of Lattakoo, where the natives choose them for the sake of

98.—Pallah.

their flesh, which, though deficient in fat, is much esteemed. The Pallah (as it is called by the Bachapins) stands three feet high at the shoulder. The general colour is deep rufous; the lips, eyebrows, interior of the ears, all the under parts, the inside of the limbs, and the region below the tail, are white: a black crescentic mark on the croup separates the white from the rufous colour on the back; the outside of the heel and knee are marked by black spots: the horns have an irregular lyrate tendency, bending first forwards and very much outwards, then with a large circular sweep inwards, and finally pointing forward again, approaching within three inches of one another at the tips, after being nearly a foot distant in the middle; they are about twenty inches long in adult animals, and surrounded for two-thirds of their length with irregular rings, often splitting into two, and forming prominent knobs on the front of the horn, but frequently obliterated, and always less strongly marked on the sides, which are slightly compressed. (Fig. 98.)

MADOQUA, Ogilby.—*Horns only in the male. Lachrymal sinuses distinct, but small. Interdigital pit distinct. Inguinal pores wanting. Teats in the female four. Horns straight.*

THE MADOQUA ANTELOPE (*Antilope Saltiana*).

This beautiful little antelope, which scarcely equals a hare in magnitude, is a native of Abyssinia, where it was first discovered by Bruce about the sources of the Abawi, or eastern branch of the Nile. Specimens are in the British Museum and in that of the Zoological Society, London. Of its habits little is known: it is said to live in pairs in mountainous districts, and Pearce informs us that many of the Abyssinians object to eat its flesh, from superstitious motives, because, as they assert, it is often found in the society of monkeys and baboons.

The height of this species at the shoulder is about fourteen inches; the horns are sharp and slightly bent outwards and forwards; the face, forehead, and legs, as

well as the tuft of long hair between the horns, are of a bright and deep red, as are likewise the backs of the ears; the neck, shoulders, flanks, rump, and outsides of the thighs are of a clear gray colour, like that of the American gray squirrels, each hair being annulated with alternate rings of black and white; the back, from the shoulders to the rump, is a deep reddish brown, and the breast, ..., interior of the fore-arms and thighs, and hinder ... of the hips, of the most pure unmixed white, ... altogether a variety, clearness, and brilliancy of ... rarely met with among quadrupeds; the tail is ... being in fact little more than a mere stump; ...re round and nearly the length of the horns; ... small, well formed, and, like the horns, of a

99.—Madoqua.

deep black colour; the forehe
head is compressed suddenly
to a small and attenuated sn
proportion to the weight of t
they scarcely equal the little f
99.)

599
H15
v.3

ELEOTRAGUS.—*Horns with a single curve, ben
forwards more or less decidedly towards the po
straight—none in the female. Suborbital sinuses w
inguinal pores large; muzzle naked.*

THE REITBOK, OR REEDBUCK (*Antilope Ele*

The interior of South Africa is the abode of
bok, where it is by no means uncommon, living
or small families, and frequenting the reedy b
mountain-streams which are drie during the heat
summer. Sometimes it is found he borders of t
rivers in dense woodland solit
humid or marshy situations are f

The Reitbok is about two fee
shoulder. The hair over the ne
rough, and of a dull ashy gray,
red; the under parts and inside
gray. The tail is long and bus
each side of the head is a nak
black colour. The horns c
and are annulated at the b
(Fig. 100.)

BUSH ANTELOPE

The animals so termed are of a compact fo
in the limbs, which are slender, but vigorous. T
is smooth and usually close; the neck is short, and
almost horizontally, and the back is arched. The
are straight and short, and situated high on the he
a considerable distance from the eyes; in one sub-g
they are possessed by females as well as males. Th
is no suborbital sinus, but its absence is compensate

599
HIS
V.3

deep black colour; the forehe
head is compressed suddenly
to a small and attenuated sn
proportion to the weight of t
they scarcely equal the little f
99.)

ELEOTRAGUS.—*Horns with a single curve, ben
forwards more or less decidedly towards the po
straight—none in the female. Suborbital sinuses w
inguinal pores large; muzzle naked.*

THE REITBOK, OR REEDBUCK (*Antilope Ele*

The [illegible] is the pheebe of
bok, where it is by no means uncommon, living
or small families, and frequenting the reedy b
mountain-streams which are drie during the hea
summer. Sometimes it is found [illegible]
rivers in dense woodland solit
haunt or marshy situations are

The Reitbok is about two fe
shoulder. The hair over the n
rough, and of a dull ashy gray,
red; the under parts and inside
gray. The tail is long and bus
each side of the head is a nak
black colour. The horns c
and are annulated at the b
(Fig. 100.)

BUSH ANTELOPE

The animals so termed are of a compact fo
in the limbs, which are slender, but vigorous. T
is smooth and usually close; the neck is short, and
almost horizontally, and the back is arched. The
are straight and short, and situated high on the he
a considerable distance from the eyes; in one sub-g
they are possessed by females as well as males. Th
is no suborbital sinus, but its absence is compensated