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NATURAL HISTORY OF THE MAMMALIA OF INDIA AND CEYLON

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Содержание

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PREFACE

This work is designed to meet an existing want, viz.: a popular manual of Indian Mammalia. At present the only work of the kind is one which treats exclusively of the Peninsula of India, and which consequently omits the more interesting types found in Assam, Burmah, and Ceylon, as well as the countries bordering the British Indian Empire on the North. The geographical limits of the present work have been extended to all territories likely to be reached by the sportsman from India, thus greatly enlarging the field of its usefulness.

The stiff formality of the compiled "Natural Histories" has been discarded, and the Author has endeavoured to present, in interesting conversational and often anecdotal style, the results of experience by himself and his personal friends; at the same time freely availing himself of all the known authorities upon the subject.

INTRODUCTION

In laying before the public the following history of the Indian Mammalia, I am actuated by the feeling that a popular work on the subject is needed, and would be appreciated by many who do not care to purchase the expensive books that exist, and who also may be more bothered than enlightened by over-much technical phraseology and those learned anatomical dissertations which are necessary to the scientific zoologist.

Another motive in thus venturing is, that the only complete history of Indian Mammalia is Dr. Jerdon's, which is exhaustive within the boundaries he has assigned to India proper; but as he has excluded Assam, Cachar, Tenasserim, Burmah, Arracan, and Ceylon, his book is incomplete as a Natural History of the Mammals of British India. I shall have to acknowledge much to Jerdon in the following pages, and it is to him I owe much encouragement, whilst we were together in the field during the Indian Mutiny, in the pursuit of the study to which he devoted his life; and the general arrangement of this work will be based on his book, his numbers being preserved, in order that those who possess his 'Mammals of India' may readily refer to the noted species.

But I must also plead indebtedness to many other naturalists who have left their records in the 'Journals of the Asiatic Society' and other publications, or who have brought out books of their own, such as Blyth, Elliott, Hodgson, Sherwill, Sykes, Tickell, Hutton, Kellaart, Emerson Tennent, and others; Col. McMaster's 'Notes on Jerdon,' Dr. Anderson's 'Anatomical and Zoological Researches,' Horsfield's 'Catalogue of the Mammalia in the Museum of the East India Company,' Dr. Dobson's 'Monograph of the Asiatic Chiroptera,' the writings of Professors Martin Duncan, Flowers, Kitchen Parker, Boyd Dawkins, Garrod, Mr. E. R. Alston, Sir Victor Brooke and others; the Proceedings and Journals of the Zoological, Linnean, and Asiatic Societies, and the correspondence in *The Asian*; so that after all my own share is minimised to a few remarks here and there, based on personal experience during a long period of jungle life, and on observation of the habits of animals in their wild state, and also in captivity, having made a large collection of living specimens from time to time.

As regards classification, Cuvier's system is the most popular, so I shall adopt it to a certain extent, keeping it as a basis, but engrafting on it such modifications as have met with the approval of modern naturalists. For comparison I give below a synopsis of Cuvier's arrangement. I have placed Cetacea after Carnivora, and Edentata at the end. In this I have followed recent authors as well as Jerdon, whose running numbers I have preserved as far as possible for purposes of reference.

Cuvier divides the Mammals into nine orders, as follows. (*The examples I give are Indian ones, except where stated otherwise*):—

Order I.—BIMANA. Man.

Order II.—QUADRUMANA. Two families—1st, Apes and Monkeys; 2nd, Lemurs.

Order III.—CARNARIA. Three families—1st, *Cheiroptera*, Bats; 2nd, *Insectivora*, Hedgehogs, Shrews, Moles, Tupaiæ, &c.; 3rd, *Carnivora*: Tribe 1, *Plantigrades*, Bears, Ailurus, Badger, Arctonyx; 2, *Digitigrades*, Martens, Weasels, Otters, Cats, Hyænas, Civets, Musangs, Mongoose, Dogs, Wolves and Foxes.

Order IV.—MARSUPIATA. Implacental Mammals peculiar to America and Australia, such as Opossums, Dasyures, Wombats, and Kangaroos. We have none in India.

Order V.—RODENTIA. Squirrels, Marmots, Jerboas, Mole-Rats, Rats, Mice, Voles, Porcupines, and Hares.

Order VI.—EDENTATA, or toothless Mammals, either partially or totally without teeth. Three families—1st, *Tardigrades*, the Sloths, peculiar to America; 2nd, *Effodientia*, or Burrowers, of which the Indian type is the Manis, but which includes in other parts of the world the Armadillos and Anteaters; 3rd, *Monotremata*, Spiny Anteaters or Echidnas, and the Ornithorynchus.

Order VII.—PACHYDERMATA, or thick-skinned Mammals. Three families—1st, *Proboscidians*, Elephants; 2nd, *Ordinary Pachyderms*, Rhinoceroses, Hogs; 3rd, *Solidungula*, Horses.

Order VIII.—RUMINANTIA, or cud-chewing Mammals. Four families—1st, *Hornless Ruminants*, Camels, Musks; 2nd, *Cervidæ*, true horns shed periodically, Deer; 3rd, *Persistent horns*, Giraffes; 4th, *Hollow-horned Ruminants*, Antelopes, Goats, Sheep and Oxen.

Order IX.—CETACEA. Three families—1st, *Herbivorous Cetacea*, Manatees, Dugongs; 2nd, *Ordinary Cetacea*, Porpoises; 3rd, *Balænidæ*, Whales.

ORDER BIMANA

Some people have an extreme repugnance to the idea that man should be treated of in connection with other animals. The development theory is shocking to them, and they would deny that man has anything in common with the brute creation. This is of course mere sentiment; no history of nature would be complete without the noblest work of the Creator. The great gulf that separates the human species from the rest of the animals is the impassable one of intellect. Physically, he should be compared with the other mammals, otherwise we should lose our first standpoint of comparison. There is no degradation in this, nor is it an acceptance of the development theory. To argue that man evolved from the monkey is an ingenious joke which will not bear the test of examination, and the Scriptural account may still be accepted. I firmly believe in man as an original creation just as much as I disbelieve in any development of the Flying Lemur (*Galeopithecus*) from the Bat, or that the habits of an animal would in time materially alter its anatomy, as in the case of the abnormal length of the hind toe and nail of the Jacana. It is not that the habit of running over floating leaves induced the change, but that an all-wise Creator so fashioned it that it might run on those leaves in search of its food. I accept the development theory to the extent of the multiplication of species, or perhaps, more correctly, varieties in genera. We see in the human race how circumstances affect physical appearance. The child of the ploughman or navvy inherits the broad shoulders and thick-set frame of his father; and in India you may see it still more forcibly in the difference between Hindu and Mahomedan races, and those Hindus who have been converted to Mahomedanism. I do not mean isolated converts here and there who intermarry with pure Mahomedan women, but I mean whole communities who have in olden days been forced to accept Islam. In a few generations the face assumes an unmistakable Mahomedan type. It is the difference in living and in thought that effects this change.

It is the same with animals inhabiting mountainous districts as compared with the same living in the plains; constant enforced exercise tells on the former, and induces a more robust and active form.

Whether diet operates in the same degree to effect changes I am inclined to doubt. In man there is no dental or intestinal difference, whether he be as carnivorous as an Esquimaux or as vegetarian as a Hindu; whereas in created carnivorous, insectivorous, and herbivorous animals there is a striking difference, instantly to be recognised even in those of the same family. Therefore, if diet has operated in effecting such changes, why has it not in the human race?

"Who shall decide when doctors disagree?" is a quotation that may aptly be applied to the question of the classification of man; Cuvier, Blumenbach, Fischer, Bory St. Vincent, Prichard, Latham, Morton, Agassiz and others have each a system.

Cuvier recognises only three types—the Caucasian, the Mongolian, and the Negro or Ethiopian, including Blumenbach's fourth and fifth classes, American and Malay in Mongolian. But even Cuvier himself could hardly reconcile the American with the Mongol; he had the high cheek-bone and the scanty beard, it is true, but his eyes and his nose were as Caucasian as could be, and his numerous dialects had no affinity with the type to which he was assigned.

Fischer in his classification divided man into seven races:—

1*st*.—*Homo japeticus*, divided into three varieties—*Caucasicus*, *Arabicus* and *Indicus*.

2*nd*.—*H. Neptunianus*, consisting of—1st, the Malays peopling the coasts of the islands of the Indian Ocean, Madagascar, &c.; 2nd, New Zealanders and Islanders of the Pacific; and, 3rd, the Papuans.

3*rd*.—*H. Scythicus*. Three divisions, viz.: 1st, Calmucks and other Tartars; 2nd, Chinese and Japanese; and, 3rd, Esquimaux.

4*th*.—*H. Americanus*, and

5*th*.—*H. Columbicus*, belong to the American Continent.

6*th*.—*H. Æthiopicus*. The Negro.

7*th*.—*H. Polynesius*. The *inland* inhabitants of the Malay Peninsula, of the Islands of the Indian Ocean, of Madagascar, New Guinea, New Holland, &c.

I think this system is the one that most commends itself from its clearness, but there are hardly two writers on ethnology who keep to the same classification.

Agassiz classifies by realms, and has eight divisions.

The Indian races with which we have now to deal are distributed, generally speaking, as follows: —

Caucasian.—(*Homo japeticus*, Bory and Fischer). Northerly, westerly, and in the Valley of the Ganges in particular, but otherwise generally distributed over the most cultivated parts of the Peninsula, comprising the Afghans (Pathans), Sikhs, Brahmins, Rajputs or Kshatryas of the north-west, the Arabs, Parsees, and Mahrattas of the west coast, the Singhalese of the extreme south, the Tamils of the east, and the Bengalis of the north-east.

Mongolians (*H. Scythicus*), inhabiting the chain of mountains to the north, from Little Thibet on the west to Bhotan on the east, and then sweeping downwards southerly to where Tenasserim joins the Malay Peninsula. They comprise the Hill Tribes of the N. Himalayas, the Goorkhas of Nepal, and the Hill Tribes of the north-eastern frontier, viz. Khamtis, Singphos, Mishmis, Abors, Nagas, Jynteas, Khasyas, and Garos. Those of the northern borders: Bhotias, Lepchas, Limbus, Murmis and Haioos; of the Assam Valley Kachari, Mech and Koch.

The Malays (*H. Neptunianus*) Tipperah and Chittagong tribes, the Burmese and Siamese.

Now comes the most difficult group to classify—the aborigines of the interior, and of the hill ranges of Central India, the Kols, Gonds, Bhils, and others which have certain characteristics of the Mongolian, but with skins almost as dark as the Negro, and the full eye of the Caucasian. The main body of these tribes, which I should feel inclined to classify under Fischer's *H. Polynesius*, have been divided by Indian ethnologists into two large groups—the Kolarians and Dravidians. The former comprise the Juangs, Kharrias, Mundas, Bhumij, Ho or Larka Kols, Santals, Birhors, Korwas, Kurs, Kurkus or Muasis, Bhils, Minas, Kulis. The latter contains the Oraons, Malers, Paharis of Rajamahal, Gonds and Kands.

The Cheroos and Kharwars, Parheyas, Kisans, Bhuikers, Boyars, Nagbansis, Kaurs, Mars, Bhunyiars, Bendkars form another great group apart from the Kolarians and Dravidians, and approximating more to the Indian variety of the Japetic class.

Then there are the extremely low types which one has no hesitation in assigning to the lowest form of the Polynesian group, such as the Andamanese, the jungle tree-men of Chittagong, Tipperah, and the vast forests stretching towards Sambhulpur.

On these I would now more particularly dwell as points of comparison with the rest of the animal kingdom. I have taken but a superficial view of the varieties of the higher types of the human race in India, for the subject, if thoroughly entered into, would require a volume of no ordinary dimensions; and those who wish to pursue the study further should read an able paper by Sir George Campbell in the 'Journal of the Asiatic Society' for June 1866 (vol. xxxv. Part II.), Colonel Dalton's 'Ethnology of Bengal,' the Rev. S. Hislop's 'Memoranda,' and the 'Report of the Central Provinces Ethnological Committee.' There is as yet, however, very little reliable information regarding the wilder forms of humanity inhabiting dense forests, where, enjoying apparently complete immunity from the deadly malaria that proves fatal to all others, they live a life but a few degrees removed from the Quadrumana.

I have in my book on the Seonee District described the little colonies in the heart of the Bison jungles. Clusters of huts imbedded in tangled masses of foliage, surrounded by an atmosphere reeking with the effluvia of decaying vegetation, where, unheedful of the great outer world beyond their sylvan limits, the Gonds pass year after year of uneventful lives.

In some of these hamlets I was looked upon with positive awe, as being the first white man the *Baigas* had seen. But these simple savages rank high in the scale compared with some others, of whom we have as yet but imperfect descriptions.

Some years ago Mr. Piddington communicated to the Asiatic Society an account of some "Monkey-men" he came across on the borders of the Palamow jungle. He was in the habit of employing the aboriginal tribes to work for him, and on one occasion a party of his men found in the jungle a man and woman in a state of starvation, and brought them in. They were both very short in stature, with disproportionately long arms, which in the man were covered with a reddish-brown hair. They looked almost more like baboons than human beings, and their language was unintelligible, except that words here and there resembled those in one of the Kolarian dialects. By signs, and by the help of these words, one of the Dhangars managed to make out that they lived in the depths of the forest, but had to fly from their people on account of a blood feud. Mr. Piddington was anxious to send them down to Calcutta, but before he could do so, they decamped one night, and fled again to their native wilds. Those jungles are, I believe, still in a great measure unexplored; and, if some day they are opened out, it is to be hoped that the "Monkey-men" will be again discovered.[1]

The lowest type with which we are familiar is the Andamanese, and the wilder sort of these will hardly bear comparison with even the degraded Australian or African Bosjesman, and approximate in debasement to the Fuegians.

The Andamanese are small in stature—the men averaging about five feet, the women less. They are very dark, I may say black, but here the resemblance to the Negro ceases. They have not the thick lips and flat nose, nor the peculiar heel of the Negro. In habit they are in small degree above the brutes, architecture and agriculture being unknown. The only arts they are masters of are limited to the manufacture of weapons, such as spears, bows and arrows, and canoes. They wear no kind of dress, but, when flies and mosquitoes are troublesome, plaster themselves with mud. The women are fond of painting themselves with red ochre, which they lay thickly over their heads, after scraping off the hair with a flint-knife. They swim and dive like ducks, and run up trees like monkeys. Though affectionate to their children, they are ruthless to the stranger, killing every one who happens to be cast away on their inhospitable shores. They have been accused of cannibalism, but this is open to doubt. The bodies of those they have killed have been found dreadfully mutilated, almost pounded to a jelly, but no portion had been removed.[2]

In the above description I speak of the savage Andamanese in his wild state, and not of the specimens to be seen at Port Blair, who have become in an infinitesimal degree civilised—that is to say, to the extent of holding intercourse with foreigners, making some slight additions to their argillaceous dress-suits, and understanding the principles of exchange and barter—though as regards this last a friend informs me that they have no notion of a token currency, but only understand the *argumentum ad hominem* in the shape of comestibles, so that your bargains, to be effectual, must be made within reach of a cookshop or grocery. The same friend tells me he learnt at Port Blair that there were marriage restrictions on which great stress was laid. This may be the case on the South Island; there is much testimony on the other side as regards the more savage Andamanese.

The forest tribes of Chittagong are much higher in the scale than the Andamanese, but they are nevertheless savages of a low type. Captain Lewin says: "The men wear scarcely any clothing, and the petticoat of the women is scanty, reaching only to the knee; they worship the terrene elements, and have vague and undefined ideas of some divine power which overshadows all. They were born and they die for ends to them as incomputable as the path of a cannon-shot fired into the darkness. They are cruel, and attach but little value to life. Reverence or respect are emotions unknown to them,

[1] There has been lately exhibited in London a child from Borneo which has several points in common with the monkey—hairy face and arms, the hair on the fore-arm being reversed, as in the apes.

[2] Since the above was written there has been published in the 'Journal of the Anthropological Institute,' vol. xii., a most interesting and exhaustive paper on these people by Mr. E. H. Man, F.R.G.S., giving them credit for much intelligence.

they salute neither their chiefs nor their elders, neither have they any expression conveying thanks." There is, however, much that is interesting in these wild people, and to those who wish to know more I recommend Captain Lewin's account of 'The Hill Tracts of Chittagong.'

ORDER QUADRUMANA

The monkeys of the Indian Peninsula are restricted to a few groups, of which the principal one is that of the *Semnopitheci*. These monkeys are distinguished not only by their peculiar black faces, with a ridge of long stiff black hair projecting forwards over the eyebrows, thin slim bodies and long tails, but by the absence of cheek pouches, and the possession of a peculiar sacculated stomach, which, as figured in Cuvier, resembles a bunch of grapes. Jerdon says of this group that, out of five species found on the continent there is only one spread through all the plains of Central and Northern India, and one through the Himalayas, whilst there are three well-marked species in the extreme south of the Peninsula; but then he omits at least four species inhabiting Chittagong, Tenasserim, Arracan, which also belong to the continent of India, though perhaps not to the actual Peninsula. Sir Emerson Tennent, in his 'Natural History of Ceylon,' also mentions and figures three species, of which two are not included in Jerdon's 'Mammals,' though incidentally spoken of. I propose to add the Ceylon Mammalia to the Indian, and therefore shall allude to these further on.

The next group of Indian monkeys is that of the Macaques or Magots, or Monkey Baboons of India, the *Lal Bundar* of the natives. They have simple stomachs and cheek pouches, which last, I dare say, most of us have noticed who have happened to give two plantains in succession to one of them.

Although numerically the *Langurs* or Entellus Monkeys form the most important group of the Quadrumana in India, yet the Gibbons (which are not included by Jerdon) rank highest in the scale, though the species are restricted to but three—*Hylobates hooluck*, *H. lar* and *H. syndactylus*. They are superior in formation (that is taking man as the highest development of the form, to which some people take objection, though to my way of thinking there is not much to choose between the highest type of monkey and the lowest of humanity, if we would but look facts straight in the face), and they are also vastly superior in intellect to either the *Langurs* or the *Macaques*, though inferior perhaps to the Ourangs.

GENUS HYLOBATES—THE GIBBONS,

Which, with the long arms of the Ourangs and the receding forehead of the Chimpanzee, possess the callosities of the true monkeys, but differ from them in having neither tail nor cheek pouches. They are true bipeds on the ground, applying the sole of the foot flatly, not, as Cuvier and others have remarked of the Ourangs, with the outer edge of the sole only, but flat down, as Blyth, who first mentions it, noticed it, with the thumb or big toe widely separated.

NO. 1. HYLOBATES HOOLUCK

The White-fronted Gibbon

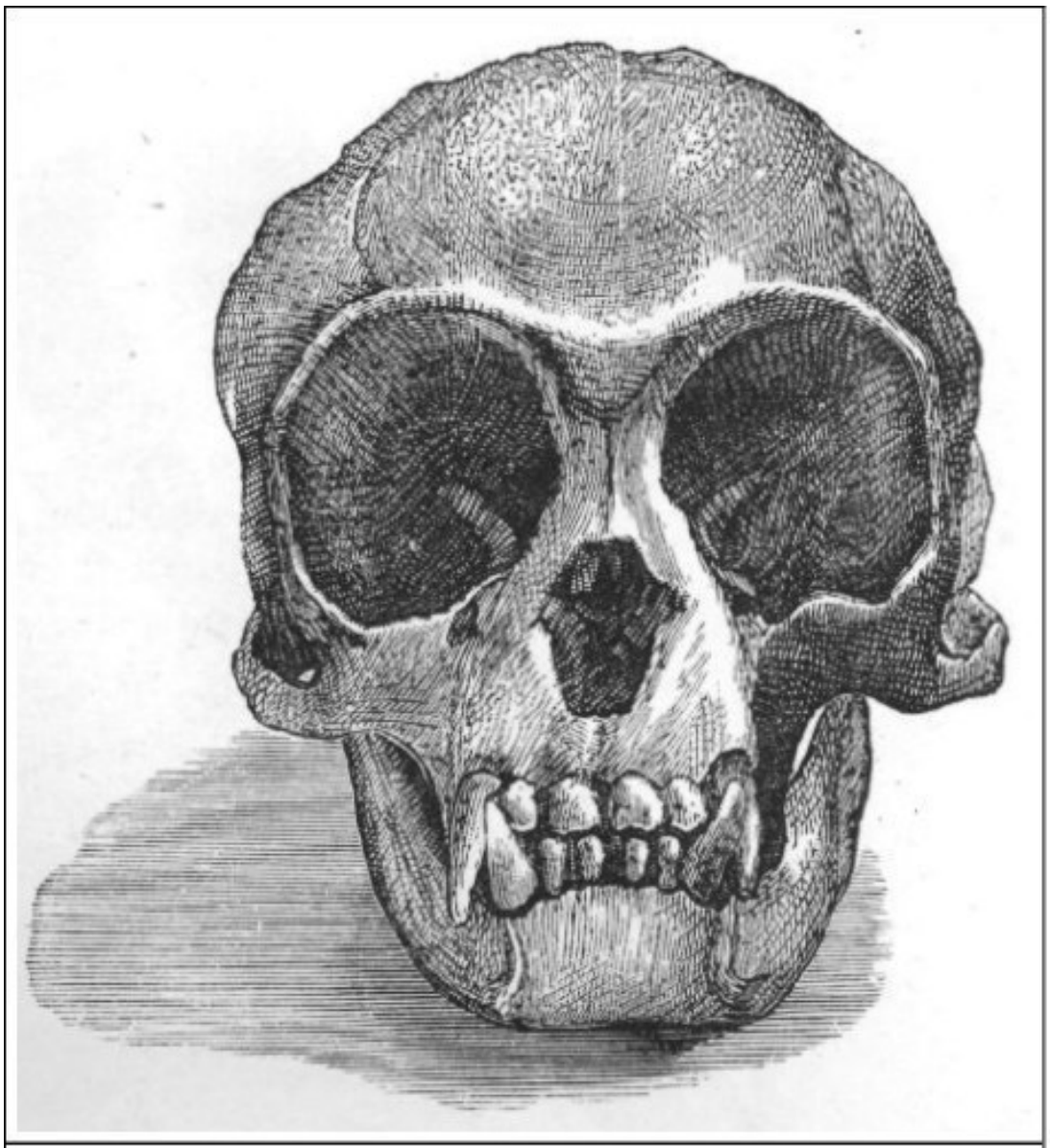
NATIVE NAMES.—*Hooluck*, *Hookoo*.

HABITAT.—Garo and Khasia Hills, Valley of Assam, and Arracan.

DESCRIPTION.—Males deep black, marked with white across the forehead. Females vary from brownish black to whitish-brown, without, however, the fulvous tint observable in pale specimens of the next species.

"In general they are paler on the crown, back, and outside of limbs, darker in front, and much darker on the cheeks and chin."—*Blyth*.

SIZE.—About two feet.



Skull of *Hylobates hooluck*.

I think of all the monkey family this Gibbon makes one of the most interesting pets. It is mild and most docile, and capable of great attachment. Even the adult male has been caught, and within the short space of a month so completely tamed that he would follow and come to a call. One I had for a time, some years ago, was a most engaging little creature. Nothing contented him so much as being allowed to sit by my side with his arm linked through mine, and he would resist any attempt I made to go away. He was extremely clean in his habits, which cannot be said of all the monkey tribe. Soon after he came to me I gave him a piece of blanket to sleep on in his box, but the next morning I found he had rolled it up and made a sort of pillow for his head, so a second piece was given him. He was destined for the Queen's Gardens at Delhi, but unfortunately on his way up he got a chill, and contracted a disease akin to consumption. During his illness he was most carefully tended by my brother, who had a little bed made for him, and the doctor came daily to see the little patient, who gratefully accepted his attentions; but, to their disappointment, he died. The only objection to these

monkeys as pets is the power they have of howling, or rather whooping, a piercing and somewhat hysterical "Whoop-poo! whoop-poo! whoop-poo!" for several minutes, till fairly exhausted.

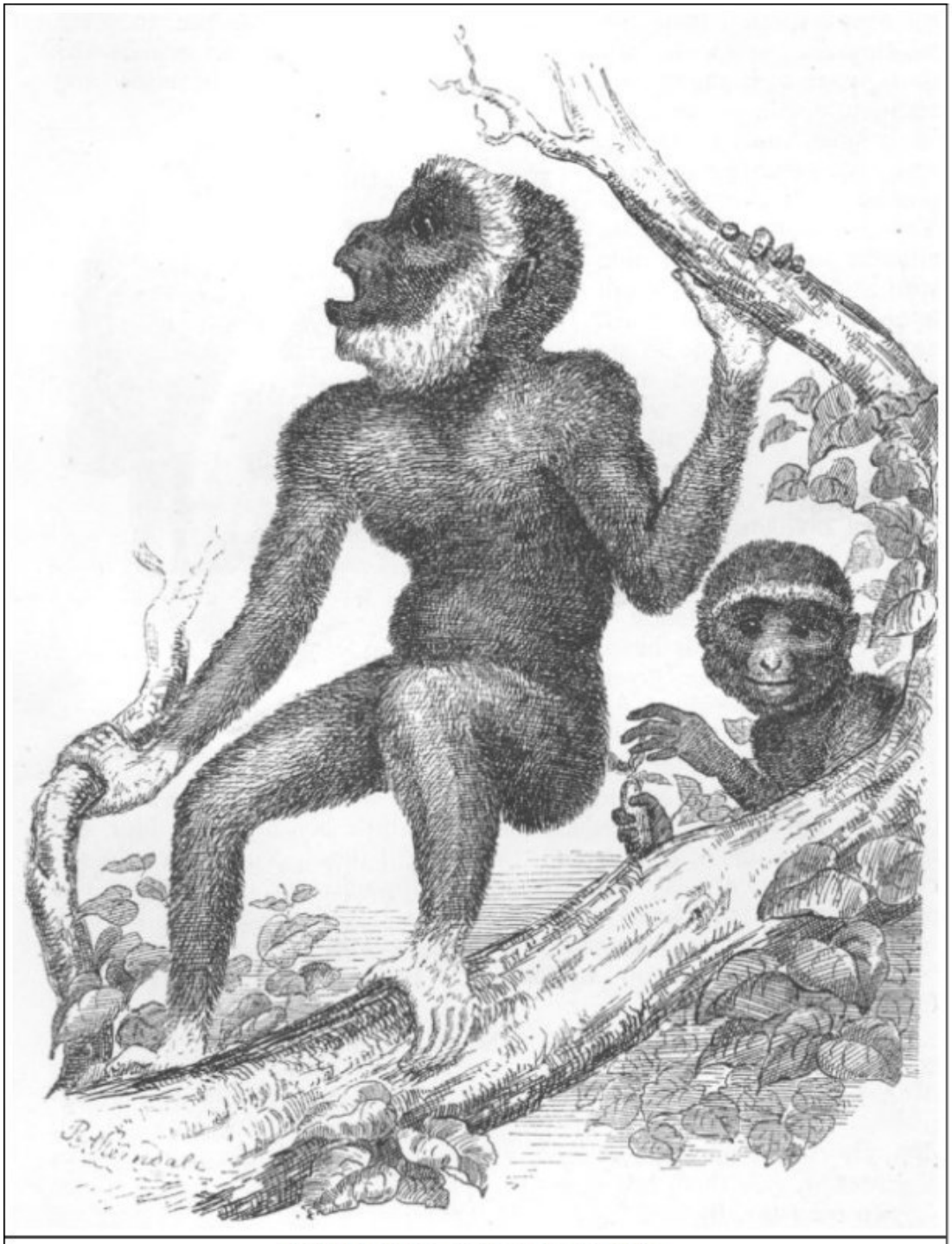
They are very fond of swinging by their long arms, and walk something like a tipsy sailor. A friend, resident on the frontiers of Assam, tells me that the full-grown adult pines and dies in confinement. I think it probable that it may miss a certain amount of insect diet, and would recommend those who cannot let their pets run loose in a garden to give them raw eggs and a little minced meat, and a spider or two occasionally.

In its wild state this Gibbon feeds on leaves, insects, eggs and small birds. Dr. Anderson notices the following as favourite leaves: *Moringa pterygosperma* (horse-radish tree), *Spondias mangifera* (amra), *Ficus religiosa* (the pipal), also *Beta vulgaris*; and it is specially partial to the *Ipomoea reptans* (the water convolvulus) and the bright-coloured flowers of the Indian shot (*Canna Indica*). Of insects it prefers spiders and the Orthoptera; eggs and small birds are also eagerly devoured.

NO. 2. HYLOBATES LAR

The White-handed Gibbon

HABITAT.—Arracan, Lower Pegu, Tenasserim, and the Malayan Peninsula.



HYLOBATES LAR. HYLOBATES HOOLUCK.

DESCRIPTION.—"This species is generally recognisable by its pale yellowish, almost white hands and feet, by the grey, almost white, supercilium, whiskers and beard, and by the deep black of the rest of the pelage."—*Anderson*.

SIZE.—About same as *H. hooluck*.

It is, however, found in every variety of colour, from black to brownish, and variegated with light-coloured patches, and occasionally of a fulvous white. For a long time I supposed it to be synonymous with *H. agilis* of Cuvier, or *H. variegatus* of Temminck, but both Mr. Blyth and Dr. Anderson separate it. Blyth mentions a significant fact in distinguishing the two Indian Gibbons,

whatever be their variations of colour, viz.: "*H. hooluck* has constantly a broad white frontal band either continuous or divided in the middle, while *H. lar* has invariably white hands and feet, less brightly so in some, and a white ring encircling the visage, which is seldom incomplete."[3]

H. lar has sometimes the index and middle fingers connected by a web, as in the case of *H. syndactylus* (a Sumatran species very distinct in other respects). The very closely allied *H. agilis* has also this peculiarity in occasional specimens. This Gibbon was called "*agilis*" by Cuvier from its extreme rapidity in springing from branch to branch. Duvaucel says: "The velocity of its movements is wonderful; it escapes like a bird on the wing. Ascending rapidly to the top of a tree, it then seizes a flexible branch, swings itself two or three times to gain the necessary impetus, and then launches itself forward, repeatedly clearing in succession, without effort and without fatigue, spaces of forty feet."

Sir Stamford Raffles writes that it is believed in Sumatra that it is so jealous that if in captivity preference be given to one over another, the neglected one will die of grief; and he found that one he had sickened under similar circumstances and did not recover till his rival (a Siamang, *H. syndactylus*) was removed.

NO. 3. HYLOBATES SYNDACTYLUS

The Siamang

HABITAT.—Tenasserim Province, Sumatra, Malayan Peninsula.

DESCRIPTION.—A more robust and thick-set animal than the two last; deep, woolly, black fur; no white supercilium nor white round the face. The skull is distinguished from the skull of the other Gibbons, according to Dr. Anderson, by the greater forward projection of the supraorbital ridges, and by its much deeper face, and the occipital region more abruptly truncated than in the other species. The index and middle toes of the foot are united to the last phalange.

SIZE.—About three feet.

This Gibbon is included in the Indian group on the authority of Helfer, who stated it to be found in the southern parts of the Tenasserim province. Blyth mentions another distinguishing characteristic —it is not only larger than the other Gibbons, but it possesses an inflatable laryngeal sac. Its arms are immense—five feet across in an adult of three feet high.

The other species of this genus inhabiting adjacent and other countries are *H. Pileatus* and *H. leucogenys* in Siam; *H. leuciscus*, Java; *H. Mulleri* and *H. concolor*, Borneo.

GENUS PRESBYTES—CUVIER'S GENUS SEMNOPITHECUS

These monkeys are characterised by their slender bodies and long limbs and tails. Jerdon says the Germans call them Slim-apes. Other striking peculiarities are the absence of cheek pouches, which, if present, are but rudimentary. Then they differ from the true monkeys (*Cercopithecus*) by the form of the last molar tooth in the lower jaw, which has five tubercles instead of four; and, finally, they are to be distinguished by the peculiar structure of the stomach, which is singularly complicated, almost as much so as in the case of Ruminants, which have four divisions. The stomach of this genus of monkey consists of three divisions: 1st, a simple cardiac pouch with smooth parietes; 2nd, a wide sacculated middle portion; 3rd, a narrow elongated canal, sacculated at first, and of simple structure towards the termination. Cuvier from this supposes it to be more herbivorous than other genera,

[3] There is an excellent coloured drawing by Wolf of these two Gibbons in the 'Proceedings of the Zoological Society,' 1870, page 86, from which I have partly adapted the accompanying sketch.

and considers this conclusion justified by the blunter tubercles of the molars and greater length of intestines and cæcum, all of which point to a vegetable diet. "The head is round, the face but little produced, having a high facial angle."—*Jerdon*.

But the *tout ensemble* of the *Langur* is so peculiar that no one who has once been told of a long, loosed-limbed, slender monkey with a prodigious tail, black face, with overhanging brows of long stiff black hair, projecting like a pent-house, would fail to recognise the animal.

The *Hanuman* monkey is reverenced by the Hindus. Hanuman was the son of Pavana, god of the winds; his strength was enormous, but in attempting to seize the sun he was struck by Indra with a thunderbolt which broke his jaw (*hanu*), whereupon his father shut himself up in a cave, and would not let a breeze cool the earth till the gods had promised his son immortality. Hanuman aided Rama in his attack upon Ceylon, and by his superhuman strength mountains were torn up and cast into the sea, so as to form a bridge of rocks across the Straits of Manar.[4]

The species of this genus of monkey abound throughout the Peninsula. All Indian sportsmen are familiar with their habits, and have often been assisted by them in tracking a tiger. Their loud whoops and immense bounds from tree to tree when excited, or the flashing of their white teeth as they gibber at their lurking foe, have often told the shikari of the whereabouts of the object of his search. The *Langurs* take enormous leaps, twenty-five feet in width, with thirty to forty in a drop, and never miss a branch. I have watched them often in the Central Indian jungles. Emerson Tennent graphically describes this: "When disturbed their leaps are prodigious, but generally speaking their progress is not made so much by *leaping* as by swinging from branch to branch, using their powerful arms alternately, and, when baffled by distance, flinging themselves obliquely so as to catch the lower boughs of an opposite tree, the momentum acquired by their descent being sufficient to cause a rebound of the branch that carries them upwards again till they can grasp a higher and more distant one, and thus continue their headlong flight."

Jerdon's statement that they can run with great rapidity on all-fours is qualified by McMaster, who easily ran down a large male on horseback on getting him out on a plain.

A correspondent of the *Asian*, quoting from the *Indian Medical Gazette* for 1870, states that experiments with one of this genus (*Presbytes entellus*) showed that strychnine has no effect on *Langurs*—as much as five grains were given within an hour without effect. "From a quarter to half of a grain will kill a dog in from five to ten minutes, and even one twenty-fourth of a grain will have a decided tetanic effect in human beings of delicate temperament."—*Cooley's Cycl*. Two days after *ten* grains of strychnine were dissolved in spirits of wine, and mixed with rum and water, cold but sweet, which the animal drank with relish, and remained unhurt.

The same experiment was tried with one of another genus (*Inuus rhesus*), who rejected the poisoned fruit at once, and on having strychnine in solution poured down his throat, died.

The *Langur* was then tried with cyanide of potassium, which he rejected at once, but on being forced to take a few grains, was dead in a few seconds.

Although we may not sympathize with those who practise such cruel experiments as these above alluded to, the facts elucidated are worth recording, and tend to prove the peculiar herbivorous nature of this genus, which, in common with other strictly herbivorous animals, instinctively knows what to choose and what to avoid, and can partake, without danger, of some of the most virulent vegetable poisons. It is possible that in the forests they eat the fruit of the *Strychnos nux-vomica*, which is also the favourite food of the pied hornbill (*Hydrocissa coronata*).

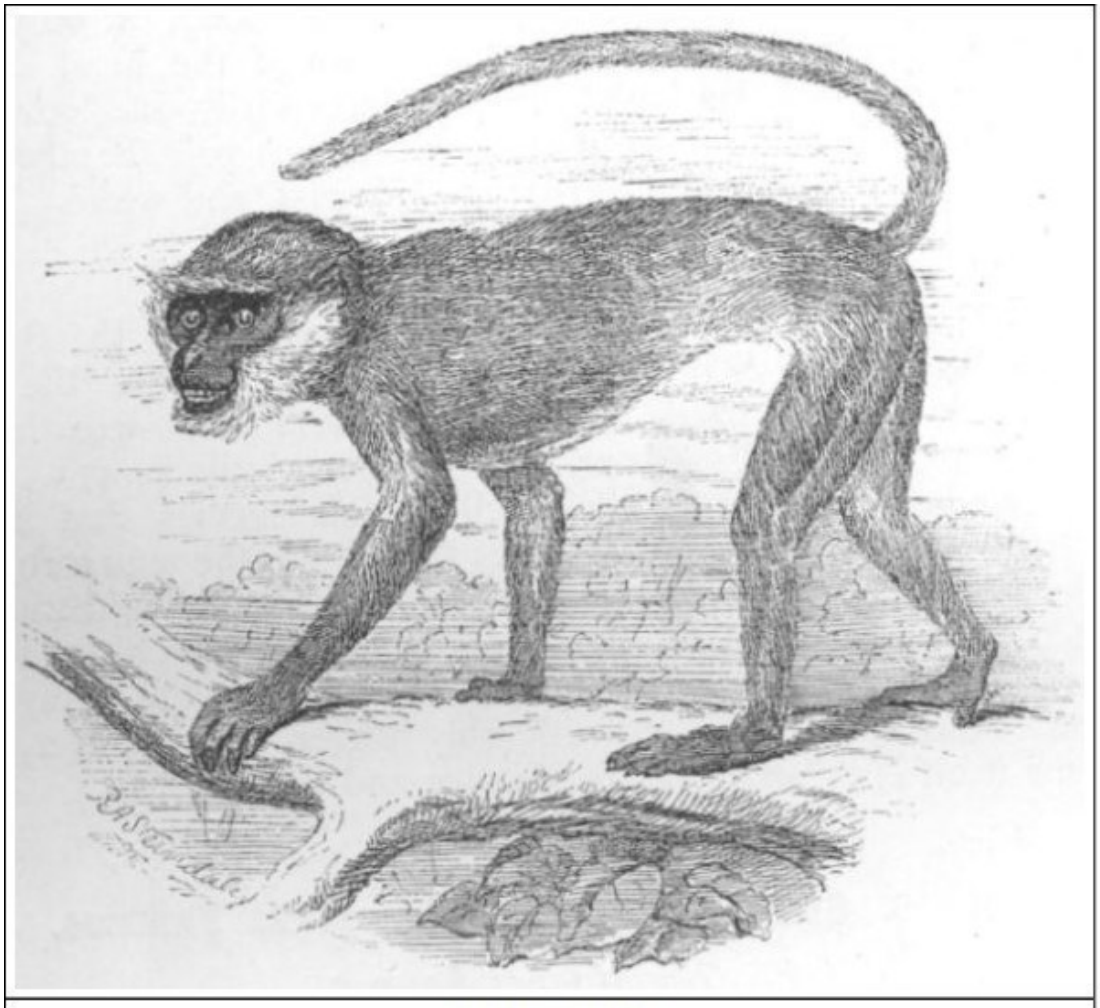
[4] The legend, with native picture, is given in Wilkin's 'Hindoo Mythology.'

NO. 4. SEMNOPITHECUS *vel* PRESBYTES ENTELLUS

The Bengal Langur (Jerdon's No. 1)

NATIVE NAMES.—*Langur*, *Hanuman*, Hindi; *Wanur* and *Makur*, Mahratti; *Musya*, Canarese.

HABITAT.—Bengal and Central India.



Presbytes entellus.

DESCRIPTION.—Pale dirty or ashy grey; darker on the shoulders and rump; greyish-brown on the tail; paler on the head and lower parts; hands and feet black.

SIZE.—Length of male thirty inches to root of tail; tail forty-three inches.

The *Entellus* monkey is in some parts of India deemed sacred, and is permitted by the Hindus to plunder their grain-shops with impunity; but I think that with increasing hard times the *Hanumans* are not allowed such freedom as they used to have, and in most parts of India I have been in they are considered an unmitigated nuisance, and the people have implored the aid of Europeans to get rid of their tormentors. In the forest the *Langur* lives on grain, fruit, the pods of leguminous trees, and young buds and leaves. Sir Emerson Tennent notices the fondness of an allied species for the flowers of the

red hibiscus (*H. rosa sinensis*). The female has usually only one young one, though sometimes twins. The very young babies have not black but light-coloured faces, which darken afterwards. I have always found them most difficult to rear, requiring almost as much attention as a human baby. Their diet and hours of feeding must be as systematically arranged; and if cow's milk be given it must be freely diluted with water—two-thirds to one-third milk when very young, and afterwards decreased to one-half. They are extremely susceptible to cold. In confinement they are quiet and gentle whilst young, but the old males are generally sullen and treacherous. Jerdon says, on the authority of the *Bengal Sporting Magazine* (August 1836), that the males live apart from the females, who have only one or two old males with each colony, and that they have fights at certain seasons, when the vanquished males receive charge of all the young ones of their own sex, with whom they retire to some neighbouring jungle. Blyth notices that in one locality he found only males of all ages, and in another chiefly females. I have found these monkeys mostly on the banks of streams in the forests of the Central Provinces; in fact, the presence of them anywhere in arid jungles is a sign that water is somewhere in the vicinity. They are timid creatures, and I have never seen the slightest disposition about them to show fight, whereas I was once most deliberately charged by the old males of a party of *Rhesus* monkeys. I was at the time on field service during the Mutiny, and, seeing several nursing mothers in the party, tried to run them down in the open and secure a baby; but they were too quick for me, and, on being attacked by the old males, I had to pistol the leader.

NO. 5. SEMNOPITHECUS *vel* PRESBYTES SCHISTACEUS.[5]

The Himalayan Langur (Jerdon's No. 2)

NATIVE NAMES.—*Langur*, Hindi; *Kamba Suhú*, Lepcha; *Kubup*, Bhotia.

HABITAT.—The whole range of the Himalayas from Nepal to beyond Simla.

DESCRIPTION (after Hodgson).—Dark slaty above; head and lower parts pale yellowish; hands concolorous with body, or only a little darker; tail slightly tufted; hair on the crown of the head short and radiated; on the cheeks long, directed backwards, and covering the ears. Hutton's description is, dark greyish, with pale hands and feet, white head, dark face, white throat and breast, and white tip to the tail.

SIZE.—About thirty inches; tail, thirty-six inches.

Captain Hutton, writing from Mussoorie, says: "On the Simla side I observed them also, leaping and playing about, while the fir-trees, among which they sported, were loaded with snow-wreaths, at an elevation of 11,000 feet."—'Jour. As. Soc. Beng.' xiii. p. 471.

Dr. Anderson remarks on the skull of this species, that it can be easily distinguished from *entellus* by its larger size, the supraorbital ridge being less forwardly projected, and not forming so thick and wide a pent roof, but the most marked difference lies in the much longer facial portion of *schistaceus*; the teeth are also larger; the symphysis or junction of the lower jaw is considerably longer and broader, and the lower jaw itself is generally more massive and deep.

[5] *Mr. J. Cockburn, of the Imperial Museum, has, since I wrote about the preceding species, given me some interesting information regarding the geographical distribution of Presbytes entellus* and *Hylobates hooluck*. He says: "The latter has never been known to occur on the north bank of the Brahmaputra, though swarming in the forests at the very water's edge on the south bank. The *entellus* monkey is also not found on the north bank of the Ganges, and attempts at its introduction have repeatedly failed." *P. schistaceus* replaces it in the Sub-Himalayan forests.

NO. 6. SEMNOPITHECUS *vel* PRESBYTES PRIAMUS

The Madras Langur

NATIVE NAME.—*Gandangi*, Telugu.

HABITAT.—The Coromandel Coast and Ceylon.

DESCRIPTION.—Ashy grey, with a pale reddish or *chocolat-au-lait* tint overlying the whole back and head; sides of the head, chin, throat, and beneath pale yellowish; hands and feet whitish; face, palms and fingers, and soles of feet and toes black; hair long and straight, not wavy; tail of the colour of the darker portion of the back, ending in a whitish tuft.—*Jerdon*.

SIZE.—About the same as *P. entellus*.

Blyth, who is followed by Jerdon, describes this monkey as having a compressed high vertical crest, but Dr. Anderson found that the specimens in the Indian Museum owed these crests to bad stuffing. Kellaart, however, mentions it, and calls the animal "the Crested Monkey." In Sir Emerson Tennent's figure of *P. priamus* a slight crest is noticeable; but Kellaart is very positive on this point, saying: "*P. priamus* is easily distinguished from all other known species of monkeys in Ceylon by its high compressed vertical crest."

Jerdon says this species is not found on the Malabar Coast, but neither he nor McMaster give much information regarding it. Emerson Tennent writes: "At Jaffna, and in other parts of the island where the population is comparatively numerous, these monkeys become so familiarised with the presence of man as to exhibit the utmost daring and indifference. A flock of them will take possession of a palmyra palm, and so effectually can they crouch and conceal themselves among the leaves that, on the slightest alarm, the whole party becomes invisible in an instant. The presence of a dog, however, excites such irrepressible curiosity that, in order to watch his movements, they never fail to betray themselves. They may be frequently seen congregated on the roof of a native hut; and, some years ago, the child of a European clergyman, stationed near Jaffna, having been left on the ground by the nurse, was so teased and bitten by them as to cause its death."

In these particulars this species resembles *P. entellus*.

NO. 7. SEMNOPITHECUS *vel* PRESBYTES JOHNII

The Malabar Langur (Jerdon's No. 4)

HABITAT.—The Malabar Coast, from N. Lat. 14° or 15° to Cape Comorin.

DESCRIPTION.—Above dusky brown, slightly paling on the sides; crown, occiput, sides of head and beard fulvous, darkest on the crown; limbs and tail dark brown, almost black; beneath yellowish white.—*Jerdon*.

SIZE.—Not quite so large as *P. entellus*.

This monkey was named after a member of the Danish factory at Tranquebar, M. John, who first described it. It abounds in forests, and does not frequent villages, though it will visit gardens and fields, where, however, it shuns observation.

The young are of a sooty brown, or nearly black, without any indication of the light-coloured hood of the adult.

NO. 8. SEMNOPITHECUS *vel* PRESBYTES JUBATUS

The Nilgheri Langur (Jerdon's No. 5)

HABITAT.—The Nilgheri Hills, the Animallies, Pulneys, the Wynaad, and all the higher parts of the range of the Ghâts as low as Travancore.

DESCRIPTION.—Dark glossy black throughout, except head and nape, which are reddish brown; hair very long; in old individuals a greyish patch on the rump.—*Jerdon*.

SIZE.—Length of head and body, 26 inches; tail, 30.

This monkey does not, as a rule, descend lower than 2,500 to 3,000 feet; it is shy and wary. The fur is fine and glossy, and is much prized (Jerdon). Its flesh is excellent food for dogs (McMaster).

Dr. Anderson makes this synonymous with the last.

NO. 9. SEMNOPITHECUS *vel* PRESBYTES PILEATUS

The Capped Langur

HABITAT.—Assam, Chittagong, Tipperah.

DESCRIPTION.—General colour dark ashy grey, with a slight ferruginous tint; darker near head and on shoulders; underneath and on the inside of the limbs pale yellowish, with a darker shade of orange or golden yellow on the breast and belly. The crown of the head is densely covered with bristly hairs, regularly disposed and somewhat elongated on the vertex so as to resemble a cap, whence the name. Along the forehead is a superciliary crest of long black bristles, directed outwardly; whiskers full and down to the chin: behind the ears is a small tuft of white hairs; the tail is long, one third longer than the body, darker near the end, and tufted; fingers and toes black.

SIZE.—A little smaller than *P. entellus*.

This monkey is found in Northern Assam, Tipperah and southwards to Tenasserim; in Blyth's 'Catalogue of the Mammals of Burmah' it is mentioned as *P. chrysogaster* (*Semnopithecus potenziani* of Bonaparte and Peters). He writes of it: "Females and young have the lower parts white, or but faintly tinted with ferruginous, and the rest of the coat is of a pure grey; the face black, and there is no crest, but the hairs of the crown are so disposed as to appear like a small flat cap laid upon the top of the head. The old males seem always to be of a deep rust-colour on the cheeks, lower parts, and more or less on the outer side of the limbs; while in old females this rust colour is diluted or little more than indicated."

Dr. Anderson says that a young one he had was of a mild disposition, which however is not the character of the adult animal, which is uncertain, and the males when irritated are fierce, and determined in attack. No rule, however, is without its exception, for one adult male, possessed by Blyth, is reported as having been an exceeding gentle animal.

NO. 10. SEMNOPITHECUS *vel* PRESBYTES BARBEI

The Tipperah Langur

HABITAT.—Tipperah, Tenasserim.

DESCRIPTION.—No vertical crest of hair on the head, nor is the occipital hair directed downwards, as in the next species. Shoulders and outside of arm silvered; tail slightly paler than body, "which is of a blackish fuliginous hue."

More information is required about this monkey, which was named by Blyth after its donor to the Asiatic Society, the Rev. J. Barbe. Blyth considered it as distinct from *P. Phayrei* and *P. obscurus*, which last is from Malacca.

Dr. Anderson noticed it in the valley of the Tapeng in the centre of the Kakhyen Hills, in troops of thirty to fifty, in high forest trees overhanging the mountain streams. Being seldom disturbed, they permitted a near approach.

NO. 11. SEMNOPITHECUS *vel* PRESBYTES PHAYREI

Syn.—SEMNOPITHECUS CRISTATUS

The Silvery-Leaf Monkey (Blyth)

HABITAT.—Arracan, Malayan Peninsula, Sumatra, Borneo.

DESCRIPTION.-Colour dusky grey-brown above, more or less dark, with black hands and feet; a conspicuous crest on the vertex; under parts white, scarcely extending to the inside of the limbs; sides grey like the back; whiskers dark, very long, concealing the ears in front; lips and eyelids conspicuously white, with white moustachial hairs above and similar hairs below.

SIZE.—Two feet; tail, 2 feet 6 inches.

This monkey was named by Blyth after Captain (now Sir Arthur) Phayre, who first brought it to his notice; but he afterwards reconciled it as being synonymous with *Semnopithecus cristatus*. The colouring, according to different authors, seems to vary considerably, which causes some confusion in description. It differs from an allied species, *S. maurus*, in selecting low marshy situations near the banks of streams. Its favourite food is the fruit of the Nibong palm (*Oncosperma filamentosa*).

NO. 12. SEMNOPITHECUS *vel* PRESBYTES OBSCURUS

The Dusky-Leaf Monkey

HABITAT.—Mergui and the Malayan Peninsula.

DESCRIPTION.—Adults ashy or brownish black, darker on forehead, sides of face, shoulder, and sides of body; the hair on the nape is lengthened and whitish. The newly-born young are of a golden ferruginous colour, which afterward changes to dusky-ash colour, the terminal half of the tail being last to change; the mouth and eyelids are whitish, but the rest of the face black.

SIZE.—Body, 1 foot 9 inches; tail, 2 feet 8 inches.

This monkey is most common in the Malayan Peninsula, but has been found to extend to Mergui, where Blyth states it was procured by the late Major Berdmore. Dr. Anderson says it is not unfrequently offered for sale in the Singapore market.

NO. 13. SEMNOPITHECUS *vel* PRESBYTES CEPHALOPTERUS

The Ceylon Langur

NATIVE NAME.—*Kallu Wanderu*.

HABITAT.—The low lands of Ceylon.

DESCRIPTION.—General colour cinereous black; croup and inside of thighs whitish; head rufescent brown; hair on crown short, semi-erect; occipital hairs long, albescent; whiskers white, thick and long, terminating at the chin in a short beard, and laterally angularly pointed; upper lip thinly fringed with white hairs; superciliary hairs black, long, stiff and standing erect; tail albescent and terminating in a beard tuft; face, palms, soles, fingers, toes and callosities black; irides brown. —*Kellaart*.

SIZE.—Length, 20 inches; tail 24 inches.

Sir E. Tennent says of this monkey that it is never found at a higher elevation than 1,300 feet (when it is replaced by the next species).

"It is an active and intelligent creature, little larger than the common bonneted macaque, and far from being so mischievous as others of the monkeys in the island. In captivity it is remarkable for the gravity of its demeanour and for an air of melancholy in its expression and movements, which are completely in character with its snowy beard and venerable aspect. In disposition it is gentle and confiding, sensible in the highest degree of kindness, and eager for endearing attention, uttering a low plaintive cry when its sympathies are excited. It is particularly cleanly in its habits when domesticated, and spends much of its time in trimming its fur and carefully divesting its hair of particles of dust. Those which I kept at my house near Colombo were chiefly fed upon plantains and bananas, but for nothing did they evince a greater partiality than the rose-coloured flowers of the red hibiscus (*H. rosa sinensis*). These they devoured with unequivocal gusto; they likewise relished the leaves of many other trees, and even the bark of a few of the more succulent ones."

NO. 14. SEMNOPITHECUS *vel* PRESBYTES URSINUS

The Great Wanderu

NATIVE NAME.—*Maha Wanderu*.

HABITAT.—The mountainous district of Ceylon.

DESCRIPTION.—Fur long, almost uniformly greyish black; whiskers full and white; occiput and croup in old specimens paler coloured; hands and feet blackish; tail long, getting lighter towards the lower half. The young and adults under middle age have a rufous tint, corresponding with that of the head of all ages.

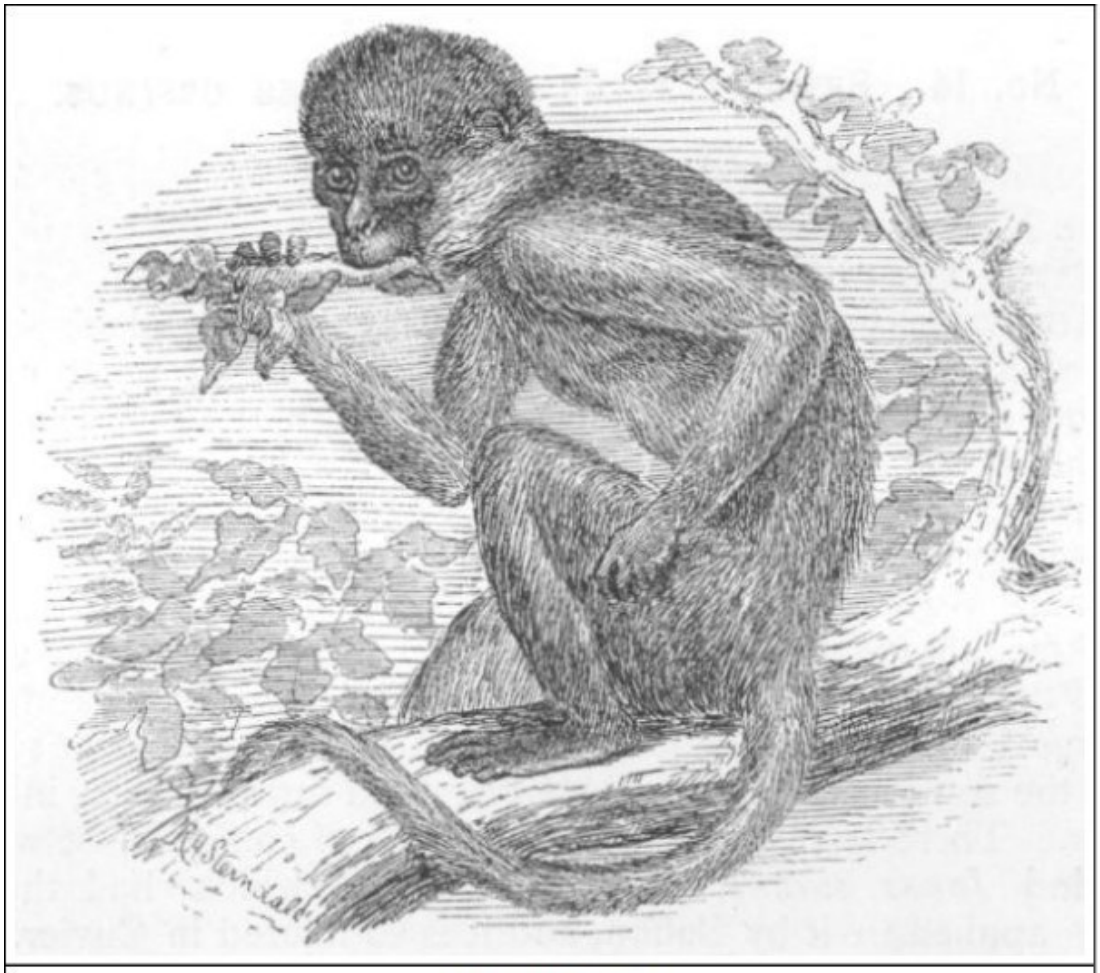
SIZE.—Body about 22 inches; tail, 26 inches.

The name Wanderu is a corruption of the Singhalese generic word for monkey, *Ouandura*, or *Wandura*, which bears a striking resemblance to the Hindi *Bandra*, commonly called *Bandar*—*b* and *v* being interchangeable—and is evidently derived from the Sanscrit *Banur*, which in the south

again becomes *Wanur*, and further south, in Ceylon, *Wandura*. There has been a certain amount of confusion between this animal and *Inuus silenus*, the lion monkey, which had the name *Wanderu* applied to it by Buffon, and it is so figured in Cuvier. They are both large monkeys, with great beards of light coloured hair, but in no other respect do they resemble. Sir Emerson Tennent says: "It is rarely seen by Europeans, this portion of the country having till very recently been but partially opened; and even now it is difficult to observe its habits, as it seldom approaches the few roads which wind through these deep solitudes. At early morning, ere the day begins to dawn, its loud and peculiar howl, which consists of quick repetition of the sound *how-how!* may be frequently heard in the mountain jungles, and forms one of the characteristic noises of these lofty situations." This was written in 1861; since then much of the mountainous forest land has been cleared for coffee-planting, and the Wanderu either driven into corners or become more familiarised with man. More therefore must be known of its habits by this time, and information regarding it is desirable.

NO. 15. SEMNOPITHECUS *vel* PRESBYTES THERSITES

NATIVE NAME.—*Ellee Wanderu* (Kellaart).
HABITAT.—Ceylon.



Presbytes thersites.

DESCRIPTION.—Chiefly distinguished from the others by wanting the head tuft; uniform dusky grey, darker on crown and fore-limbs; slaty brown on wrists and hands; hair on toes whitish; whiskers and beard largely developed and conspicuously white.

The name was given by Blyth to a single specimen forwarded by Dr. Templeton, and it was for a time doubtful whether it was really a native, till Dr. Kellaart procured a second. Dr. Templeton's specimen was partial to fresh vegetables, plantains, and fruit, but he ate freely boiled rice, beans, and gram. He was fond of being noticed and petted, stretching out his limbs in succession to be scratched, drawing himself up so that his ribs might be reached by the finger, closing his eyes during the operation, and evincing his satisfaction by grimaces irresistibly ludicrous.—*Emerson Tennent*.

Dr. Anderson considers this monkey as identical with *Semnopithecus priamus*, but Kellaart, as I have before stated, is very positive on the point of difference, calling *S. priamus* emphatically the crested monkey, and alleging that *thersites* has no crest, and it is probable he had opportunities of observing the two animals in life; he says he had a young specimen of *priamus*, which distinctly showed the crest, and a young *thersites* of the same age which showed no sign of it.

In Emerson Tennent's 'Natural History of Ceylon,' (1861) page 5, there is a plate of a group in which are included *priamus* and *thersites*; in the original they are wrongly numbered—the former should be 2 and not 3, and the latter 3 and not 2. If these be correct (and Wolf's name should be a voucher for their being so) there is a decided difference. There is no crest in the latter, and the white whiskers terminate abruptly on a level with the eyebrow, and the superciliary ridge of hair is wanting.

NO. 16. SEMNOPITHECUS *vel* PRESBYTES ALBINUS (*Kellaart*)

The White Langur

HABITAT.—Ceylon, in the hills beyond Matelle.

DESCRIPTION.—Fur dense, sinuous, nearly of uniform white colour, with only a slight dash of grey on the head; face and ears black; palm, soles, fingers and toes flesh-coloured; limbs and body the shape of *P. ursinus*; long white hairs prolonged over the toes and claws, giving the appearance of a white spaniel dog to this monkey; irides brown; whiskers white, full, and pointed laterally.—*Kellaart*.

The above description was taken by Dr. Kellaart from a living specimen. He considered it to be a distinct species, and not an Albino, from the black face and ears and brown eyes.

The Kandyans assured him that they were to be seen (rarely however) in small parties of three and four over the hills beyond Matelle, but never in company with the dark kind.

Emerson Tennent also mentions one that was brought to him taken between Ambepasse and Kornegalle, where they were said to be numerous; except in colour it had all the characteristics of *P. cephalopterus*. So striking was its whiteness that it might have been conjectured to be an Albino, but for the circumstance that its eyes and face were black. An old writer of the seventeenth century, Knox, says of the monkeys of Ceylon (where he was captive for some time) that there are some "milk-white in body and face, but of this sort there is not such plenty."—*Tennent's 'Natural History of Ceylon,' page 8*.

NOTE.—Since the above was in type I have found in the List of Animals in the Zoological Society's Gardens, a species entered as *Semnopithecus leucoprymnus*, the Purple-faced Monkey from Ceylon—see P.Z.S.

PAPIONINÆ

This sub-family comprises the true baboons of Africa and the monkey-like baboons of India. They have the stomach simple, and cheek-pouches are always present. According to Cuvier they possess, like the last family, a fifth tubercle on their last molars. They produce early, but are not completely adult for four or five years; the period of gestation is seven months.

The third sub-family of *Simiadæ* consists of the genera *Cercopithicus*, *Macacus*, and *Cynocephalus*, as generally accepted by modern zoologists, but Jerdon seems to have followed Ogilby in his classification, which merges the long-tailed Macaques into *Cercopithecus*, and substituting *Papio* for the others.

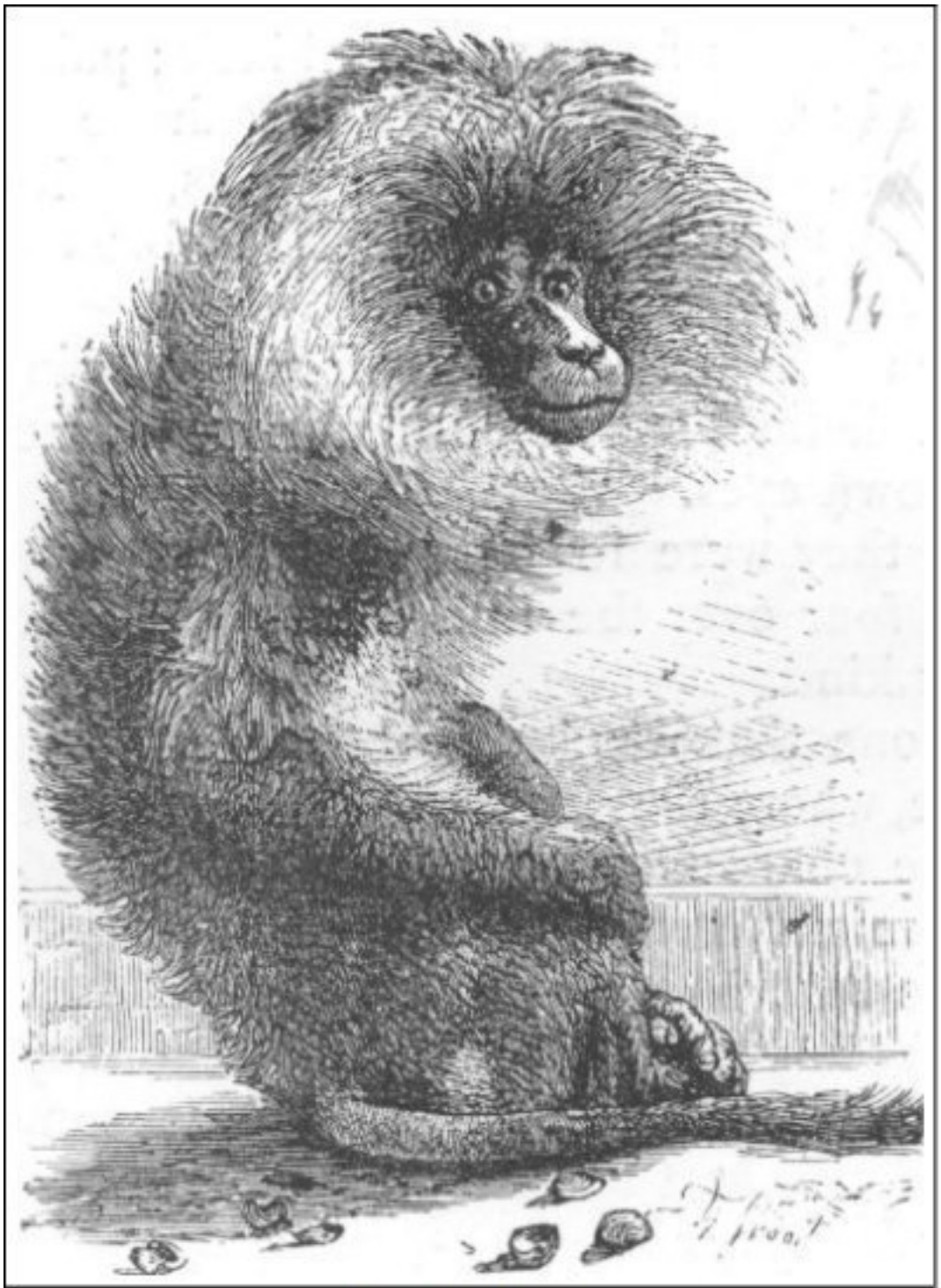
GENUS INUUS

Cuvier applies this term to the Magots or rudimentary-tailed Macaques. The monkeys of this genus are more compactly built than those of the last. They are also less herbivorous in their diet, eating frogs, lizards, crabs and insects, as well as vegetables and fruit. Their callosities and cheek-pouches are large, and they have a sac which communicates with the larynx under the thyroid cartilage, which fills with air when they cry out.

Some naturalists of the day, however, place all under the generic name Macacus.

NO. 17. INUUS *vel* MACACUS SILENUS

The Lion Monkey (Jerdon's No. 6)



Macacus silenus.

NATIVE NAMES.—*Nil bandar*, Bengali; *Shia bandar*, Hindi; *Nella manthi*, Malabari.

HABITAT.—The Western Ghâts of India from North Lat. 14° to the extreme south, but most abundant in Cochin and Travancore (*Jerdon*), also Ceylon (*Cuvier* and *Horsfield*), though not confirmed by Emerson Tennent, who states that the *silenus* is not found in the island except as introduced by Arab horse-dealers occasionally, and that it certainly is not indigenous. Blyth was also assured by Dr. Templeton of Colombo that the only specimens there were imported.

DESCRIPTION.—Black, with a reddish-white hood or beard surrounding the face and neck; tail with a tuft of whitish hair at the tip; a little greyish on the chest.

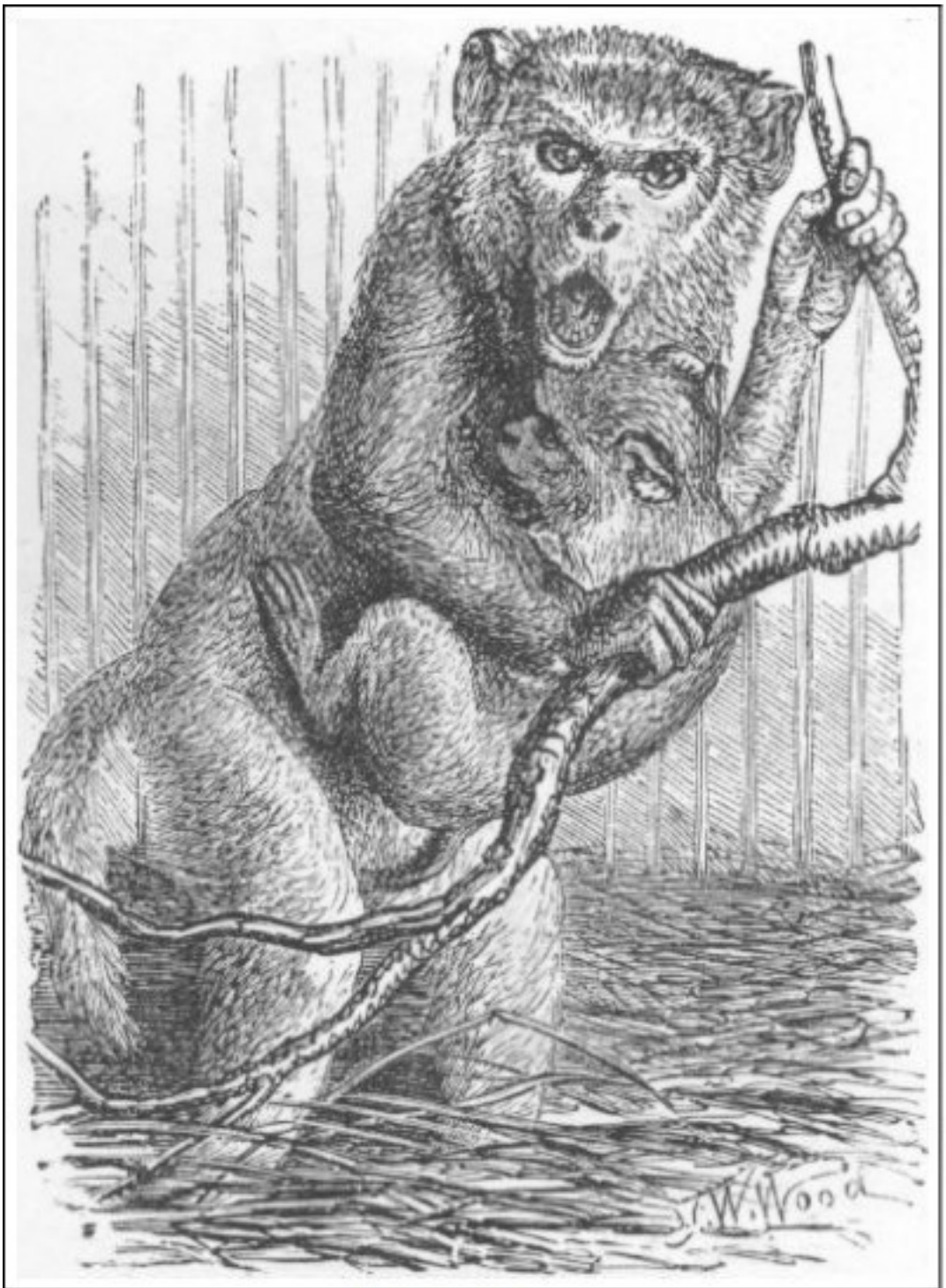
SIZE.—About 24 inches; tail, 10 inches.

There is a plate of this monkey in Carpenter and Westwood's edition of Cuvier, under the mistaken name of *Wanderoo*.

It is somewhat sulky and savage, and is difficult to get near in a wild state. Jerdon states that he met with it only in dense unfrequented forest, and sometimes at a considerable elevation. It occurs in troops of from twelve to twenty.

NO. 18. INUUS *vel* MACACUS RHESUS

The Bengal Monkey (Jerdon's No. 7)



Macacus rhesus.

NATIVE NAMES.—*Bandar*, Hindi; *Markot*, Bengali; *Suhu*, Lepcha, *Piyu*, Bhotia.

HABITAT.—India generally from the North to about Lat. 18° or 19°; but not in the South, where it is replaced by *Macacus radiatus*.

DESCRIPTION.—Above brownish ochrey or rufous; limbs and beneath ashy-brown; callosities and adjacent parts red; face of adult males red.

SIZE.—Twenty-two inches; tail 11 inches.

This monkey is too well-known to need description. It is the common acting monkey of the *bandar-wallas*, the delight of all Anglo-Indian children, who go into raptures over the romance of *Munsur-ram* and *Chameli*, their quarrels, parting, and reconciliation, so admirably acted by these miniature comedians.

NOTE.—For *Macacus rheso-similis*, Sclater, see P.Z.S. 1872, p. 495, pl. xxv., also P.Z.S. 1875, p. 418.

NO. 19. INUUS *vel* MACACUS PELOPS

Syn.—MACACUS ASSAMENSIS

The Hill Monkey (Jerdon's No. 8)

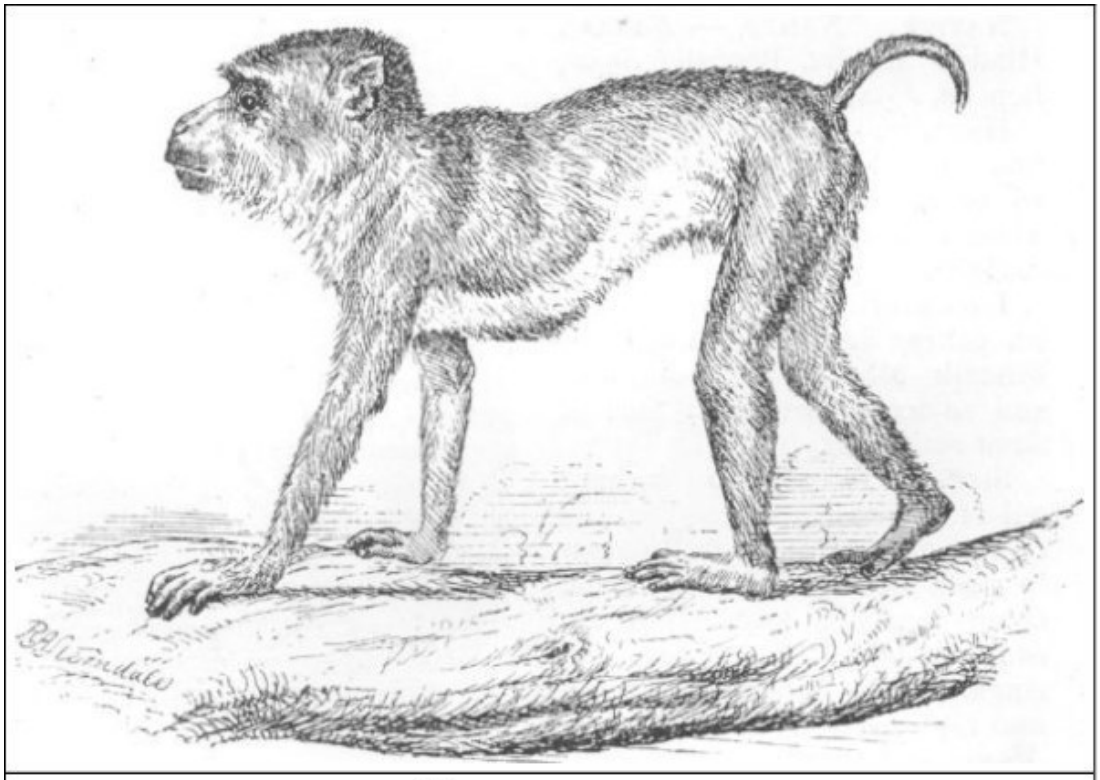
HABITAT.—The Himalayan ranges and Assam.

DESCRIPTION.—Brownish grey, somewhat mixed with slaty, and rusty brownish on the shoulders in some; beneath light ashy brown; fur fuller and more wavy than in *rhesus*; canine teeth long; of stout habit; callosities and face less red than in the last species (*Jerdon*). Face flesh-coloured, but interspersed with a few black hairs (*McClelland*).

NO. 20. INUUS *vel* MACACUS NEMESTRINUS

The Pig-tailed Monkey

HABITAT.—Tenasserim and the Malay Archipelago.



Macacus nemestrinus.

DESCRIPTION.—General colour grizzled brown; the piles annulated with dusky and fulvous; crown darker, and the middle of the back also darker; the hair lengthened on the fore-quarters; the back stripe extends along the tail, becoming almost black; the tail terminates in a bright ferruginous tuft. This monkey is noted for its docility, and in Bencoolen is trained to be useful as well as amusing. According to Sir Stamford Raffles it is taught to climb the cocoa palms for the fruit for its master, and to select only those that are ripe.

NO. 21. INUUS *vel* MACACUS LEONINUS

The Long-haired Pig-tailed Monkey

HABITAT.—Arracan.

DESCRIPTION.—A thick-set powerful animal, with a broad, rather flattened head above, and a moderately short, well clad, up-turned tail, about one-third the length of the body and head; the female smaller.—*Anderson*.

Face fleshy brown; whitish round the eyes and on the forehead; eyebrows brownish, a narrow reddish line running out from the external angle of the eye. The upper surface of the head is densely covered with short dark fur, yellowish brown, broadly tipped with black; the hair radiating from the vertex; on and around the ear the hair is pale grey; above the external orbital angle and on the sides of the face the hair is dense and directed backwards, pale greyish, obscurely annulated with dusky brown, and this is prolonged downwards to the middle of the throat. On the shoulders, back of the neck, and upper part of the thighs, the hairs are very long, fully three inches in the first-mentioned localities; the basal halves greyish; and the remainder ringed with eleven bands of dark brown and orange; the tips being dark. The middle and small of the back is almost black, the shorter hair there

being wholly dark; and this colour is prolonged on the tail, which is tufted. The hair on the chest is annulated, but paler than on the shoulders, and it is especially dense on the lower part. The lower halves of the limbs are also well clad with annulated fur, like their outsides, but their upper halves internally and the belly are only sparsely covered with long brownish grey plain hairs, not ringed.

The female differs from the male in the absence of the black on the head and back, and in the hair of the under parts being brownish grey, without annulations. The shoulders somewhat brighter than the rest of the fur, which is yellowish olive; greyish olive on outside of limbs; dusky on upper surface of hands and feet; and black on upper surface of tail.

SIZE.—Length of male, head and body 23 inches; tail, without hair, 8 inches; with hair 10 inches.

The above description is taken from Dr. Anderson's account, 'Anat. and Zool. Res.,' where at page 54 will be found a plate of the skull showing the powerful canine teeth. Blyth mentions a fine male with hair on the shoulders four to five inches long.

NO. 22. INUUS *vel* MACACUS ARCTOIDES

The Brown Stump-tailed Monkey

HABITAT.—Cachar, Kakhyen Hills, east of Bhamo.

DESCRIPTION.—Upper surface of head and along the back dark brown, almost blackish; sides and limbs dark brown; the hair, which is very long, is ringed with light yellowish and dark brown, darker still at the tips; face red; tail short and stumpy, little over an inch long.

This monkey is one over which many naturalists have argued; it is synonymous with *Macacus speciosus*, *M. maurus*, *M. melanotus*, and was thought to be with *M. brunneus* till Dr. Anderson placed the latter in a separate species on account of the non-annulation of its hair. It is essentially a denizen of the hills; it has been obtained in Cachar and in Upper Assam. Dr. Anderson got it in the Kakhyen Hills on the frontier of Yunnan, beyond which, he says, it spreads to the southeast to Cochin-China.

NO. 23. INUUS *vel* MACACUS THIBETANUS

The Thibetan Stump-tailed Monkey

DESCRIPTION.—Head large and whiskered; form robust; tail stumpy and clad; general colour of the animal brown; whiskers greyish; face nude and flesh-coloured, with a deep crimson flush round the eyes.

SIZE.—Two feet 9 inches; tail about 3 inches.

This large monkey, though not belonging to British India, inhabiting, it is said, "the coldest and least accessible forests of Eastern Thibet," is mentioned here, as the exploration of that country by travellers from India is attracting attention.

GENUS MACACUS

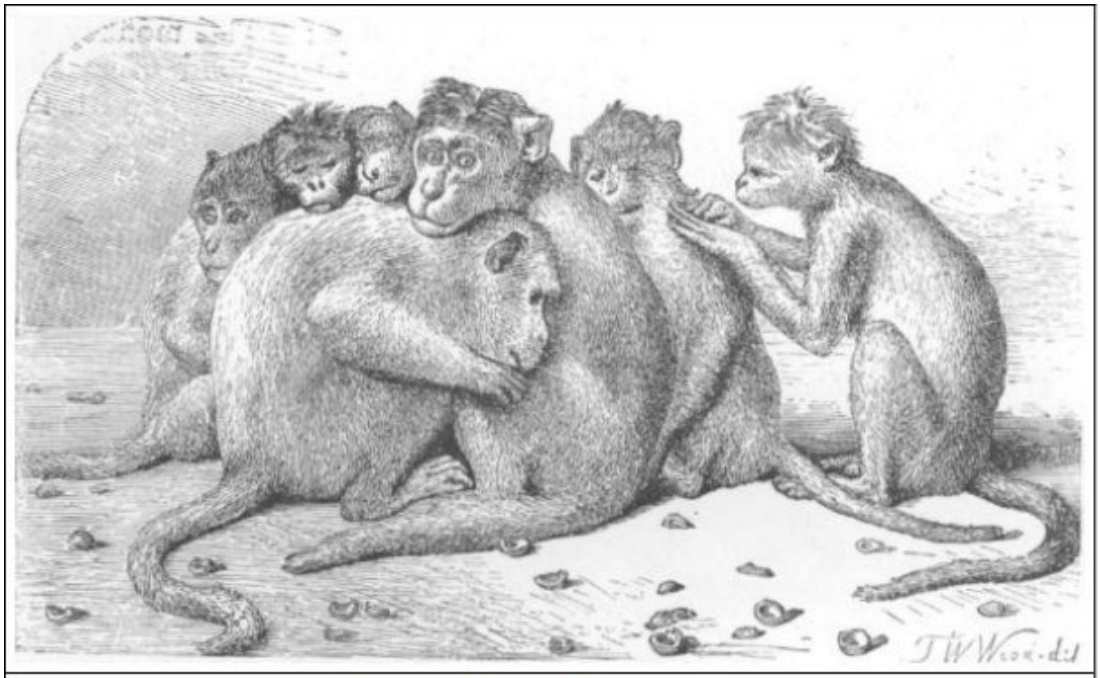
Tail longer than in *Inuus*, and face not so lengthened; otherwise as in that genus.—*Jerdon*.

NO. 24. MACACUS RADIATUS

The Madras Monkey (Jerdon's No. 9)

NATIVE NAMES.—*Bandar*, Hindi; *Makadu* or *Wanur*, Mahratti; *Kerda mahr* of the Ghâts; *Munga*, Canarese; *Koti*, Telegu; *Vella munthi*, Malabar.

HABITAT.—All over the southern parts of India, as far north as lat. 18°.



Macacus radiatus and *Macacus pileatus*.

DESCRIPTION.—Of a dusky olive brown, paler and whitish underneath, ashy on outer sides of limbs; tail dusky brown above, whitish beneath; hairs on the crown of the head radiated.

SIZE.—Twenty inches; tail 15 inches.

Elliott remarks of this monkey that it inhabits not only the wildest jungles, but the most populous towns, and it is noted for its audacity in stealing fruit and grain from shops. Jerdon says: "It is the monkey most commonly found in menageries, and led about to show various tricks and feats of agility. It is certainly the most inquisitive and mischievous of its tribe, and its powers of mimicry are surpassed by none." It may be taught to turn a wheel regularly; it smokes tobacco without inconvenience.—*Horsfield*.

NO. 25. MACACUS PILEATUS (*vel* SINICUS, *Lin.*)

The Capped Monkey, or *Bonneted Macaque* of *Cuvier*

NATIVE NAME.—*Rilawa*, Singhalese.

HABITAT.—Ceylon and China.

DESCRIPTION.—Yellowish brown, with a slight shade of green in old specimens; in some the back is light chestnut brown; yellowish brown hairs on the crown of the head, radiating from the centre to the circumference; face flesh-coloured and beardless; ears, palms, soles, fingers, and toes blackish; irides reddish brown; callosities flesh-coloured; tail longish, terminating in short tuft.—*Kellaart*.

SIZE.—Head and body about 20 inches; tail 18 inches.

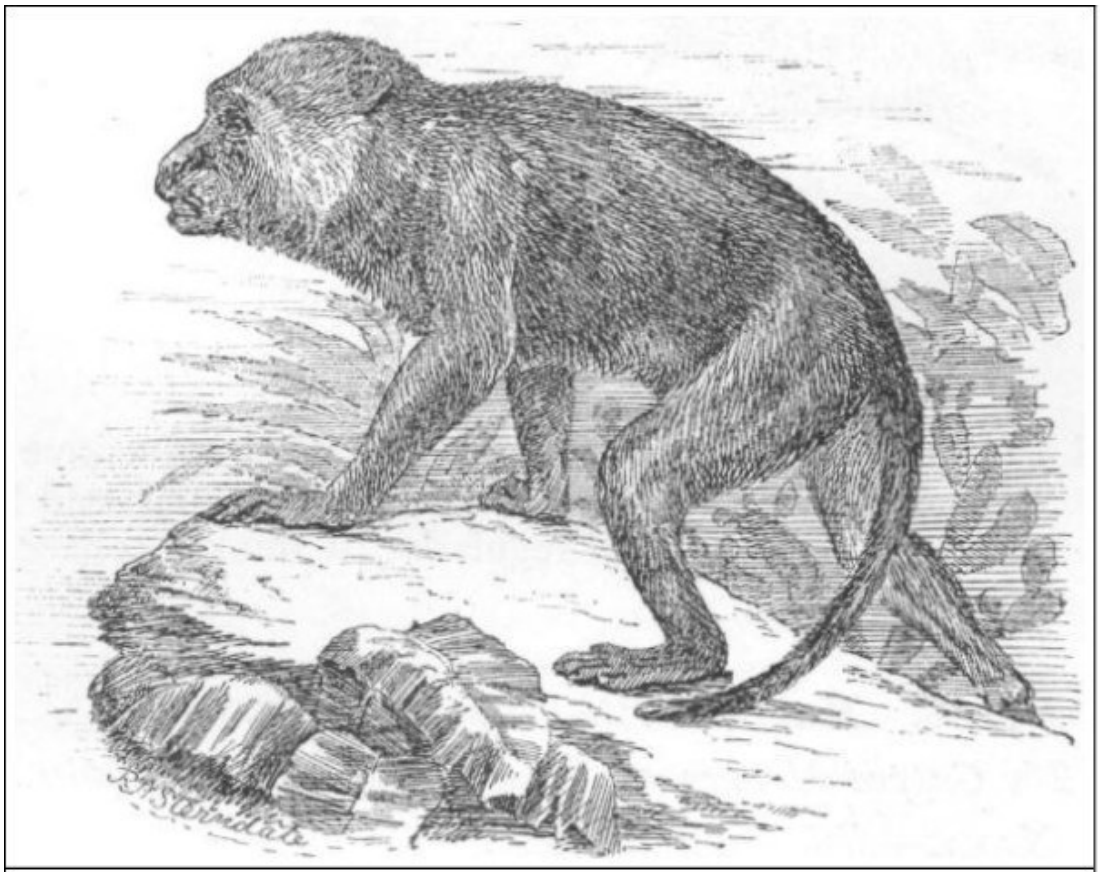
This is the *Macacus sinicus* of Cuvier, and is very similar to the last species. In Ceylon it takes the place of our rhesus monkey with the conjurors, who, according to Sir Emerson Tennent, "teach it to dance, and in their wanderings carry it from village to village, clad in a grotesque dress, to exhibit its lively performances." It also, like the last, smokes tobacco; and one that belonged to the captain of a tug steamer, in which I once went down from Calcutta to the Sandheads, not only smoked, but chewed tobacco. Kellaart says of it: "This monkey is a lively, spirited animal, but easily tamed; particularly fond of making grimaces, with which it invariably welcomes its master and friends. It is truly astonishing to see the large quantity of food it will cram down its cheek pouches for future mastication."

NO. 26. MACACUS CYNOMOLGUS

The Crab-eating Macaque

NATIVE NAME.—*Kra*, Malay.

HABITAT.—Tenasserim, Nicobars, Malay Archipelago.



Macacus cynomolgus.

DESCRIPTION.—"The leading features of this animal are its massive form, its large head closely set on the shoulders, its stout and rather short legs, its slender loins and heavy buttocks, its tail thick at the base" (Anderson). The general colour is similar to that of the Bengal rhesus monkey, but the skin of the chest and belly is bluish, the face livid, with a white area between the eyes and white eyelids. Hands and feet blackish.

SIZE.—About that of the Bengal rhesus.

According to Captain (now Sir Arthur) Phayre "these monkeys frequent the banks of salt-water creeks and devour shell-fish. In the cheek-pouch of the female were found the claws and body of a crab. There is not much on record concerning the habits of this monkey in its wild state beyond what is stated concerning its partiality for crabs, which can also, I believe, be said of the rhesus in the Bengal Sunderbunds."

NO. 27. MACACUS CARBONARIUS

The Black-faced Crab-eating Monkey

HABITAT.—Burmah.

DESCRIPTION.—In all respects the same as the last, except that its face is blackish, with conspicuously white eyelids.

FAMILY LEMURIDÆ

The Indian members of this family belong to the sub-family named by Geoffroy *Nycticebinæ*.

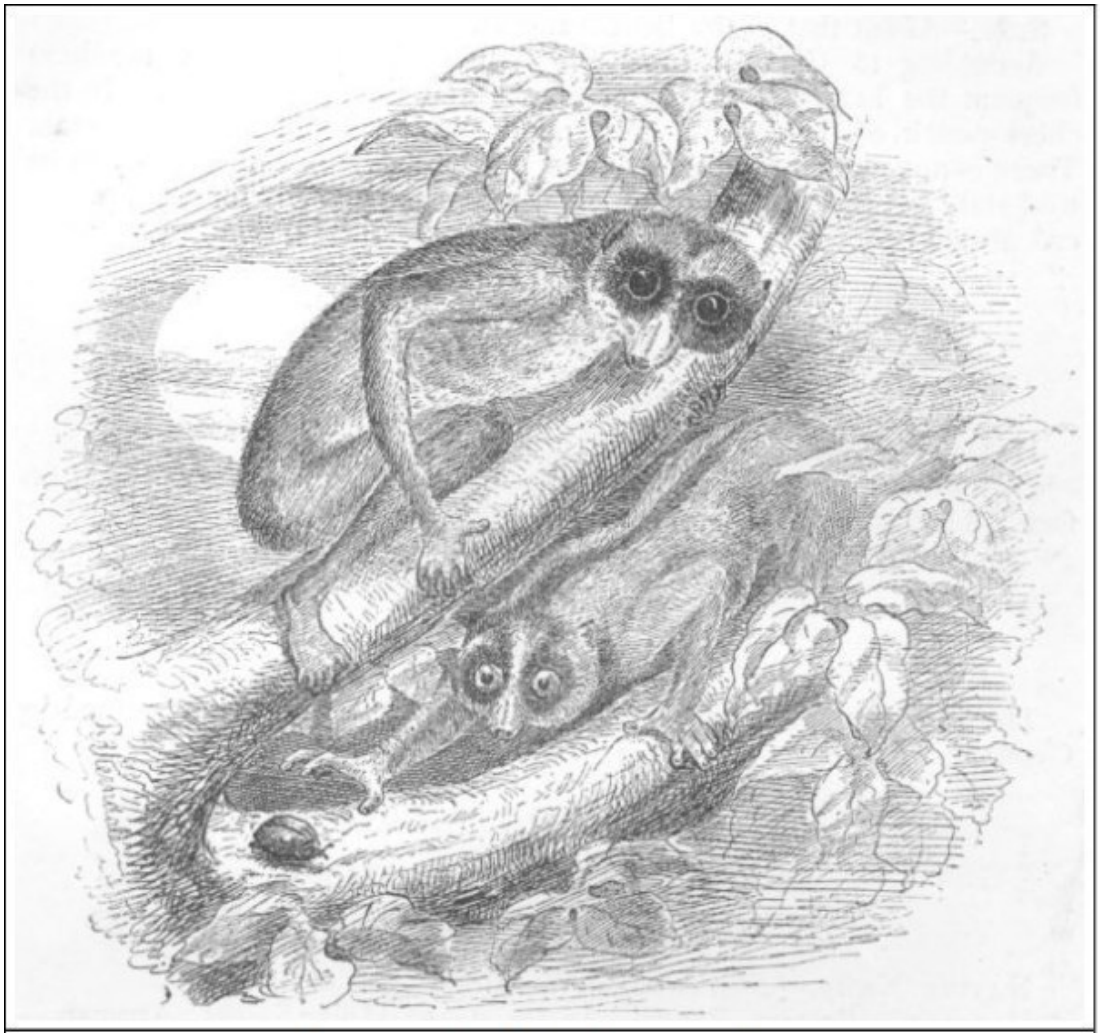
GENUS NYCTICEBUS

NO. 28. NYCTICEBUS TARDIGRADUS

The Slow-paced Lemur (Jerdon's No. 10)

NATIVE NAME.—*Sharmindi billi*, Hindi.

HABITAT.—Eastern Bengal, Assam, Garo Hills, Sylhet, Arracan.—*Horsfield*.



Loris gracilis and *Nycticebus tardigradus*.

DESCRIPTION.—Dark ashy grey, with a darker band down middle of back, beneath lighter grey; forehead in some dark, with a narrow white stripe between the eyes, disappearing above them; ears and round the eye dark; tail very short.—*Jerdon*.

SIZE.—Length about 14 to 15 inches; tail 5/8 of an inch.

Nocturnal in its habits; sleeping during the day in holes of trees, and coming out to feed at night. Sir William Jones describes one kept by him for some time; it appeared to have been gentle, though at times petulant when disturbed; susceptible of cold; slept from sunrise to sunset rolled up like a hedgehog. Its food was chiefly plantains, and mangoes when in season. Peaches, mulberries, and guavas, it did not so much care for, but it was most eager after grasshoppers, which it devoured voraciously. It was very particular in the performance of its toilet, cleaning and licking its fur. Cuvier also notices this last peculiarity, and with regard to its diet says it eats small birds as well as insects. These animals are occasionally to be bought in the Calcutta market. A friend of mine had a pair which were a source of great amusement to his guests after dinner. (See Appendix C.)

GENUS LORIS

Body and limbs slender; no tail; eyes very large, almost contiguous; nose acute.

NO. 29. LORIS GRACILIS

The Slender Lemur (Jerdon's No. 11)

NATIVE NAMES.—*Tevangar*, Tamil; *Dewantsipilli*, Telegu. (*Oona happslava*, Singhalese. —*Kellaart*.)

HABITAT.—Southern India and Ceylon.

DESCRIPTION.—Above greyish rufescent (tawny snuff brown: Kellaart); beneath a paler shade; a white triangular spot on forehead, extending down the nose; fur short, dense, and soft; ears thin, rounded (Jerdon). A hooped claw on inner toes; nails of other toes flat; posterior third of palms and soles hairy (Kellaart).

SIZE.—About 8 inches; arm, 5; leg, 5½.

This, like the last, is also nocturnal in its habits, and from the extreme slowness of its movements is called in Ceylon "the Ceylon sloth." Its diet is varied—fruit, flower, and leaf buds, insects, eggs, and young birds. Sir Emerson Tennent says the Singhalese assert that it has been known to strangle pea-fowl at night and feast on the brain, but this I doubt. Smaller birds it might overcome. Jerdon states that in confinement it will eat boiled rice, plantains, honey or syrup and raw meat. McMaster, at page 6 of his 'Notes on Jerdon,' gives an interesting extract from an old account of 'Dr. John Fryer's Voyage to East India and Bombain,' in which he describes this little animal as "Men of the Woods, or more truly Satyrs;" asleep during the day; but at "Night they Sport and Eat." "They had Heads like an owl. Bodied like a monkey without Tails. Only the first finger of the Right Hand was armed with a claw like a bird, otherwise they had hands and feet which they walk upright on, not pronely, as other Beasts do."

These little creatures double themselves up when they sleep, bending the head down between their legs. Although so sluggish generally, Jerdon says they can move with considerable agility when they choose.

SUB-ORDER PLEUROPTERA.—FAMILY GALÆOPITHECIDÆ

There is a curious link between the Lemurs and the Bats in the Colugos. (*Galæopithecus*): their limbs are connected with a membrane as in the Flying Squirrels, by which they can leap and float for a hundred yards on an inclined plane. They are mild, inoffensive animals, subsisting on fruits and leaves. Cuvier places them after the Bats, but they seem properly to link the Lemurs and the frugivorous Bats. As yet they have not been found in India proper, but are common in the Malayan Peninsula, and have been found in Burmah.

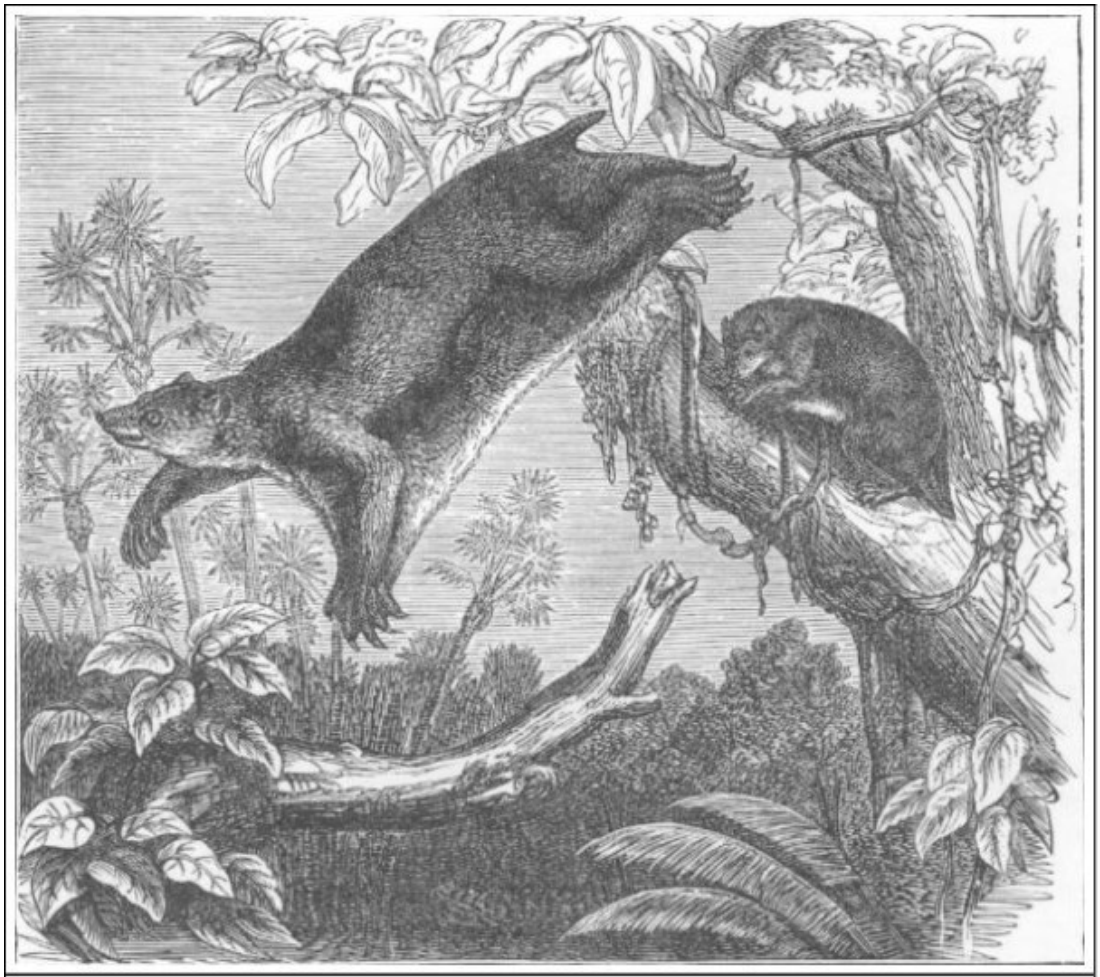
GENUS GALÆOPITHECUS

NO. 30. GALÆOPITHECUS VOLANS

The Flying Lemur

NATIVE NAME.—*Myook-hloung-pyan*, Burmese.

HABITAT.—Mergui; the Malayan Peninsula.



Galæopithecus volans.

DESCRIPTION.—Fur olive brown, mottled with irregular whitish spots and blotches; the pile is short, but exquisitely soft; head and brain very small; tail long and prehensile. The membrane is continued from each side of the neck to the fore feet; thence to the hind feet, again to the tip of the tail. This animal is also nocturnal in its habits, and very sluggish in its motions by day, at which time it usually hangs from a branch suspended by its fore hands, its mottled back assimilating closely with the rugged bark of the tree; it is exclusively herbivorous, possessing a very voluminous stomach, and long convoluted intestines. Wallace says of it, that its brain is very small, and it possesses such tenacity of life that it is very difficult to kill; he adds that it is said to have only one at a birth, and one he shot had a very small blind naked little creature clinging closely to its breast, which was quite bare and much wrinkled. Raffles, however, gives two as the number produced at each birth. Dr. Cantor says that in confinement plantains constitute the favourite food, but deprived of liberty it soon dies. In its wild state it "lives entirely on young fruits and leaves; those of the cocoanut and *Bombax pentandrum* are its favourite food, and it commits great injury to the plantations of these."—*Horsfield's* 'Cat. Mam.' Regarding its powers of flight, Wallace, in his 'Travels in the Malay Archipelago,' says: "I saw one of these animals run up a tree in a rather open space, and then glide obliquely through the air to another tree on which it alighted near its base, and immediately began to ascend. I paced the distance from one tree to the other, and found it to be seventy yards, and the amount of descent not more than thirty-five or forty feet, or less than one in five. This, I think, proves that the animal must have some

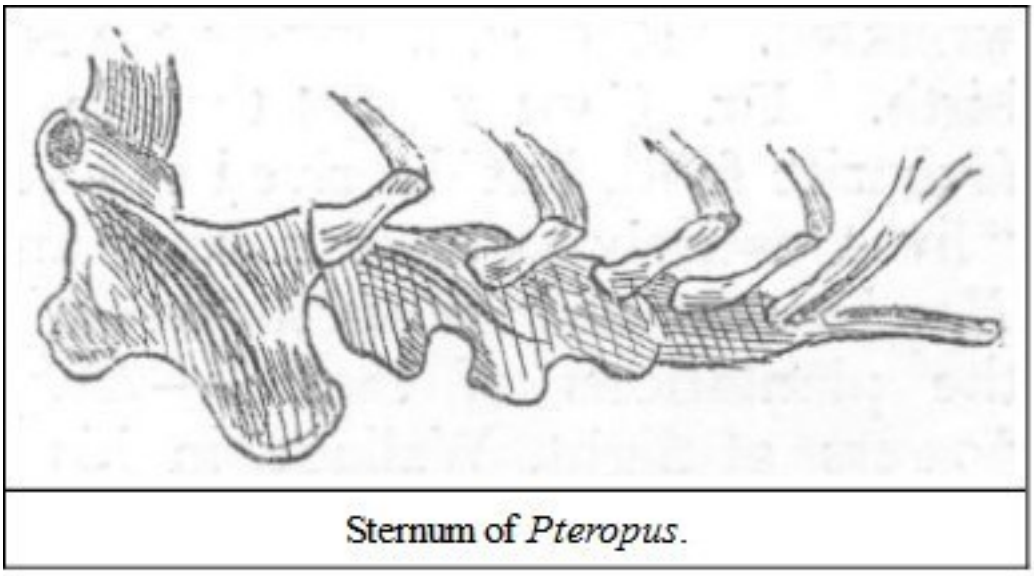
power of guiding itself through the air, otherwise in so long a distance it would have little chance of alighting exactly upon the trunk."

There is a carefully prepared skeleton of this animal in the Indian Museum in Calcutta.

ORDER CARNARIA

CHEIROPTERA

It may seem strange to many that such an insignificant, weird little creature as a bat should rank so high in the animal kingdom as to be but a few removes from man. It has, however, some striking anatomical affinities with the last Order, *Quadrumana*, sufficient to justify its being placed in the next link of the great chain of creation.



Sternum of *Pteropus*.

"Bats have the arms, fore-arms and fingers excessively elongated, so as to form with the membrane that occupies their intervals, real wings, the surface of which is equally or more extended than in those of birds. Hence they fly high and with great rapidity."—*Cuvier*. They suckle their young at the breast, but some of them have pubic warts resembling mammæ. The muscles of the chest are developed in proportion, and the sternum has a medial ridge something like that of a bird. They are all nocturnal, with small eyes (except in the case of the frugivorous bats), large ears, and in some cases membranous appendages to the nostrils, which may possibly be for the purpose of guiding themselves in the dark, for it is proved by experiment that bats are not dependent on eyesight for guidance, and one naturalist has remarked that, in a certain species of bat which has no facial membrane, this delicacy of perception was absent. I have noticed this in one species, *Cynopterus marginatus*, one of which flew into my room not long ago, and which repeatedly dashed itself against a glass door in its efforts to escape. I had all the other doors closed.

Bats are mostly insectivorous; a few are fruit-eaters, such as our common flying-fox. They produce from one to two at a birth, which are carried about by the mother and suckled at the breast, this peculiarity being one of the anatomical details alluded to as claiming for the bats so high a place.

Bats are divided into four sub-families—Pteropodidæ, Vampyridæ, Noctilionidæ, and Vespertilionidæ.

MEGACHIROPTERA

SUB-FAMILY PTEROPODIDÆ

GENUS PTEROPUS

These are frugivorous bats of large size, differing, as remarked by Jerdon, so much in their dentition from the insectivorous species that they seem to lead through the flying Lemurs (*Colugos*) directly to the *Quadrumana*. The dentition is more adapted to their diet; they have cutting incisors to each jaw, and grinders with flat crowns, and their intestines are longer than those of the insectivorous bats. They produce but one at birth, and the young ones leave their parents as soon as they can provide for themselves. The tongue is covered with rough papillæ. They have no tail. These bats and some of the following genus, which are also frugivorous, are distinguished from the rest of the bats by a claw on the first or index finger, which is short.

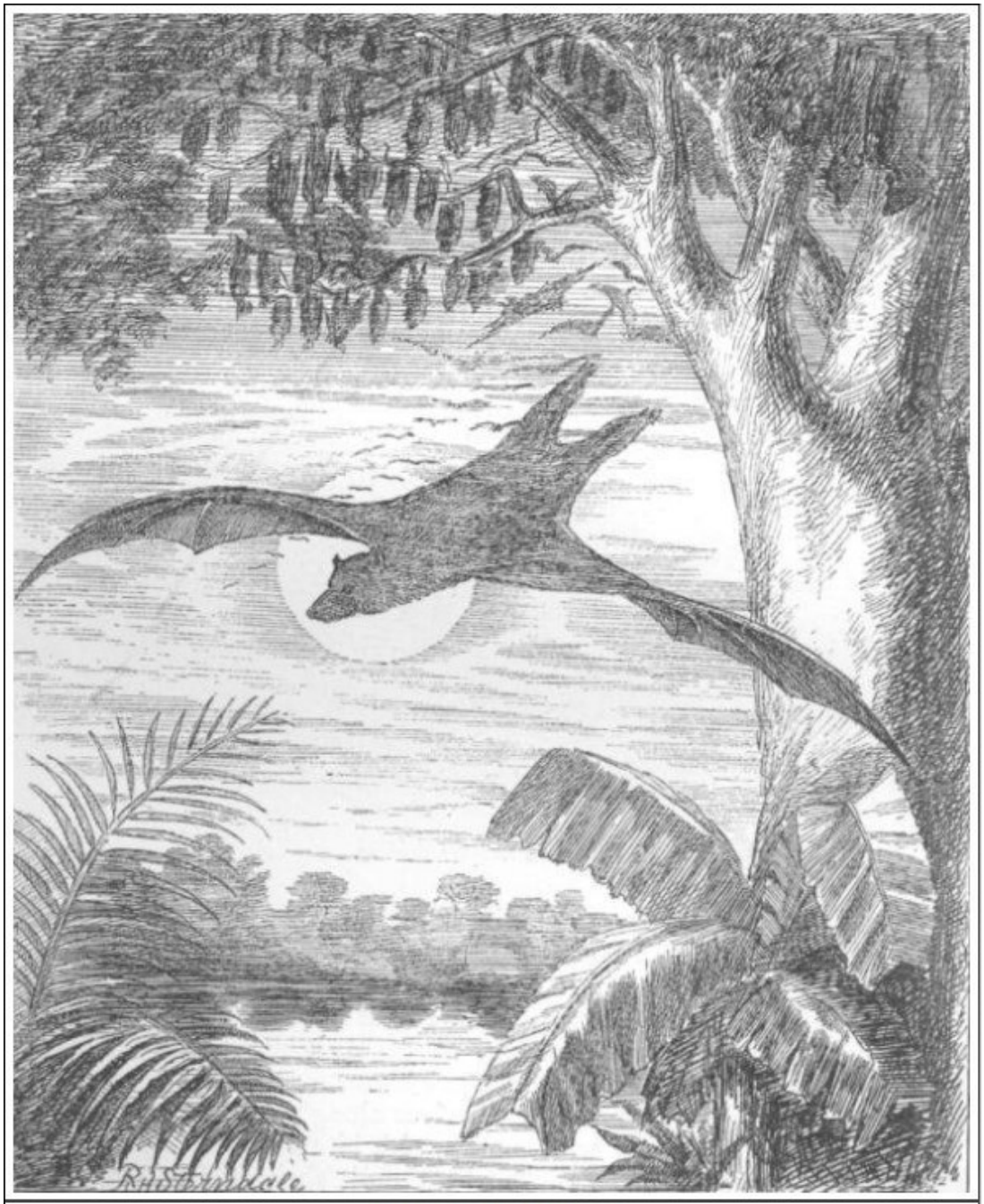
Dental formula: Inc., 4/4; can., 1—1/1—1; premolars, 2—2/3—3; molars, 3—3/3—3.

NO. 31. PTEROPUS EDWARDSII *vel* MEDIUS

The Common Flying Fox (Jerdon's No. 12)

NATIVE NAMES.—*Badul*, Bengali and Mahratti; *Wurbagul*, Hindi; *Toggul bawali*, Canarese; *Sikurayi*, Telegu.

HABITAT.—All through India, Ceylon, and Burmah.

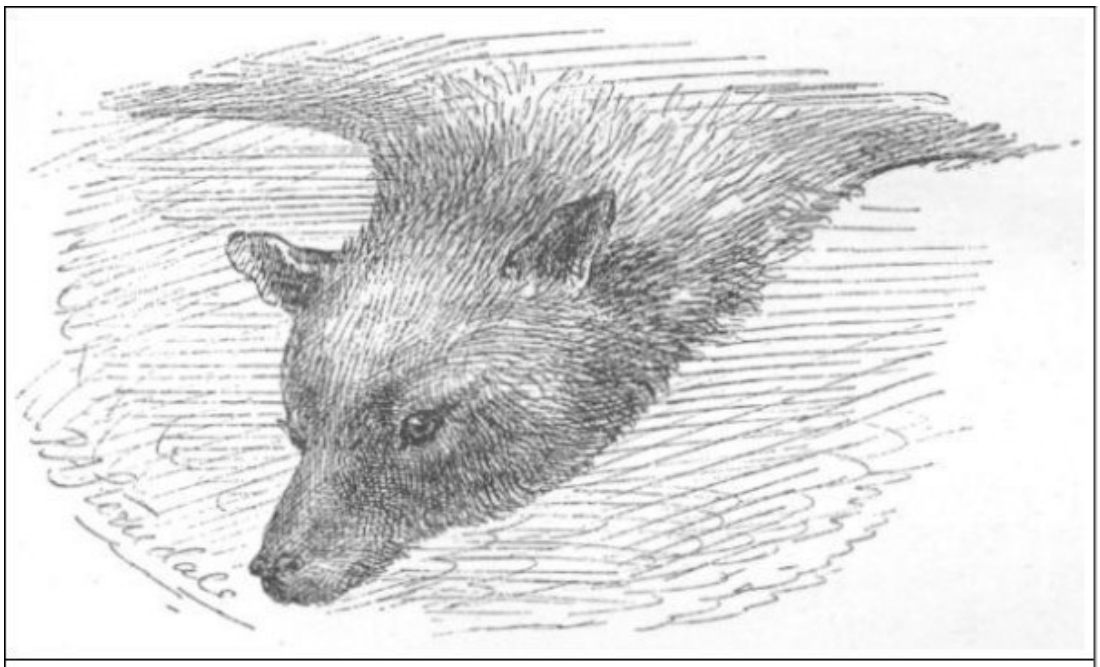


The Flying Fox at Home.

DESCRIPTION.—Head and nape rufous black; neck and shoulders golden yellow (the hair longer); back dark brown; chin dark; rest of body beneath fulvous or rusty brown; interfemoral membrane brownish black.—*Jerdon*.

SIZE.—Length, 12 to 14 inches; extent of wings, 46 to 52 inches.

These bats roost on trees in vast numbers. I have generally found them to prefer tamarinds of large size. Some idea of the extent of these colonies may be gathered from observations by McMaster, who attempted to calculate the number in a colony. He says: "In five minutes a friend and I counted upwards of six hundred as they passed over head, *en route* to their feeding grounds; supposing their nightly exodus to continue for twenty minutes, this would give upwards of two thousand in one roosting place, exclusive of those who took a different direction."



Head of *Pteropus medius*.

Tickell's account of these colonies is most graphic, though Emerson Tennent has also given a most interesting and correct account of their habits. The former writes:—"From the arrival of the first comer until the sun is high above the horizon, a scene of incessant wrangling and contention is enacted among them, as each endeavours to secure a higher and better place, or to eject a neighbour from too close vicinage. In these struggles the bats hook themselves along the branches, scrambling about hand over hand with some speed, biting each other severely, striking out with the long claw of the thumb, shrieking and cackling without intermission. Each new arrival is compelled to fly several times round the tree, being threatened from all points, and, when he eventually hooks on, he has to go through a series of combats, and be probably ejected two or three times before he makes good his tenure." For faithful portraying, no one could improve on this description. These bats are exceeding strong on the wing. I was aware that they went long distances in search of food, but I was not aware of the power they had for sustained flight till the year 1869, when, on my way to England on furlough, I discovered a large flying fox winging his way towards our vessel, which was at that time more than two hundred miles from land. Exhausted, it clung on to the fore-yard arm; and a present of a rupee induced a Lascar to go aloft and seize it, which he did after several attempts. The voracity with which it attacked some plantains showed that it had been for some time deprived of food, probably having been blown off shore by high winds. Hanging head-downwards from its cage, it stuffed the fruit into its cheeks, monkey-fashion, and then seemed to chew it at leisure. When I left the steamer at Suez it remained in the captain's possession, and seemed to be tame and reconciled to its imprisonment, tempered by a surfeit of plantains. In flying over water they frequently dip down to touch the surface. Jerdon was in doubt whether they did this to drink or not, but McMaster feels sure that they do this in order to drink, and that the habit is not peculiar to the *Pteropodidæ*, as he has noticed other bats doing the same. Colonel Sykes states that he "can personally testify that their flesh is delicate and without disagreeable flavour;" and another colonel of my acquaintance once regaled his friends on some flying fox cutlets, which were pronounced "not bad." Dr. Day accuses these bats of intemperate habits; drinking the toddy from the earthen pots on the cocoanut trees, and flying home intoxicated. The wild almond is a favourite fruit.

Mr. Rainey, who has been a careful observer of animals for years, states that in Bengal these bats prefer clumps of bamboos for a resting place, and feed much on the fruit of the betel-nut palm when ripe. Another naturalist, Mr. G. Vidal, writes that in Southern India the *P. medius* feeds chiefly on the green drupe or nut of the Alexandrian laurel (*Calophyllum inophyllum*), the kernels of which contain a strong-smelling green oil on which the bats fatten amazingly; and then they in turn yield, when boiled down, an oil which is recommended as an excellent stimulative application for the hair. I noticed in Seonee a curious superstition to the effect that a bone of this bat tied on to the ankle by a cord of black cowhair is a sovereign remedy, according to the natives, for rheumatism in the leg. Tickell states that these bats produce one at a time in March or April, and they continue a fixture on the mother till the end of May or beginning of June.

NO. 32. PTEROPUS LESCHENAULTII (CYNONYCTERIS AMPLEXICAUDATA)

The Fulvous Fox-Bat (Jerdon's No. 13)

Dobson places this bat in the sub-group *Cynonycteris*. It seems to differ from *Pteropus* only, as far as I can see, in having a small distinct tail, though the above-quoted author considers it closely allied to the next genus.

HABITAT.—The Carnatic, Madras and Trichinopoly; stated also procurable at Calcutta and Pondicherry (*Jerdon*); Ceylon (*Kellaart*).

DESCRIPTION.—Fur short and downy; fulvous ashy, or dull light ashy brown colour, denser and paler beneath; the hairs whitish at the base; membranes dark brown.

SIZE.—Length, 5 to 5½ inches; extent of wing, 18 to 20 inches.

More information is required regarding the habits of this bat.

GENUS CYNOPTERUS

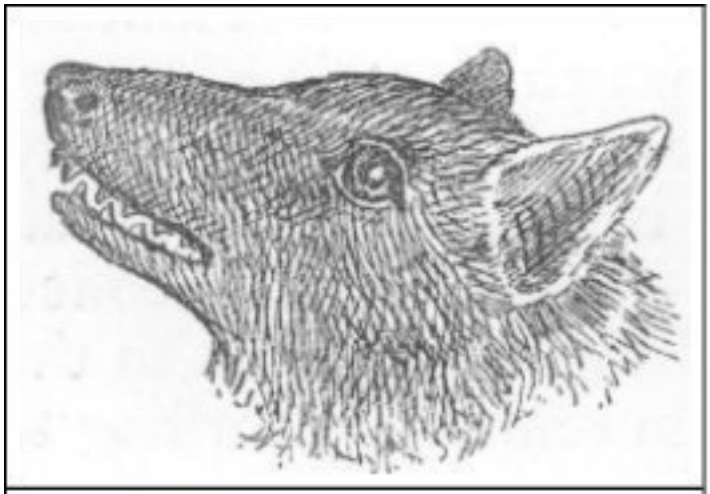
This genus has four molars less than the last, a shorter muzzle; the cheek-bones or zygomatic arch more projecting; tongue rather longer and more tapering, and slightly extensile.

Dental formula: Inc., 4/4 or 4/2; can., 1—1/1—1; premolars, 2—2/3—3; molars, 2—2/2—2.

NO. 33. CYNOPTERUS MARGINATUS

The Small Fox-Bat (Jerdon's No. 14)

NATIVE NAME.—*Chamgadili*, Hindi; *Coteekan voulha*, Singhalese.



Cynopterus marginatus.

HABITAT.—India generally, and Ceylon.

DESCRIPTION.—General colour fulvous olivaceous, paler beneath and with an ashy tinge; ears with a narrow margin of white (*Jerdon*.) A reddish smear on neck and shoulders of most specimens; membranes dusky brown. Females paler (*Kellaart*).

SIZE.—Length, 4½ to 5½ inches; extent of wing, 17 to 20 inches.

This bat is found all over India; it is frugivorous exclusively, though some of this sub-order are insectivorous. Blyth says he kept some for several weeks; they would take no notice of the buzz of an insect held to them, but are ravenous eaters of fruit, each devouring its own weight at a meal, voiding its food but little changed whilst slowly munching away; of guava it swallows the juice only. Blyth's prisoners were females, and after a time they attracted a male which hovered about them for some days, roosting near them in a dark staircase; he was also caught, with one of the females who had escaped and joined him. Dr. Dobson writes that in three hours one of these bats devoured twice its own weight. This species usually roosts in trees.

NO. 34. MACROGLOSSUS (PTEROPUS) MINIMUS

The Tenasserim Fox-Bat

NATIVE NAME.—*Lowo-assu* (dog-bat), Javanese.

HABITAT.—The Himalayas, Burmah, Tenasserim, and the Indian Archipelago.

DESCRIPTION.—Ears half length of head, narrow and rounded at tip; face abruptly narrowed in front of eyes; muzzle long, narrow, cylindrical; lower jaw slightly projecting; eyes large; tongue very long, last third attenuated, covered with brush-like papillæ; interfemoral membrane very narrow, especially at root of tail; fur reddish brown, and very long.

SIZE.—Head and body, 2-3/10 inches.

Like other *Pteropi* this bat feeds on fruit of every description, but particularly attacks the various cultivated varieties of *Eugenia* (Jamoon).

GENUS EONYCTERIS

Muzzle long and cylindrical; nostrils scarcely projecting; upper lip with a shallow vertical groove in front; *index finger without a claw*; thumb short; part of the terminal phalanx included in the wing membrane; metacarpal bone of the second finger equal to the index finger in length; tail short and distinct; the base contained in the narrow interfemoral membrane; tongue long, as in *Macroglossus*.

Dentition: Inc., 4/4; can., 1—1/1—1; premolars, 2—2/2—2; molars, 3—3/3—3.

NO. 35. EONYCTERIS SPELÆA

HABITAT.—Burmah.

DESCRIPTION.—Head long; muzzle narrow, cylindrical, abruptly narrowed in front of the eyes; nostrils with an intervening emargination, which also passes down to the lips; tongue very long and pointed; ears conical, with rounded tips; body clothed with very short and thinly-spread fur of a uniform dark brown colour; the fur on the head extends only as far as the inner corners of the eye, leaving the rest of the face naked; tail half an inch. On each side, and a little behind the anal opening, are two small, kidney-shaped subcutaneous glandular bodies.

SIZE.—Head and body, 4 inches; tail, ½ inch.

Found in Farm Caves, Moulmein. The absence of the claw on the index finger is specially to be noted.

MICROCHIROPTERA

SUB-FAMILY VAMPYRIDÆ

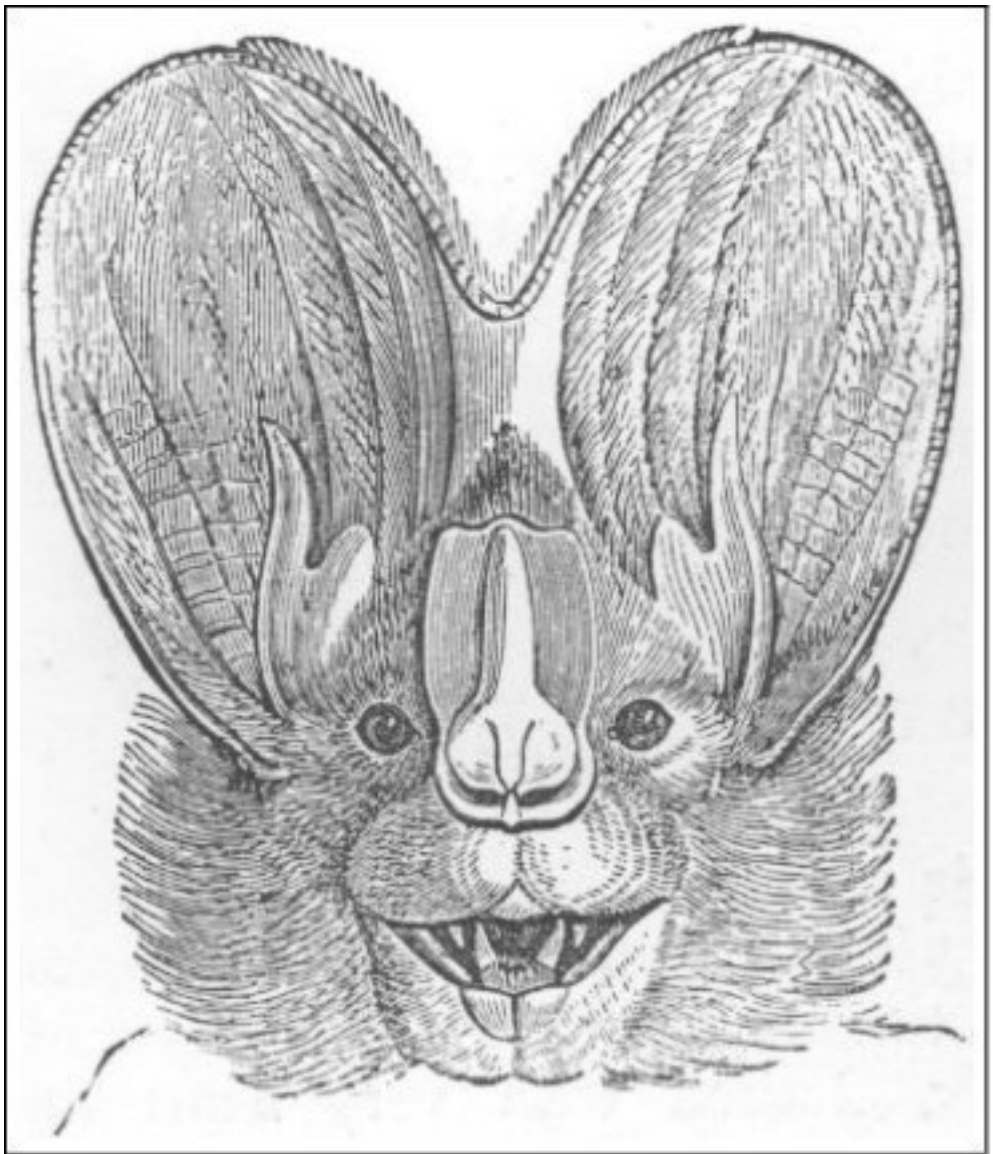
GENUS MEGADERMA

Bats with simple or complicated nose-leaves or membranes. The conch of the ear very large, and joined together on the top of the head; tragus large and bifurcated; nasal membranes complicated; no tail; wings remarkably ample. They have four incisors below but none above, the intermaxillaries remaining cartilaginous.

Dental formula: Inc., 0/4; can., 1—1/1—1; pre-m., 2—2/2—2; molars, 3—3/3—3.

NO. 36. MEGADERMA LYRA

The Large-eared Vampire Bat (Jerdon's No. 15)



Megaderma lyra.

HABITAT.—India and Ceylon.

DESCRIPTION.—Above ashy blue, slaty or pale mouse colour; albescent or yellowish ashy beneath; nasal appendage large, oblong, free at the tip, reaching to the base of the ears with a fold down the centre; tragus (*oreillon*) cordate, two-lobed, anterior long, narrow and pointed, posterior lobe half the height and rounded; muzzle truncated; under-lip cleft; wing membranes dark brown.

SIZE.—Head and body, 3 or 3½ inches; wing extent, 14 to 19 inches.

Very abundant in old buildings. They are beyond doubt blood-suckers. Blyth noticed one fly into his room one evening with a small *vespertilio*, which it dropped on being chased. The smaller bat

was weak from loss of blood, and next morning (the Megaderm having been caught), on both bats being put into the same cage, the little one was again attacked and devoured; it was seized both times behind the ear. McMaster writes that in Rangoon he had a tame canary killed by a bat, and the bird's mate soon afterwards was destroyed in the same way. The case was clearly proved.

Mr. Frith informed Mr. Blyth that these bats were in the habit of resorting to the verandah of his house at Mymensing, and that every morning the ground under them was strewed with the hind quarters of frogs, and the wings of large grasshoppers and crickets. On one occasion the remains of a small fish were observed; but frogs appeared to be their chief diet—never toads; and of a quiet evening these animals could be distinctly heard crunching the heads and smaller bones of their victims.

NO. 37. MEGADERMA SPECTRUM

The Cashmere Vampire (Jerdon's No. 16)

HABITAT.—Cashmere.

DESCRIPTION.—Above slaty cinereous, whitish beneath; the vertical nose-leaf of moderate size, oval; inner lobe of tragus ovate (*Jerdon*).

SIZE.—Two and three-quarter inches.

Dobson makes this bat synonymous with the last.

NO. 38. MEGADERMA SPASMA

HABITAT.—Tenasserim, Ceylon.

Megaderma spasma.

DESCRIPTION.—Muzzle, ear-conch, and tragus similar to those of *M. lyra*; the posterior portion of the tragus, however, is longer and more attenuated upwards, and more acutely pointed; the nose-leaf is shorter, with convex sides; but the anterior concave disc is considerably larger, and the base of the thickened process is cordate; thumbs and wings as in *M. lyra*; interfemoral membrane deeper; the calcaneum stronger; colour the same.

SIZE.—Head and body, about 3 inches. This bat is alluded to by Jerdon as *M. Horsfieldii*.

RHINOLOPHINÆ

Nasal leaf complicated, and crests resting on the forehead, presenting more or less the figure of a horse-shoe; tail long and placed in the interfemoral membrane; ears large, but separate, and not joined at the base, as in the last genus; without a tragus, but often with a lobe at the base of the outer margin; wings large and long; forefinger of a single joint.

GENUS RHINOLOPHUS

Nose-leaf cordate, or semi-orbicular, bi-lobed in front of the nostrils; a longitudinal crest along the nose and an erect frontal leaf posteriorly more or less lanceolate.—*Jerdon*.

Dental formula: Inc., 2/4; can., 1—1/1—1; premolars, 2—2/2—2; molars, 3—3/3—3.

NO. 39. RHINOLOPHUS PERNIGER *vel* LUCTUS

The Large Leaf-Bat (Jerdon's No. 17)

HABITAT.—Nepaul, Darjeeling, Khasya Hills.

Rhinolophus luctus.

DESCRIPTION.—Ears very large, much longer than the head; broad, acutely pointed; nasal apparatus very complicated; the lower leaf very large, concealing the upper lip like a door knocker;

the upper leaf like a graduated spire; ears transversely striate; a rather large semi-circular lobe at base of ear; fur long, dense, soft, and lax, slightly curled or woolly black with a silvery grizzle, or greyish-black or rich chestnut-brown.—*Jerdon*.

SIZE.—Length, 3¾; tail, 1¾; wing expanse, 17 inches.

NO. 40. RHINOLOPHUS MITRATUS

The Mitred Leaf-Bat (Jerdon's No. 18)

HABITAT.—Chybassa, Central India, Mussoorie(?)

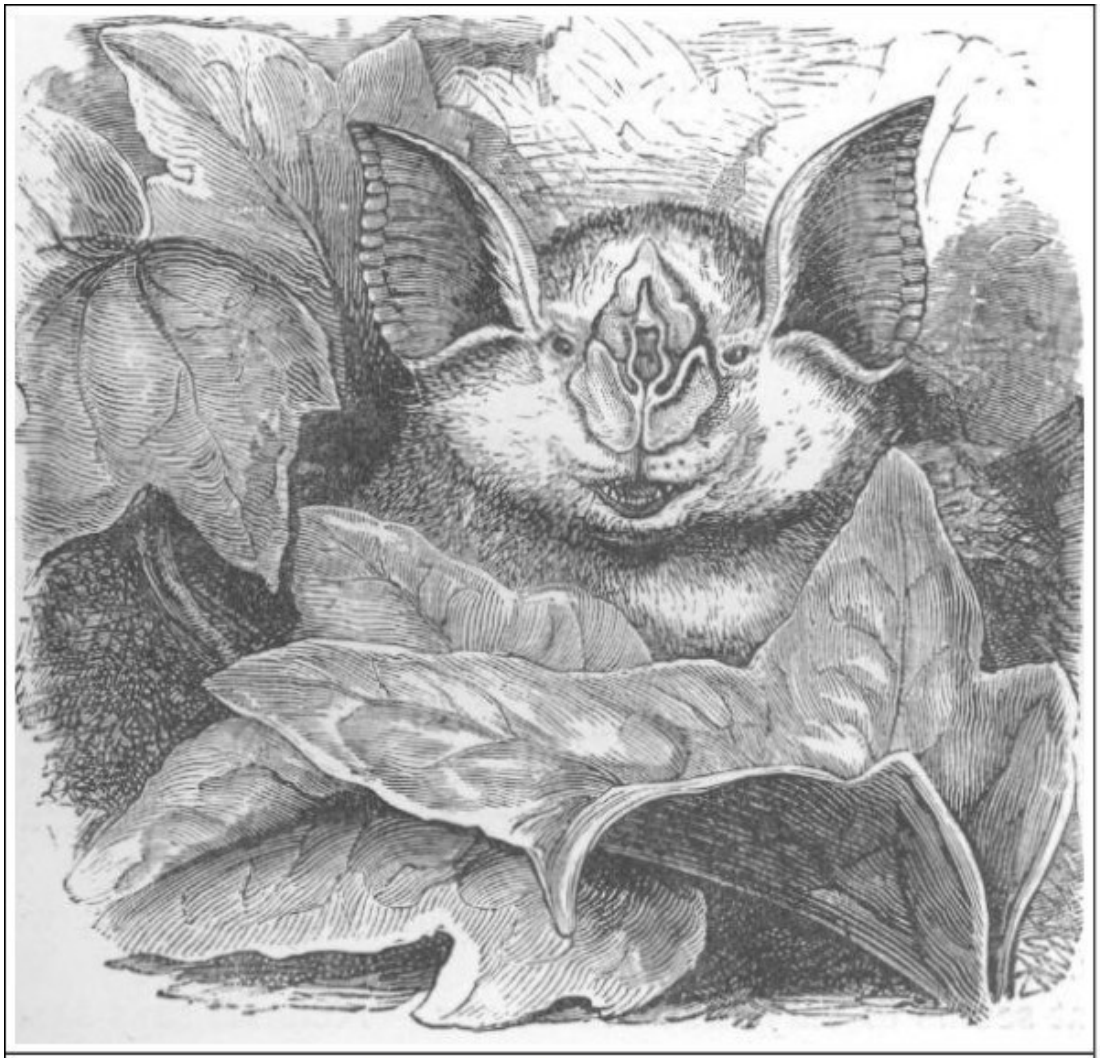
DESCRIPTION.—Ears large; anti-helix moderately developed; upper leaf triangular acute; tail extending beyond the tibia; color above light brown; paler beneath.—*Jerdon*.

SIZE.—Head and body, 2½ inches; tail, 1½ inch; wing expanse, 12 to 14 inches.

NO. 41. RHINOLOPHUS TRAGATUS *vel* FERRUM-EQUINUM

The Dark-brown Leaf-Bat (Jerdon's No. 19)

HABITAT.—Nepaul, Mussoorie.



Rhinolophus ferrum-equinum.

DESCRIPTION.—Upper process like a barbed spear-head; central one small and narrow, a little expanded at the summit; anti-tragus less developed than usual; lips simple; colour a uniform deep brown, with tips of the hair paler, and somewhat rusty.—*Jerdon*.

SIZE.—Head and body, 2-5/8 inches; tail, 1-7/8 inch; wing, 15½ inches.

The tail of this species seems unusually long. It is found in cavities of rock, and issues forth soon after dusk—sooner, according to Hodgson, than the species of *vespertilio*.

NO. 42. RHINOLOPHUS PEARSONII

Pearson's Leaf-Bat (Jerdon's No. 20)

HABITAT.—Lower Himalayan range, Darjeeling, Mussoorie, &c.

DESCRIPTION.—Colour above dark brown, with a slight shade of chestnut; underneath brown, with a sooty cast; fur very long, dense and soft; ears distinct, with an additional rounded lobe below, measuring anteriorly nearly three-fourths of an inch; point of the facial crest moderately developed; length from the tip of the nose to root of tail three inches; tail half an inch; length of fore-

arm two inches; expanse of the wings eleven inches. Although allied to Mr. Hodgson's *R. tragatus*, possesses distinct characters.—*Horsfield*.

SIZE.—As given by Horsfield above.

This bat was first sent from Darjeeling by Mr. J. T. Pearson, and was named after him. It has also, according to Jerdon, been found by Captain Hutton at Mussoorie; it is therefore reasonable to suppose that it inhabits the whole range of the lower Himalayas. One striking difference between it and the last species is the very short tail, and it is easily to be recognised by the great length of the fur.

NO. 43. RHINOLOPHUS AFFINIS

The Allied Leaf-Bat (Jerdon's No. 21)

HABITAT.—Ceylon, Burmah, and perhaps the Malabar coast.

DESCRIPTION.—Above bright red ferruginous brown; tips of hair darker, paler beneath; ears pointed and external; edge deeply emarginated; internal edge and basal third of external surface hairy; anti-helix well developed; nasal process apparently very similar to that of *R. mitratus* (*Kellaart*). Upper leaf triangular, emarginate at the tip, reaching above the base of the ears (*Jerdon*).

SIZE.—Head and body about 2-3/10 inches; tail, 1 inch; wing extent, 12 inches.

This bat seems to vary much in colour. Kellaart says some are of a brighter red than others, and a few had a yellower tinge. Another marked variety was of a uniform pale yellow brown.

NO. 44. RHINOLOPHUS ROUXI

The Rufous Leaf-Bat (Jerdon's No. 22)

HABITAT.—India generally.

DESCRIPTION.—Ears large, pointed, externally notched; tragus broad; tips of upper nose-leaf triangular, with its sides well emarginate, reaching above the base of the ears; no upper incisors [as in *Megaderma lyra*]; lower molars only five; canines very large; fur short, crisp; colour above smoky brown in some, reddish brown in others, and golden rufous in some; beneath paler.—*Jerdon*.

SIZE.—Length, 2-3/8 inches; tail, 1-1/8; wing expanse, 13 inches.

Hodgson considers this bat as allied to the two following species. It is the *R. lepidus* of Blyth.

NO. 45. RHINOLOPHUS MACROTIS

The Large-eared Leaf-Bat (Jerdon's No. 23)

HABITAT.—Lower Himalayas.

DESCRIPTION.—Ears very large, broad, oval, with pointed recurved tip, and a large obtuse tragus; anterior central crest of nose-leaf produced in front over the top of the flat transverse front edge; hinder leaf lanceolate triangular; above sooty brown or light earthy olive-brown, paler below, some with a rufous or Isabelline tint; no pubic teats.—*Jerdon*.

SIZE.—Head and body, 1¾ inch; tail, ¾; wing expanse, 9¾.

NO. 46. RHINOLOPHUS SUB-BADIUS

The Bay Leaf-Bat (Jerdon's No. 24)

HABITAT.—Nepaul.

DESCRIPTION.—Ears not larger than the head, obtusely pointed and ovoid; nasal appendage quadrate, with a transverse bar nearly surmounting it; upper leaf triangular, with slightly emarginate sides; clear brown above, paler below and on head and face.

SIZE.—Head and body, 1½ inch; tail, 1¼; wing expanse, 7½.—*Jerdon*.

NO. 47. RHINOLOPHUS RAMMANIKA (*Kellaart*)

HABITAT.—Ceylon.

DESCRIPTION.—Above rufescent, beneath ashy brown; face slightly fulvous; round the base of the ears and on the sides of the posterior half of the body bright fulvous; tail enclosed in the interfemoral membrane.

SIZE.—Head and body, 2½ inches; tail, 1; wing expanse, 10 inches.

This is a doubtful species. Dr. Kellaart got one from Amanapoora hill at Kaduganava. He says: "As the specimen reached us in a dried condition, we are unable to say anything more about its nasal processes than that in place of a transverse process above the nostrils it had a small triangular peak over the usual horse-shoe process surrounding the nasal opening. This triangular crest was hairy; superiorly there was no appearance of a sac above it to the best of our recollection."

NO. 48. RHINOLOPHUS ANDAMANENSIS

HABITAT.—Southern Andaman Island.

DESCRIPTION (*apud* Dobson).—Like *R. affinis* generally, but the anterior horizontal horse-shoe shaped membrane is very broad, completely concealing the muzzle when viewed from above, as in *R. Pearsonii*; the posterior terminal leaf is also much longer, produced backwards between the ears, and not concave on the sides as in *R. affinis*. The thumb is also much longer. Fur bright reddish brown above and beneath.

NO. 49. RHINOLOPHUS MINOR

HABITAT.—Burmah, Yunan.

DESCRIPTION.—Light brown above, greyish brown beneath; ears slightly shorter than the head, sub-acutely pointed; anti-tragus large, separated by a deep angular notch; lower lip with three vertical grooves.

SIZE.—Length of head and body from 1 to 1¾ inch.

NO. 50. RHINOLOPHUS COELOPHYLLUS

HABITAT.—Burmah.

DESCRIPTION.—Fur brown, with whitish roots, light brownish white below; ears large, with pointed tips projecting outwards; "anti-tragus large, separated by an angular emargination from the

outer margin of the ear; horse-shoe large; horizontal margins of central nose-leaf triangular, small; erect portion rather short, with parallel sides and rounded summit, meeting the connected vertical process at the same level" (*Dobson*). For a more detailed description see Dobson's Monograph, page 53. Three vertical grooves on lower lip.

SIZE.—Length of head and body about 2 inches.

NO. 51. RHINOLOPHUS GAROENSIS

HABITAT.—Garo Hills, Assam; Himalayas (Mussoorie).

DESCRIPTION (*apud* Dobson).—Ears acutely pointed, with a large anti-tragus, as in *R. affinis*; anterior vertical process of the sella maintaining the same breadth upwards and rounded off above, considerably exceeded in height by the upper edge of the connecting process, which develops a long acutely pointed projection; terminal portion of the posterior leaf broad with straight sides, forming an almost equilateral triangle.

Wing membrane from the ankles, inter femoral membrane square behind; extreme tip of the tail free.

SIZE.—Length of head and body about 1·5 inch.

This bat is figured (head only) in Dobson's Monograph, page 48.

NO. 52. RHINOLOPHUS PETERSII

HABITAT.—India. Precise locality unknown.

DESCRIPTION.—Ears acutely pointed, with an emargination immediately beneath the tip; anti-tragus large, separated from the outer margin by a deep angular incision; nose-leaf horizontal, horse-shoe-shaped, not so broad as the muzzle; vertical part of the sella almost same breadth upwards, and rounded off above, exceeded considerably in height by the upper margin of the posterior connecting process; lower lip with three vertical grooves; fur dark brown above, greyish brown beneath.

SIZE.—Length of head and body, 2·5 inches; tail, 1 inch.

There are two good woodcuts of the head of this bat in Dobson's Monograph.

NO. 53. RHINOLOPHUS TRIFOLIATUS

HABITAT.—East coast of India.

DESCRIPTION.—Very much like *R. perniger* (*luctus*), but is distinguished by its smaller size and by the more pointed vertical process of the central nose-leaf, which in the other is truncated.

SIZE.—Length of head and body, 2 inches; tail about 1 inch.

GENUS HIPPOSIDEROS (*GRAY*) VEL *PHYLLORHINA* (*BONAPARTE*)

Nasal-leaf broad, depressed, transverse; ears with transverse wrinkles; a circular sac behind the nasal crest, which can be turned inside out; when alarmed the animal blows it out, and then withdraws it at each breath; it contains a waxy matter of green or yellow colour. Blyth thinks that this sac is affected by the amorous season, as in the case of the infra-orbital cavities of various ruminants and analogous glandular follicles in other animals.

This genus is also distinguishable from the last by the form of the ear conch, the small size of the anti-tragus, and, as Dr. Dobson particularly points out, by the presence of *two* joints only in all the toes, as also by the number and character of the teeth, which are as follows:—

Inc., 2/4; can., 1—1/1—1; premolars, 2—2/2—2; molars, 3—3/3—3.

NO. 54. HIPPOSIDEROS ARMIGER

The Large Horse-shoe Bat (Jerdon's No. 25)

HABITAT.—Lower Himalaya ranges; Ceylon.

DESCRIPTION.—Nasal-leaf large and square; lips with a triple fold of skin on each side; tragus vaguely developed and wavily emarginate; of a uniform light-brown colour, with maroon tips to the hairs of the upper parts; membranes black.

SIZE.—Head and body, 4½ inches; tail, 2½; wing expanse, 22.

Jerdon makes this out to be the same as Kellaart's *H. lankadiva* and the Malayan *H. nobilis*, but those are synonymous with *Phyllorhina diadema*. Kellaart supposed it to be identical with *H. insignis*, which will be found further on as *Phyllorhina larvata*, all those bats closely resembling each other in a general way. I think this No. 25 of Jerdon is the same as Peter's *Phyllorhina armigera*. Hutton found it at Darjeeling, and writes of it as follows:—

"When captured alive the large ears are kept in a constant state of rapid tremulous motion, and the animal emits a low purring sound, which becomes a sharp scream when alarmed or irritated. When suspended at rest the tail and inter-femoral membrane are turned up, not in front, like the *Rhinolophi*, but behind, over the lower part of the back; neither does it appear to envelope itself in its wings so completely as does *R. luctus.*" He then goes on to say he has noticed the tremor of the ears and facial crests in all the *Rhinolophi* when disturbed, and concludes with a graphic description of this species, sallying forth in the evening to prey upon the noisy *Cicadas*; leisurely wheeling with noiseless, cautious flight round some wide-spreading oak, "scanning each branch as he slowly passes by—now rising to a higher circle, and then perchance descending to the lower branches, until at length, detecting the unfortunate minstrel, it darts suddenly into the tree, and snatching the still screaming insect from its perch, bears it away."

Jerdon procured specimens at Darjeeling, and Kellaart says it is found in great abundance at Kandy and its neighbourhood; Kurnegalle Tunnel swarms with them.

NO. 55. HIPPOSIDEROS SPEORIS

The Indian Horse-shoe Bat (Jerdon's No. 26)

HABITAT.—India generally and Ceylon.

DESCRIPTION.—Mouse brown or fulvous brown. Occasionally golden fulvous and sometimes dusky black above, paler beneath; membranes dusky brown; interfemoral membrane narrow, enclosing the tail except the last half joint (about 2-10ths of an inch), which is free.

Ear large, erect and pointed, rounded at the base and emarginated on the outer edge; nasal process complicated. "Males have a frontal sac; females none" (*Kellaart*). Pubis naked, with two inguinal warts.

SIZE.—Head and body, 2 inches; tail, 1-2/10; wing expanse, 12.

Inhabits old buildings, wells, &c.

NO. 56. HIPPOSIDEROS MURINUS

The Little Horse-shoe Bat (Jerdon's No. 27)

HABITAT.—Southern India, Ceylon, and Burmah.

DESCRIPTION.—Muzzle short; body short and thick; a transverse frontal leaf with a sac behind it; no folds of skin on each side of the horse-shoe as in the last species; ears large, naked and rounded; colour dusky brown or mouse, sometimes light fawn; wing membrane blackish; interfemoral membrane large, and including the tail all but the tip.

SIZE.—Head and body, 1-4/5 inch; tail, 1-1/5 inch; wing expanse, 10.

Jerdon says the mouse-coloured variety is common in the Carnatic, but he has only seen the light fulvous race on the Nilgheries; but Mr. Elliot procured both in the southern Mahratta country. A dark variety of this bat was called *Rhinolophus ater* by Templeton, and *H. atratus* by Kellaart; in other respects it is identical, only a little smaller.

NO. 57. HIPPOSIDEROS CINERACEUS

The Ashy Horse-shoe Bat (Jerdon's No. 28)

HABITAT.—Punjab Salt range.

DESCRIPTION.—Similar to the last, but larger, and I should think the argument against *H. atratus* would apply to this as a distinct species.

NO. 58. HIPPOSIDEROS LARVATUS

Syn.—PHYLLORHINA LARVATA

HABITAT.—Arracan.

DESCRIPTION.—The fur of the upper part bright fulvous; more or less tinged with maroon on the back, lighter underneath; membranes dusky, but tinged with the prevailing colour of the fur; ears angulated; a minute false molar in front of the carnassial in the upper jaw.

SIZE.—Head and body, 2¾ inches; tail, 1¼; wing extent, 12.

Kellaart writes of this bat under his *H. aureus*. He describes it as head, neck, and body of a bright golden yellow, with a slight maroon shade on the tips of the hairs on the back. Females paler coloured. Frontal sac only in males; the waxy matter of a yellow colour, and quite transparent.

NO. 59. HIPPOSIDEROS VULGARIS

Syn.—PHYLLORHINA LARVATA

The Common Malayan Horse-shoe Bat

HABITAT.—Arracan and Malayana.

DESCRIPTION.—"It differs from the last in being rather smaller, and of a brown colour above, much paler at the base of the hairs and at their extreme tips, and lighter coloured below; the ears more apiculated, or rather they appear so from being strongly emarginated externally towards the tip."—*Blyth*.

SIZE.—2-3/10 inches; tail 1-2/10; wing expanse about 12.

NO. 60. HIPPOSIDEROS BLYTHII

HABITAT.—Ceylon, Fort Frederic.

DESCRIPTION.—Above surface colour a rich dark tawny brown; base of hairs much lighter coloured, of a brighter yellow tinge; beneath paler; face partially blackish; ears black; tip of tail excerted; no frontal sac; membranes blackish; nasal processes as in *H. speoris*.

SIZE.—Head and body, 2-2/10 inches; tail, 1; wing expanse, 12.

Dr. Kellaart considered this a new and undescribed species, distinguished from *H. speoris* and *H. vulgaris* (*vel Templetonii*—Kellaart) by the greater length of the fore-arm, which is two inches. This remark however does not apply to *vulgaris*, of which Kellaart himself gives two inches as the length of the radius, and Blyth gives two and a quarter. The absence of the frontal sac would have been a greater proof, but both specimens on which Kellaart made his observations were females; and as colouring is so varied in the bat tribe as to preclude the division of species on this ground, I think we may put this down as a doubtful species on which more information is desirable.

NO. 61. PHYLLORHINA DIADEMA

HABITAT.—India generally; Ceylon and Burmah.

DESCRIPTION.—The fur with three shades—buff, then reddish brown with ashy tips, underneath greyish or pale brown. "The hinder erect nose-leaf," according to Dobson's description, "equals the horse-shoe and slightly exceeds the sella in width, its free margin forming a segment of the circumference of a circle, with a small blunt projection in the centre and three vertical ridges on its concave front surface; sella large, with a prominent ridge in the centre, forming a small projection above and one smaller on each side; sides of the muzzle with prominent vertical leaves, three on each side; no frontal pore."

There is a good figure of the head of this bat in Cuvier's 'Animal Kingdom,' Carpenter's and Westwood's edition, under the name of *Rhinolophus nobilis*. It is the same also as Kellaart's *Hipposideros lankadiva*. Captain Hutton, who was a keen observer of the habits of the bats at Mussoorie, says of this one: "Like *R. affinis*, this species may frequently be heard during its flight cracking and crunching the hard wings of beetles, which in the evening hours are usually abundant among the trees; the teeth are strong, and the *tout ensemble* of its aspect is not unlike that of a bull-dog."—'Proc. Zoo. Soc.,' 1872, page 701.

NO. 62. PHYLLORHINA MASONI

HABITAT.—Burmah (Moulmein).

DESCRIPTION.—This bat resembles the last closely; such difference as exists is that the concave surface of the terminal nose-leaf is divided into two cells only by a single central vertical ridge, and from the under surface of the juncture of the mandible a small bony process projects downwards about equal to the lower canine tooth in vertical extent, and covered by the integument.

There is an excellent figure of this bat in Dobson's Monograph, from whence I have also taken the above description.

NO. 63. PHYLLORHINA NICOBARENSIS

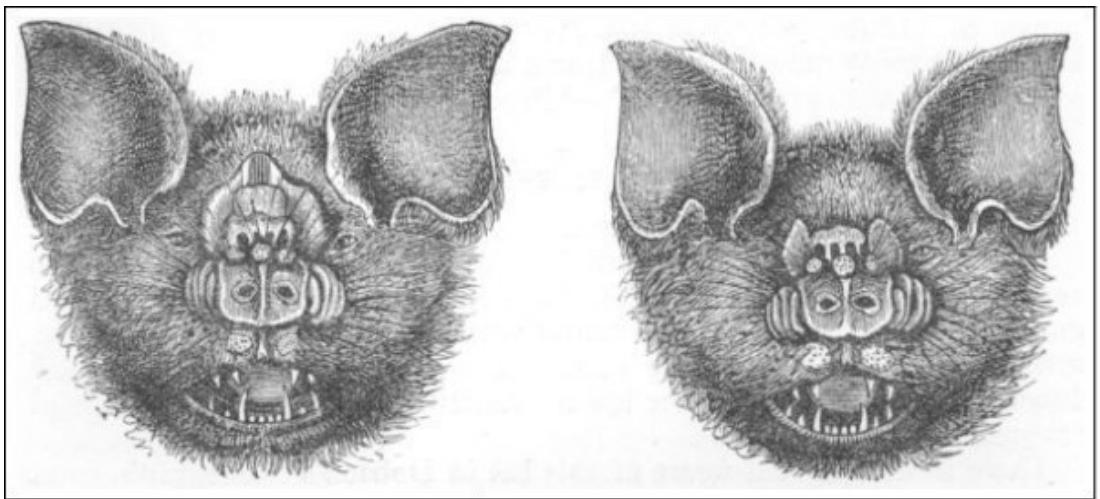
HABITAT.—Nicobar Island.

DESCRIPTION.—"Ears large, acute; outer margin slightly concave beneath the tip; no frontal sac behind the nose-leaf; upper margin of the transverse terminal leaf simple, forming an arc of a circle, folded back and overhanging the concave front surface, which is divided into *two* cells only by a single central longitudinal ridge; in front the margin of the horse-shoe is marked by three small points" (*Dobson*). Fur light brown, then greyish, with light brown tips.

SIZE.—Length of head and body, 3 inches.

NO. 64. PHYLLORHINA ARMIGERA

HABITAT.—The entire range of the Himalayas, Khasya Hills, and Ceylon.



Male.	Female.

Phyllorhina armigera.

DESCRIPTION.—The hinder erect nose-leaf narrow, not so broad as the horse-shoe; upper edge sinuate, slightly elevated in the centre, and at either extremity; vertical ridges beneath well developed, prominent, enclosing moderately deep cells; wart-like granular elevations on each side above the eyes are usually greatly developed, forming large thickened longitudinal elevations

extending forward on each side of the posterior erect nose-leaf, and backwards towards the frontal sac (*Dobson*). The colour varies.

SIZE.—Length of head and body from 3 to 4 inches; tail about 2.

This is the largest of this genus, and one of the most interesting of the species. My space will not admit of extensive quotations from those who have written about it, but there is a fuller description of it in Dr. Dobson's book, and a very interesting account of its habits by Capt. J. Hutton, in the 'Proceedings of the Zoological Society,' 1872, page 701.

NO. 65. PHYLLORHINA LEPTOPHYLLA

HABITAT.—Khasya Hills.

DESCRIPTION.—Ears large, broad, triangular, with subacute tips; outer margin slightly concave; upper transverse nose-leaf small; upper edge simple, narrower than horse-shoe, thin; three vertical folds in front faintly descernible at base only; horse-shoe with small incision in centre of front free edge; frontal pore small, placed at some distance behind the transverse nose-leaf; fur and integuments dark throughout.—*Dobson*.

SIZE.—Length of head and body, 2 inches; tail, 1-6/10.

NO. 66. PHYLLORHINA GALERITA

HABITAT.—Central India, Deccan.

DESCRIPTION.—"Ear comparatively small, as broad as long; inner margin very convex forward; outer margin slightly concave beneath the tip; nose-leaf as in *P. larvata*, but the transverse terminal leaf is more rectangular; the superior margin less convex, and its concave front surface is marked by three very prominent vertical ridges; frontal pore small, indistinct, not larger than in the females of *P. larvata*."—*Dobson*.

SIZE.—Head and body about 2 inches; tail, 1 inch.

NO. 67. PHYLLORHINA BICOLOR

HABITAT.—India (N. W. Himalaya), Nicobar Islands.

DESCRIPTION.—Fur above reddish chestnut; the base of the hairs pale reddish-white, or base of hair pure white, the tip, dark reddish-brown. Ears as long as the head, broad; the lower half of the inner margin very convex; the summit of the ear conch rounded off broadly as far as a point on the outer side, where a slight but distinct flattening occurs, and indicates the position of the tip. Horse-shoe small, square; the concave front surface divided into four cells by three distinct vertical ridges; no secondary leaflets external to the horse-shoe; frontal sac distinct in males, rudimentary in females (*Dobson*). Blyth includes this bat in his Burmese Catalogue, but does not say much about it.

GENUS COELOPS

Possesses the general characteristics of *Rhinolophus*, but the tail and calcanea wanting entirely; the intercrural membrane acutely emarginate to the depth of a line even with the knees; ears large, broad and rounded; the summit of the facial membranes rising abruptly, obtusely bifid, bent forward; fur long, delicately fine.—*Jerdon*.

Dental formula: Inc., 1—1/4; can., 1—1/1—1; premolars, 2—2/2—2; molars, 3—3/3—3.

NO. 68. COELOPS FRITHII

Frith's Tailless Bat (Jerdon's No. 29)

HABITAT.—The Sunderbunds, Bengal.

DESCRIPTION.—Colour dusky or blackish; the fur tipped with ashy brown above, paler and somewhat ashy beneath; membranes fuscous.

SIZE.—Length, 1-7/8 inch; membrane beyond ¾ inch; forearm, 1¾.

This bat is rare. The above description, given by Jerdon, is based on one specimen sent to Mr. Blyth by Mr. Frith, who obtained it in the Sunderbunds. It also inhabits Java. Dr. Dobson examined a specimen from thence in the Leyden Museum. He says: "Calcanea and tail very short," whereas the above description says entirely wanting. "The ears are funnel-shaped, and thickly covered with fine hair. Metacarpal bone of thumb very long; the wing membrane enclosing the thumb up to the base of the claw; wing to the tarsus close to the ankles; feet very slender; toes with strong claws."

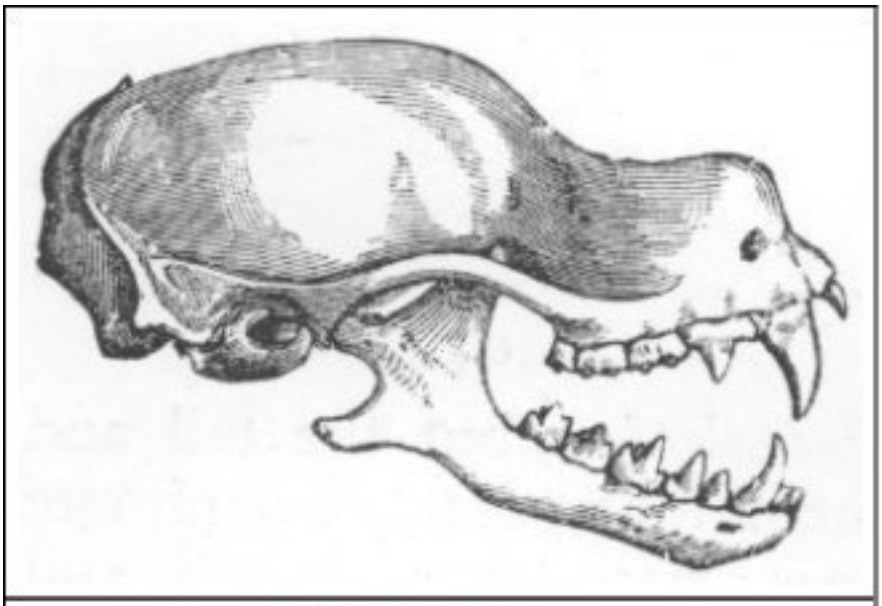
GENUS RHINOPOMA

Ears moderate, but joined above, as in the Megaderms; the nostrils at the end of the muzzle, with a little lamina above, forming a kind of snout; tail slender and joined at the base with the intercrural membrane, but extending far beyond it.

Dental formula: Inc., 2/4; can., 1—1/1—1; premolars, 1—1/2—2; molars 3—3/3—3.

NO. 69. RHINOPOMA HARDWICKII

Hardwick's Long-tailed Leaf Bat (Jerdon's No. 30)



Skull of *Rhinopoma*.

HABITAT.—All over India, Burmah and Malayana.

DESCRIPTION.—Muzzle long, thick, truncated, and surrounded by a small leaf; tragus oblong, bi-acuminate; forehead concave with a channel down the centre; fur soft and very fine, dull brown throughout; face, rump, and part of abdominal region naked.—*Jerdon*.

SIZE.—Head and body, 2-6/10 inches; tail, 2½; expanse, 13.

Frequents old ruins, caves, and clefts in rocks.

SUB-FAMILY NOCTILIONIDÆ

Bats without facial membranes; with short obtuse and bull-doggish heads; large lips.

GENUS TAPHOZOUS

Have a small rounded indenture on the forehead; no raised lamina on the nostrils; the head pyramidal; eyes rather large; ears moderate in size and not joined at the base, but widely apart; the tip of the tail free above the membrane, which is much longer.

The males have a transverse cavity under the throat; wings long and narrow, collapsing with a double flexure outwards; fur soft and velvety. (Dobson includes this genus in his Family *Emballonuridæ*.)

Dental formula: Inc., 1—1/4; can., 1—1/1—1; premolars, 2—2/2—2; molars, 3—3/3—3; premaxillaries cartilaginous, supporting only one pair of weak incisors with a gap between them.

NO. 70. TAPHOZOUS LONGIMANUS

The Long-armed Bat (Jerdon's No. 31)

HABITAT.—India generally.

DESCRIPTION.—"Ears oval, with many distinct folds, naked except at the base; tragus securiform; fur thick, close, fuscous-black; or dark fuscous-brown above; beneath paler, except on the throat, the hairs being conspicuously tipped with grey, the upper hairs being all white at their base; face nude, and the membrane dark brownish-black" (*Jerdon*). The gular sac, though represented in the male, is almost absent in the female, being but a rudimentary fold of skin; in this it differs from another common Indian species, *T. saccolaimus*, in which the gular sac is well developed in both sexes, though larger in the male.

SIZE.—Length, 5 inches; expanse, 15 to 16; tail, 1; fore-arm, 2-5/8; tibia, 1 inch.

This bat frequents old buildings, dark cellars, old ruins, &c.; the young are fulvescent, and become darker with age. Blyth states that it has a surprising faculty for creeping about on the vertical board of a cage, hitching its claws into the minute pores of the wood.

NO. 71. TAPHOZOUS MELANOPOGON

The Black-bearded Bat (Jerdon's No. 32)

HABITAT.—Common about Calcutta, East Coast of India, Burmah, and Cochin China.

DESCRIPTION.—"No gular sac, the openings of small pores appearing along a line corresponding to the position of the mouth of the gular sac in other species; in some male specimens the hair behind these pores is very long, forming a dense black beard" (*Dobson*). Ears moderate, oval, with the outer margin extending under the eyes, dilated into a large rounded lobe; the tragus leaf-shaped; the head, muzzle, and chin covered with short hairs.

SIZE.—Length of head and body about 3½; tail, 2/3; wing expanse, 14 inches.

Horsfield says it occurs in caves in Java inhabited by the esculent swallows (*Collocalia nidifica*), the gelatinous nests of which are used for soup by the Chinese. Dobson remarks that the black beard is not always developed in the males; he conceives it to be owing to certain conditions, probably connected with the amorous seasons. In five males in the Indian Museum the beard is well developed; he found that only two per cent. of the Cochin China specimens in the Paris Museum possessed it.

NO. 72. TAPHOZOUS SACCOLAIMUS

The White-bellied Bat (Jerdon's No. 33)

HABITAT.—Peninsula of India, Burmah, and Ceylon.

DESCRIPTION.—"Muzzle angular, naked, very acute; nostrils small, close; ears distant, shorter than the head, large inner margin recurved, outer margin dilated, reaching to the commissure of the mouth; tragus wide, securiform (i.e. axe-shaped); fur short, smooth, blackish on the head, chestnut brown on the back; beneath, dirty-white or black brown above with white pencillings; pure

white below" (*Jerdon*). Dobson says of the fur: "above, white at the base, the terminal three-fourths of the hairs black, with a few irregular small white patches on the back; beneath dark brown." The gular sac is to be found in both sexes, but somewhat larger in the males.

SIZE.—About 5 inches; wing expanse, 17.

NO. 73. TAPHOZOUS THEOBALDI

HABITAT.—Tenasserim.

DESCRIPTION.—The gular sac is absent in both sexes; ears larger than in any others of the sub-genus; the muzzle, from the corners of the eyes downwards, naked.

SIZE.—Head and body about 3-1/10 inches; tail, 1¼.

NO. 74. TAPHOZOUS KACHHENSIS

HABITAT.—Kachh, N. W. India.

DESCRIPTION (*apud* Dobson).—"Gular sac absent in both male and female; its usual position indicated in the male by a semi-circular fold of skin and nakedness of the integument in this situation; in other respects similar to *T. nudiventris*. The deposits of fat about the tail very large."

SIZE.—Head and body about 3 inches; tail, 1¼.

T. nudiventris, above alluded to, is an inhabitant of Asia Minor, Egypt, and Nubia; similar to the above, only that it has a small gular sac in the male, of which a trace only exists in the female. Its most striking peculiarity is the deposit of fat at the root of the tail, which may possibly be for purposes of absorption during the dormant winter season.

GENUS NYCTINOMUS

"Ears broad, short, approximate or connate with the outer margin, terminating in an erect lobe beyond the conch; tragus small, concealed" (often very small and quadrate, but never reduced to a mere point, as in *Molossus*—Dobson); "wings narrow, folded as in *Taphozous*; intercrural membrane short, truncate; tall free at the tip; feet short, with strong toes; muzzle thick; lips tumid, lax; upper lip with coarse wrinkles."—*Jerdon*.

Dental formula: Inc., 2/6 or 2/4; can., 1—1/1—1; premol., 2—2/2—2; mol., 3—3/3—3.

NO. 75. NYCTINOMUS PLICATUS

The Wrinkle-lipped Bat (Jerdon's No. 34)

HABITAT.—India generally.

DESCRIPTION.—Muzzle broad and thick; upper lip overhanging the lower, marked by vertical wrinkles; ears large and quadrilateral; outer margin ending in a decided anti-tragus; tail thick; the lower part of the leg is free from the wing membrane, which however, is connected with the ankle by a strong fibrous band; fur dense, smoky or snuff brown above (or bluish black—*Dobson*); paler beneath.

SIZE.—Head and body about 2-1/10 inches; tail, 1-1/10. Jerdon gives length, 4¼ to 4-1/10; expanse, 13½; tail, 1¾.

This bat is common about Calcutta, frequenting ruins, dark places and hollow trees. It is allied to *N. tenuis* (*Horsfield*), and it is mentioned as inhabiting hollow trees in such numbers as to attract

attention by the hissing noise from within, every available spot in the interior being occupied. A synonym of the genus is *Dysopes*.

NO. 76. NYCTINOMUS TRAGATUS

HABITAT.—India generally.

DESCRIPTION.—This differs from the last in having the wing membrane from the ankles, and in the free portion of the tail being shorter; ears united at the base; tragus broad and rounded above, partially concealed by the large anti-tragus.

SIZE.—About the same as the last.

SUB-FAMILY VESPERTILIONIDÆ

These bats have simple nostrils, as in the frugivorous ones, with no complications of foliated cutaneous appendages; the muzzle is conical, moderately long, and clad with fur; the ears wide apart; the inner margins springing from the sides, not the top of the head; the tragi are large; eyes usually very small, and the tail, which is long, is wholly included in the membrane.

Dentition (usually): Inc., 2—2/6; can., 1—1/1—1, premol., 3—3/3—3; mol., 3—3/3—3. The upper incisors are small, and placed in pairs near the canines, leaving a gap in the centre. The lower ones sharp-edged and somewhat notched. At birth there are twenty-two teeth, which are shed, and replaced by others, with sixteen additional ones, the adult bat having thirty-eight teeth.

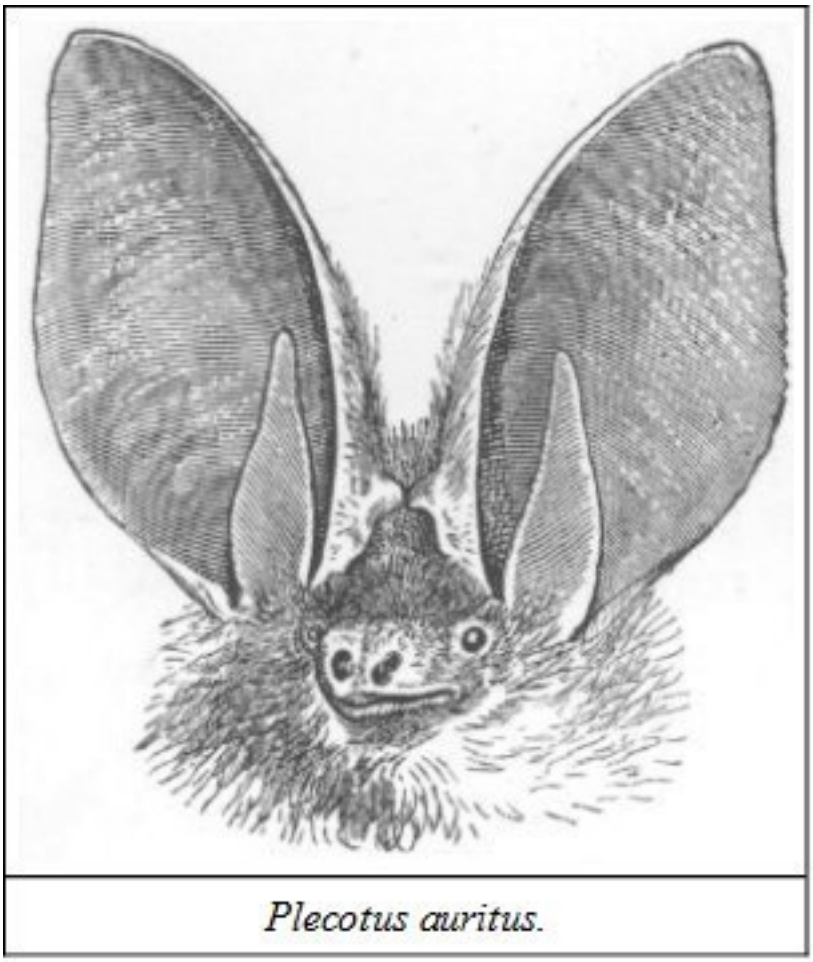
GENUS PLECOTUS

Ears very large, united at the base; outer margin of the ear conch terminating opposite the base of the tragus, the inner margin with an abrupt rounded projection directed inwards above the base; tragus very large, tapering upwards, with a lobe at the base of the outer margin.

Dentition: Inc., 2—2/6; can., 1—1/1—1; premolars, 2—2/2—2; molars, 3—3/3—3.

The English species *P. auritus* is very common there, and also in France; its ears are nearly as long as its body, yet, when reposing, they are so folded as to be almost out of sight. The Indian species is only a variety distinguishable by its yet longer ears ("and comparative shortness of the thumbs"—*Dobson*).

NO. 77. PLECOTUS AURITUS *vel* HOMOCHROUS



Plecotus auritus.

HABITAT.—The Himalayas and the Khasia Hills.

DESCRIPTION.—Head slightly raised above the face-line; ears nearly as long as the fore-arm, joined by a low band across the forehead at the bases of their inner margins; wings from the base of the toes; feet slender; tip of the tail free; fur silky, short, and of a uniform dull brown.

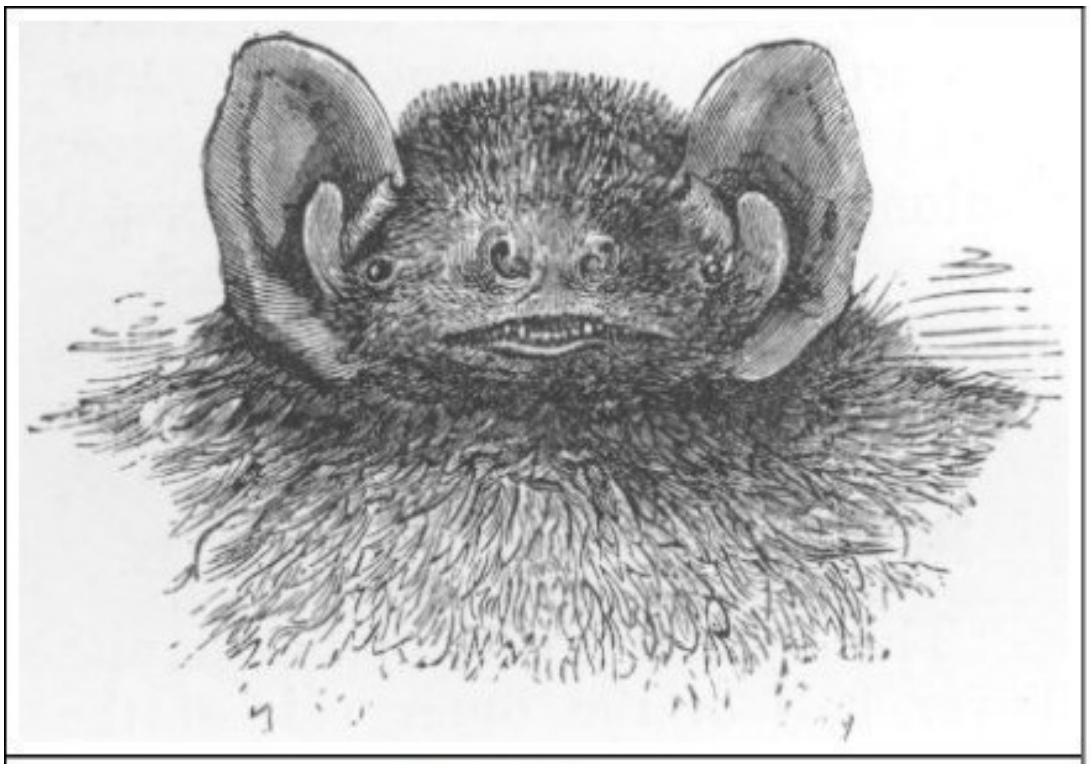
SIZE.—Head and body, 1·7 inch; ears, 1·55 (ears of English type of same size, 1·4 inch); tail, 1·7 inch. Jerdon gives larger results, but I put more reliance on Dobson's figures.

GENUS VESPERUGO

Bats with very broad and obtuse muzzles; the glandular prominences much developed between the eyes and the nostrils; crown of the head flat; but what distinguishes it from the following genus, *Scotophilus*, is the presence of four incisors in the upper jaw, whereas *Scotophilus* has two only—otherwise the two genera are very similar.

NO. 78. VESPERUGO NOCTULA

HABITAT.—Nepal.



Vesperugo noctula.

DESCRIPTION.—Head broad and flat; ears oval and broad; the outer margin convex, reflected backwards, and forming a thick lobe terminating close to the angle of the mouth; tragus short and curved inwards; muzzle devoid of hair; fur dark reddish brown.

NO. 79. VESPERUGO LEUCOTIS

HABITAT.—Deserts of Northern India, and Beluchistan.

DESCRIPTION.—"Ears, sides of face, about the eyes, interfemoral membrane, antehumeral membrane, and that portion of the wing membrane along the sides of the body, white, very translucent; remaining portion of wing membrane sepia, traversed by very distinct reticulations; fur on the upper surface black at the base of the hairs for about half their length, remaining portion light yellowish brown; beneath the same, but paler, almost white."—*Dobson*.

NO. 80. VESPERUGO MAURUS

HABITAT.—Khasya Hills.

DESCRIPTION.—Muzzle broad and flat, with large labial development; ears broad, triangular, broadly rounded off above; tragus broad and square; fur long and dense, uniformly sooty brown, with greyish tips; membranes, nose, ears and lips black.

SIZE.—Head and body 1-1/10 inch; tail, 1 inch.

NO. 81. VESPERUGO AFFINIS

HABITAT.—Burmah (Bhamo, Yunan).

DESCRIPTION (*apud* Dobson).—Head flat; upper labial glands so developed as to cause a deep depression between them on the face behind the nostrils; ears broad as long from behind; the outer margin extends from the tip to its termination near the corner of the mouth without emargination or lobe; tragus broad; inner margin straight; outer convex; small triangular lobe at base. Fur chocolate brown above, lighter on head and neck; beneath dark brown with lighter tips on the pubes, and along the thighs dirty white or pale buff.

SIZE.—Head and body, 1·9 inch; tail, 1·65 inch.

There is a good figure of the head of this bat in Dobson's Monograph; it was obtained by Dr. J. Anderson at an elevation of 4500 feet at Bhamo.

NO. 82. VESPERUGO PACHYOTIS

DESCRIPTION.—"This species is readily distinguished by the peculiar thickness of the lower half of the outer side of the ear-conch, which appears as it were excavated out of the thick integument of the neck; tragus short, curved inwards."—*Dobson*.

This bat is more fully described with three illustrations in Dobson's Monograph; he does not mention where it is found, so it may or it may not be an Indian species.

NO. 83. VESPERUGO ATRATUS

Syn.—NYCTICEJUS ATRATUS

HABITAT.—Darjeeling.

DESCRIPTION.—Head broad; muzzle obtuse; upper labial glands largely developed; ears large, oval, with rounded tips, which in the natural position of the ears appear acute, owing to the longitudinal folding of the outer side of the conch on the inner, commencing at and almost bisecting the tip (*Dobson*). Fur long, dense and black; Jerdon says rich dark brown; paler beneath.

SIZE.—Head and body, 1·9 inch; tail, 1·8 inch.

NO. 84. VESPERUGO TICKELLI

HABITAT.—Chybassa, Jashpur, and Sirguja.

DESCRIPTION.—Head broad and flat; labial glands developed; ears moderate, rounded above; outer edge straight, emarginate opposite base of tragus, terminating in a small lobe; tragus lunate; tail long; last vertebra free. The face is more clad with fur than in other species of this genus; fur of the body pale, straw brown above, pale buff beneath. For a fuller description and illustration, see Dobson's Monograph.

SIZE.—Head and body, 1·65 inch; tail, 2 inches.

NO. 85. VESPERUGO PACHYPUS

HABITAT.—Darjeeling, Tenasserim, and Andaman Islands.

DESCRIPTION.—Crown of head very flat; ears short, triangular, with broadly rounded tips, tragus short; under surface of the base of the thumb and soles of the feet with broad fleshy pads; wings rather short; fur fine and dense, above reddish brown, paler beneath.

SIZE.—Head and body, 1·75 inch; tail 1 inch.

NO. 86. VESPERUGO ANNECTANS

HABITAT.—Naga Hills and Assam.

DESCRIPTION.—Muzzle sharper; face hairy; ears pointed; tragus long; colour dark brown; illustration in Dobson's Monograph.

SIZE.—About 2 inches; tail, 1·6 inch.

Unites the appearance of a *Vespertilio* to the dentition of *Vesperugo*.

NO. 87. VESPERUGO DORMERI

HABITAT.—Southern India and Bellary Hills.

DESCRIPTION.—Head flat; ears shorter, triangular, with rounded tips; tragus with a small triangular lobe near base of outer margin; fur brown, with ashy tips above, darker brown below, with the terminal third of the hairs white. Dentition approaches the next genus, there being only one pair of unicuspidate upper incisors placed, one by each upper canine.

NO. 88. (VESPERUGO) SCOTOPHILUS SEROTINUS

Syn.—VESPERUGO SEROTINUS

The Silky Bat (Jerdon's No. 35)

HABITAT.—Europe, but extending through Asia to the Himalayas, Beluchistan and Kashmir.

DESCRIPTION.—Ears shorter than head, widely separate, ovate, angular, projecting forward, terminating in a convex; lobe ending on a level with the corner of the mouth; tragus twice the length of its breadth, semi-cordate; fur deep bay or chestnut brown; above fulvous, grey beneath; hairs of back long and silky, but the colour of the fur varies considerably.

SIZE.—Head and body, 2½ inches; tail, 2; wing expanse, 13.

This is a rare bat in India, though Captain Hutton has procured it at Mussoorie. In England it is not uncommon even near London; it flies steadily and rather slow, and is found in ruins, roofs of churches, and sometimes old hollow trees.

NO. 89. (VESPERUGO) SCOTOPHILUS LEISLERI

Syn.—VESPERUGO LEISLERI

The Hairy-armed Bat (Jerdon's No. 36)

HABITAT.—Himalayas.

Vesperugo Leisleri.

DESCRIPTION.—Ears short, oval, triangular; tragus short, rounded at tip; membrane attached to base of outer toe; all toes short; membrane over the arms very hairy, some cross-lines of hair on the interfemoral membrane; fur long, deep fuscous brown at base, chestnut at the tip; beneath greyish brown.—*Jerdon*.

SIZE.—Head and body, 2¼ inches; tail, 3¾; expanse, 11½.

SCOTOPHILUS PACHYOMUS

(Jerdon's No. 37)

Synonymous with his No. 35; see Dobson's Monograph.

NO. 90. (VESPERUGO) SCOTOPHILUS COROMANDELIANUS

Syn.—VESPERUGO ABRAMUS; VESPERTILIO COROMANDELICUS

The Coromandel Bat (Jerdon's No. 38)

HABITAT.—India generally, Burmah and Ceylon.

DESCRIPTION.—Ears triangular, rather large; outer margin straight or slightly concave; tragus lunate; feet small; wing membrane attached to the base of the toes; fur short, above dingy brown, the hairs tipped with a lighter tinge, paler beneath.

SIZE.—2½ inches, including tail, which is about 1-1/8; wing expanse, 7½.

This is a very common little bat, akin to the English Pipistrelle, and is found everywhere in roofs, hollow bamboos, &c.

NO. 91. (VESPERUGO) SCOTOPHILUS LOBATUS

Syn.—VESPERUGO KUHLII

The Lobe-eared Bat (Jerdon's No. 39)

HABITAT.—India generally.

DESCRIPTION.—Ears small, triangular; the base of the margin very convex forward; a triangular lobule above the base of the outer margin; tragus short and uniform in width; a short muzzle; wings from the base of the toes; feet small; calcaneum long; tip of tail free; fur blackish yellow above, ashy beneath.

SIZE.—Two and a-half inches, of which the tail is 1¼; expanse 7-2/3. Jerdon, quoting Tomes, states that this is the same as *V. Abramus*, but that is the synonym of the last species.

GENUS SCOTOPHILUS

Muzzle short, bluntly conical, devoid of hair; ears longer than broad; tail shorter than the head and body; wing membrane attached to the base of the toes.

Dentition: Inc., 1—1/6; can., 1—1/1—1; premolars, 1—1/2—2; molars 3—3/3—3.

Jerdon's formula gives upper incisors 4.

NO. 92. SCOTOPHILUS FULIGINOSUS

The Smoky Bat (Jerdon's No. 40)

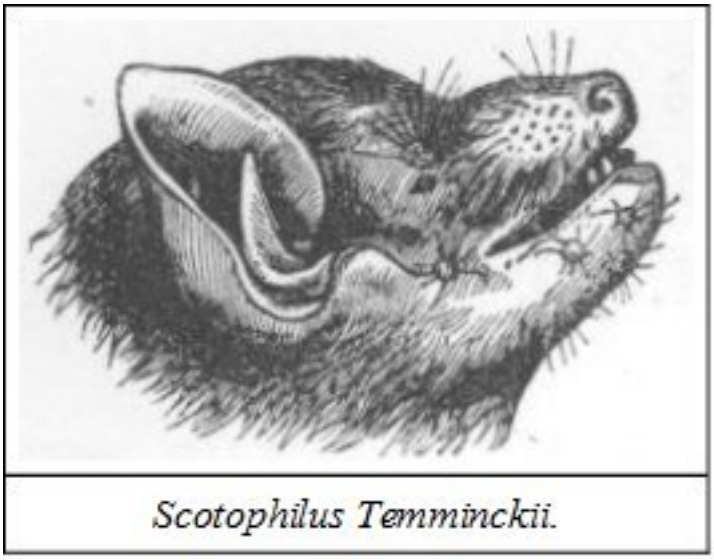
HABITAT.—Central Nepal.

DESCRIPTION (*apud* Hodgson).—"Feet very small, included in the wing membrane nearly to the end of the toes; ears acutely pointed, shorter than the head; muzzle groved, nudish; face sharp; rostrum somewhat recurved; wholly sooty brown; a little smaller than *Vesp. formosa*."

I cannot find this bat mentioned by any other author, and Jerdon says it does not seem to be recognised.

NO. 93. SCOTOPHILUS TEMMINCKII

Syn.—NYCTICEJUS TEMMINCKII (*Jerdon*)



Scotophilus Temminckii.

HABITAT.—India generally; Burmah and Ceylon.

DESCRIPTION.—Ears short, rounded and narrow; tragus narrow, curved and pointed inwards; muzzle thick, blunt and conical; the fur varies, sometimes dark olive brown, fulvous beneath, and occasionally chestnut, with a paler shade of yellow below.

SIZE.—Four and a-half inches, of which the tail is 1½; expanse, 13.

A very common species, appearing early in the evening. Horsfield says of it that it collects by hundreds in hollow trees, and feeds chiefly on white ants.

NO. 94. SCOTOPHILUS HEATHII

HABITAT.—India and Ceylon (Rajanpore, Punjab).

DESCRIPTION.—Similar to the above, but longer in all its measurements (*Dobson*). Judging from drawings, the head and muzzle of this are more in a line than in the last species, the ears project forward, and are also larger, the tragus especially, and there is a greater width between the ears.

SIZE.—Five inches, of which the tail is 2.

NO. 95. SCOTOPHILUS EMARGINATUS

HABITAT.—India; precise locality unknown.

DESCRIPTION.—Head broad and flat; muzzle obtuse and thick; ears long and large, with rounded tips turning outwards; tragus short; thumb long with a strong claw; wing membrane quite devoid of hair, except on the interfemoral membrane, which is half covered; fur tricolored, first dark chestnut, buff, and then yellowish brown.

SIZE.—Head and body, 2-1/10 inches; tail, 2 inches.

NO. 96. SCOTOPHILUS ORNATUS

Syn.—NYCTICEJUS ORNATUS

HABITAT.—India and Burmah.

DESCRIPTION.—Head broad; muzzle short; ears triangular, erect, with rounded tips, and broadly rounded lobe at the base; tragus narrow, semi-lunate, curved towards the front; fur a light Isabelline brown, spotted with white; a white spot on the centre of the forehead, and from the back of the head down the spine for two-thirds of its length a narrow white streak; on each side of the body two white patches; a broad white collar, or rather demi-collar, from one ear spot to the other, passing under the throat. Dr. Dobson says the position of these patches is very constant, but the size varies, being greatest in individuals of a pale rusty red colour, and these he found always to be males.

SIZE.—Head and body, 3 inches; tail, 2 inches; expanse, 15.

NO. 97. SCOTOPHILUS PALLIDUS

HABITAT.—Mian Mir, Lahore.

DESCRIPTION.—Head and muzzle as in *S. Temminckii*; ears slightly shorter than the head; internal basal lobe convex, evenly rounded; tip broadly rounded off; tragus moderately long and rounded at the tip; a prominent triangular lobe at base. Wing membrane from base of toes; lobule at the heel very narrow and long; last rudimentary caudal vertebra free; fur of the body, wings, and interfemoral membrane pale buff throughout.

SIZE.—Head and body, 2 inches; tail, 1·4 inch.

NOCTULINIA NOCTULA

(See *ante:* *Vesperugo noctula*—*Jerdon's No. 41*.)

NYCTICEJUS HEATHII

Large Yellow Bat (Jerdon's No. 42)

(See *ante:* *Scotophilus Heathii*.)

NYCTICEJUS LUTEUS

The Bengal Yellow Bat (Jerdon's No. 43)

NYCTICEJUS TEMMINCKII

The Common Yellow Bat (Jerdon's No. 44)

Both the above (Nos. 43 and 44) are, according to Dr. Dobson, synonymous with *Scotophilus Temminckii*, which see.

NYCTICEJUS CASTANEUS

The Chestnut Bat (Jerdon's No. 45)

This is also a variety of *Scotophilus Temminckii*.

NYCTICEJUS ATRATUS

The Sombre Bat (Jerdon's No. 46)

(See *ante:* *Vesperugo atratus*.)

NYCTICEJUS CANUS

The Hoary Bat (Jerdon's No. 47)

(See *ante:* *Vesperugo lobatus*.)

NYCTICEJUS ORNATUS

The Harlequin Bat (Jerdon's No. 48)

(See *ante:* *Scotophilus ornatus*.)

NO. 98. NYCTICEJUS NIVICOLUS

The Alpine Bat (Jerdon's No. 49)

HABITAT.—Sikim.

DESCRIPTION.—"Head and body above uniform light brown with a slight yellowish shade; underneath, from the throat to the vent, dark grey with a brownish tint, lighter on the sides of the throat. Ears long, attenuated to an obtuse point."—*Jerdon*.

SIZE.—Head and body, 3 inches; tail, 2 inches; expanse, 19 inches.

This bat was described by Hodgson ('Ann. Mag. Nat. Hist.' 1855), but there is some doubt about it, and it has been classed as a *Lasiurus* and also with *Scot. ornatus* and *Vesp. formosa*, but Jerdon thinks it a *distinct* species. I cannot find any mention of it in Dobson's monograph.

GENUS HARPIOCEPHALUS

This is also the genus *Murina* of Gray. Dr. Dobson explains his acceptance of the former term in the following way: that he first accepted *Murina* on the score of priority in a paper showing that

Harpiocephalus and *Murina* must be united in a single genus; but finding afterwards that Gray had founded *Murina* on a specimen of what he believed to be *Vesp. suillus* (Temm.), but which was in reality a specimen of a very different species from Darjeeling, belonging to the same section of the genus as *Vespertilio harpia* (Temm.) the type of his genus *Harpiocephalus*, it remained therefore either to discard both names or to retain *Harpiocephalus*, in which course he was supported by Professor Peters, to whom he mentioned the facts.

Horsfield's genus *Lasiurus* is included in this one, though Jerdon considers it distinct from *Murina*.

Muzzle elongated, conical; *nostrils prominent, tubular; produced beyond the upper lip*, opening laterally or sublaterally, emarginate between; crown of the head scarcely raised above the face line; ears thin, generally covered with glandular papillæ; tragus long, attenuated towards the tip, and inclined outwards; thumb very large, with a large, strongly curved claw; wings around interfemoral membrane very hairy.—*Dobson*.

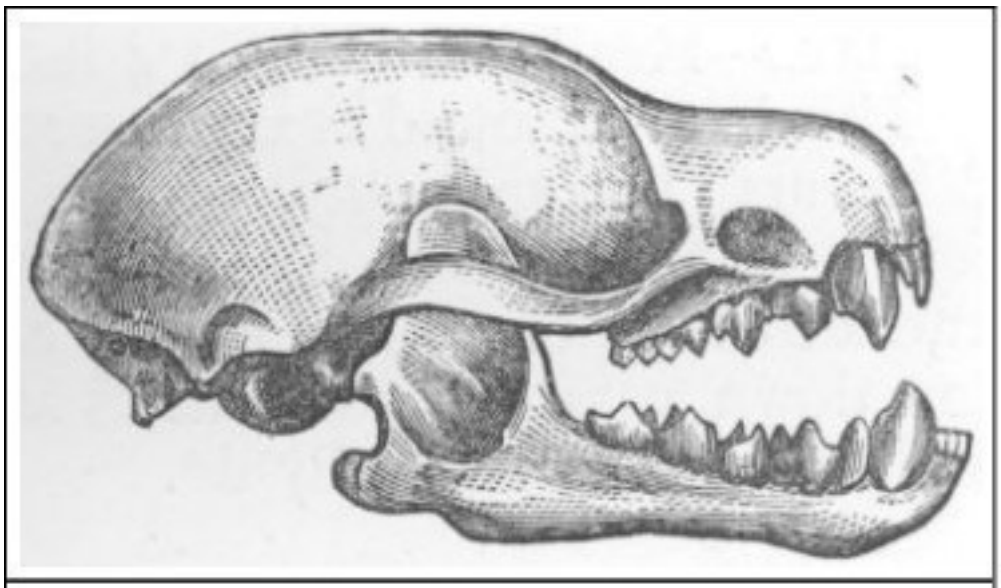
Dentition: Inc., 2—2/6; can. 1—1/1—1; premolars, 2—2/2—2; molars, 3—3/3—3.

NO. 99. HARPIOCEPHALUS HARPIA

Lasiurus Pearsonii (Horsfield) (Jerdon's No. 50)

HABITAT.—Darjeeling and Khasia hills.

DESCRIPTION.—"Fur above very soft, silky, and rather long; colour on the head, neck, and shoulders brownish grey, with a ferruginous cast, variegated with whitish hairs; the rest of the body above, with the base of the membrane, the thighs and the interfemoral membrane, have a deep bay or reddish-brown hue, and delicate hairs of the same colour are scattered over the membrane and project from its border; the body underneath is thickly covered with a grey fur, which is paler on the breast and body; the interfemoral membrane marked with regularly parallel transverse lines" (*Horsfield*). Ears ovoid; tragus rather long, nearly straight, acute at the tip (*Jerdon*). Muzzle rather short, obtusely conical; end of nose projecting considerably beyond the lip, consisting of diverging tubular nostrils opening laterally, with a slight emargination between each (*Dobson*).



Harpiocephalus harpia.

SIZE.—Head and body, 3 inches; tail, 1½ inch; expanse, 14. Hodgson, who procured it at Darjeeling, writes of it: "Entire legs and caudal membrane clad in fur like the body, which is thick and woolly. Colour bright rusty above; sooty below, the hairs tipped with hoary."

This bat is, for its size, one of the most powerfully armed with teeth. The skull reminds one of that of a dog or hyæna in miniature; the teeth are very stout, the canines blunt and conical, and the cusps of the molars short and blunt, well coated with enamel; the jaws are correspondingly muscular and adapted to the food of the animal, which consists of hard-shelled beetles, the crushed cases of which have been found in its stomach.

NO. 100. HARPIOCEPHALUS (MURINA) SUILLUS

The Pig-Bat (Jerdon's No. 51)

HABITAT.—Darjeeling (*Jerdon*); Malayan archipelago.

DESCRIPTION.—Muzzle narrow, elongated; nostrils very prominent, which, viewed from below, resemble in shape a small hour-glass placed horizontally at the extremity of the muzzle; ears moderate, shorter than the head, rounded at the tips; tragus moderately long, attenuated above and slightly curved outwards; fur light greyish-brown; extremities dark brown; beneath light greyish-brown throughout.—*Dobson*.

SIZE.—Head and body, 1¾ to 2 inches; tail, 1½ inch; expanse 9 to 10.

NO. 101. HARPIOCEPHALUS AURATUS

HABITAT.—Thibet.

DESCRIPTION.—Head and muzzle as in *H. suillus*, but the nostrils are differently shaped; each nostril forms a distinct tube directed sublaterally with a circular aperture marked by a very small notch on the outer and upper margin (*Dobson*). The whole body is thickly clad; the fur on the back is

black, with bright golden yellow tips; the back of the fore-arm covered with short golden hair; the hair of the under parts black with silvery tips, whiter on the lower jaw, neck and pubis; the interfemoral membrane is covered with very long hair, which forms a fringe along its free margin extending on the legs and feet, and projecting beyond the toes; underneath short silvery hair.

SIZE.—Head and body 1·4 inch; tail 1·2.

NO. 102. HARPIOCEPHALUS GRISEUS

HABITAT.—Jeripani, N.W. Himalayas.

DESCRIPTION.—Head and muzzle as in *H. suillus*; fur above dark brown, with yellowish-brown extremities; beneath similar, but with the extreme points of the hairs ashy.

SIZE.—Head and body, 1·4 inch; tail 1 inch.

This bat was found near Mussoorie by Captain Hutton, who writes that it occurs, but sparingly, on the outer southern range of hills at 5500 feet. It skims close to the ground, and somewhat leisurely over the surface of the crops and grass; and one which flew into his room kept low down, passing under chairs and tables, instead of soaring towards the ceiling, as bats generally do.

NO. 103. HARPIOCEPHALUS LEUCOGASTER

HABITAT.—N.W. Himalayas, Thibet.

DESCRIPTION.—Head and muzzle as in *H. harpia*; fur long and dense, above brown with grey bases; underneath whitish; sides light brown. It differs from the next species by a small projecting tooth on the inner margin of the ear conch, by the smaller size of the first upper premolar, and by the colour.—*Dobson*.

SIZE.—Head and body, 1·9 inch; tail 1·5.

NO. 104. HARPIOCEPHALUS CYCLOTIS

HABITAT.—Darjeeling, Ceylon.

DESCRIPTION.—Similar to the last, but with round ears; fur bicoloured, the hairs being dark brown at the base, with bright ferruginous tips; below pale brown; the upper surface of the interfemoral membrane and back of the feet covered with hair, which also extends beyond the toes; the first premolar in the upper jaw nearly equal in size to the second, whereas in the last species it is only about three-fourths.

SIZE.—Head and body, 1·7 inch; tail, 1·5.

GENUS KERIVOULA

DESCRIPTION.—Muzzle long and narrow; skull very concave between the nasal bones and the vertex, so that the crown appears considerably vaulted; ears funnel-shaped and semi-transparent; tragus very long, narrow and pointed; wings very wide; tail longer than head and body, wholly contained within the interfemoral membrane.

Dentition: Inc., 2—2/6; can., 1—1/1—1; premolars, 3—3/3—3; molars, 3—3/3—3.

The generic name of this bat is composed of two Singhalese words—*kehel* or *kela*, the plantain, and *voulha*, which is the Singhalese for bat, the specimen on which Gray founded his genus being the following:—

NO. 105. KERIVOULA PICTA

The Painted Bat (Jerdon's No. 53)

HABITAT.—India generally, Burmah and Ceylon.

DESCRIPTION.—"Fur fine, woolly; above yellowish-red or golden rufous, beneath less brilliant and more yellow; wing membranes inky black, with rich orange stripes along the fingers extending in indentations into the membrane."—*Jerdon*.

Ears moderate, laid forwards; the tips reach midway between the eyes and the middle of the muzzle; tragus very long and straight; thumb short; wings to the base of the toes.

SIZE.—Head and body, 1½ inch; tail, 1·6 inch; expanse about 10 inches.

This beautiful little bat is found all over India, but is not common; it is occasionally caught in plantain gardens, as it resorts to the leaves of that tree for shelter during the night, and may sometimes be discovered in the folds of a leaf. As Jerdon remarks, it looks more like a butterfly or a moth when disturbed during the day time. Dr. Dobson pertinently observes that the colours of this bat appear to be the result of the "protective mimicry" which we see so often in insects, the Mantidea and other genera, the colours being adapted to their abiding places. He alludes to Mr. Swinhoe's account ('P. Z. S.,' 1862, p. 357) of an allied species:—"The body of this bat was of an orange yellow, but the wings were painted with orange yellow and black. It was caught suspended head downwards on a cluster of the round fruit of the longan tree. (*Nephelium* [*Scytalia*] *longanum*) [the *ash phul* of Bengal]. Now this tree is an evergreen, and all the year through some portion of its foliage is undergoing decay, the particular leaves being in such a stage partially orange and black; this bat can therefore at all seasons suspend from its branches and elude its enemies by its resemblance to the leaf of the tree." This bat was named by Pallas *Vespertilio pictus*. Boddaert in 1785 termed it *Vesp. kerivoula*, and Gray afterwards took the second specific name for that of the genus, leaving the first as it is.

KERIVOULA PALLIDA

(Jerdon's No. 54.)

This is synonymous with *Vespertilio formosus*, which see further on, it is the same as the *Kerivoula formosa* of Gray.

NO. 106. KERIVOULA PAPILLOSA

(Jerdon's No. 55.)

HABITAT.—Java, but said by Jerdon to have been found in Calcutta and Ceylon.

DESCRIPTION.—Fur fine woolly, long, bicoloured; above light shining brown, paler below; the free edge of the interfemoral membrane margined with small papillæ.

NO. 107. KERIVOULA HARDWICKII

HABITAT.—India (Assam—Shillong, Khasia hills).

DESCRIPTION.—Same size as *K. picta*, but ears larger; fur uniformly dark above and below, with shining greyish-brown extremities.

GENUS VESPERTILIO

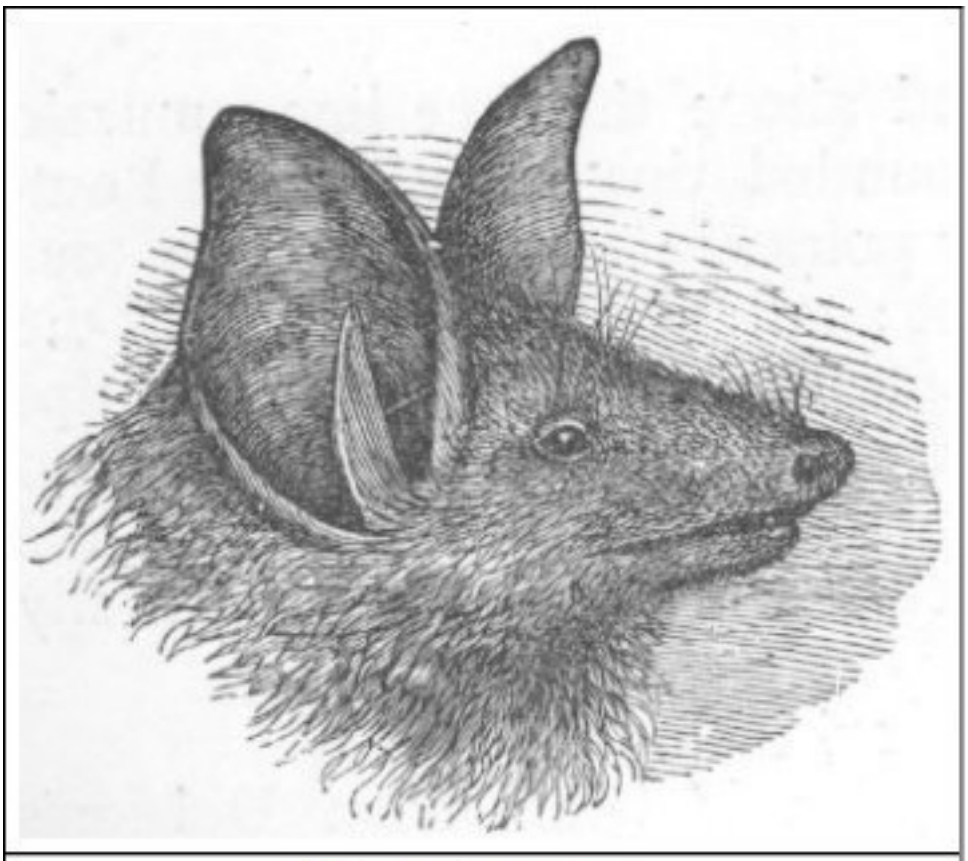
Muzzle long; ears often larger than the head, oval, apart; tragus long, acute; crown of head vaulted; feet moderate; wing membrane from base of toes; tail, wholly included in interfemoral membrane, less than length of head and body.

Dentition: Inc., 2—2/6; can., 1—1/1—1; premolars, 3—3/3—3; molars, 3—3/3—3.

NO. 108. MYOTIS (VESPERTILIO) MURINUS

(Jerdon's No. 61.)

HABITAT.—N.W. Himalayas.



Vespertilio murinus.

DESCRIPTION.—Fur above light reddish or smoke brown beneath dusky white, the base of the hairs dark.

SIZE.—Head and body, 2½ inches; tail, 2 inches; expanse, 15 inches.

NO. 109 & 110. MYOTIS THEOBALDI and MYOTIS PARVIPES

(Jerdon's Nos. 62 & 63.)

Both these appear to be closely allied to the *pipistrelle* of Europe, and are stated to have been found at Mussoorie and in Kashmir.

NO. 111. VESPERTILIO LONGIPES

HABITAT.—Kashmir (caves of Bhima Devi, 6000 feet).

DESCRIPTION.—Wings from the ankles; *feet very large*, about one-fourth the length of the head and body; fur black above, underneath black with whitish tips.

SIZE.—Head and body, 1·75 inch; tail, 1·45 inch.

NO. 112. VESPERTILIO MYSTACINUS

HABITAT.—Himalayas.

DESCRIPTION.—Muzzle narrow; skull vaulted; ears as long as head, wings from base of toes; fur dark brown.

NO. 113. VESPERTILIO MURICOLA

HABITAT.—Himalayas, Arracan.

DESCRIPTION.—Similar to the above, but may be distinguished by a small lobe behind the heel, by the deep emargination of the upper third of the outer margin of the ear; by the intensely black colour of the fur and membranes, and by its small size.—*Dobson*.

SIZE.—Head and body, 1·6 inch; tail, 1·55 inch.

NO. 114. VESPERTILIO MONTIVAGUS

HABITAT.—Burmah, Hotha, Yunan.

DESCRIPTION.—Head slightly elevated above the face line; muzzle obtuse; ears narrow, tapering, *with* rounded tips slightly turned outwards; tragus long, narrow, and acutely pointed; feet very small; toes two-thirds the length of the whole foot; tail wholly contained in the membrane; wings from base of toes; fur dark brown above, the tips paler and shining, beneath much darker, almost black, with ashy tips to the hairs; face much covered with hair, which almost conceals the eyes; the tip of the nose alone naked; wing membranes partially covered with fur.

SIZE.—Head and body, 1·8 inch; tail, 1·6 inch.

This bat, of which the above description is taken from Dobson's monograph, was obtained by Dr. J. Anderson during the Yunan Expedition.

NO. 115. VESPERTILIO MURINOIDES

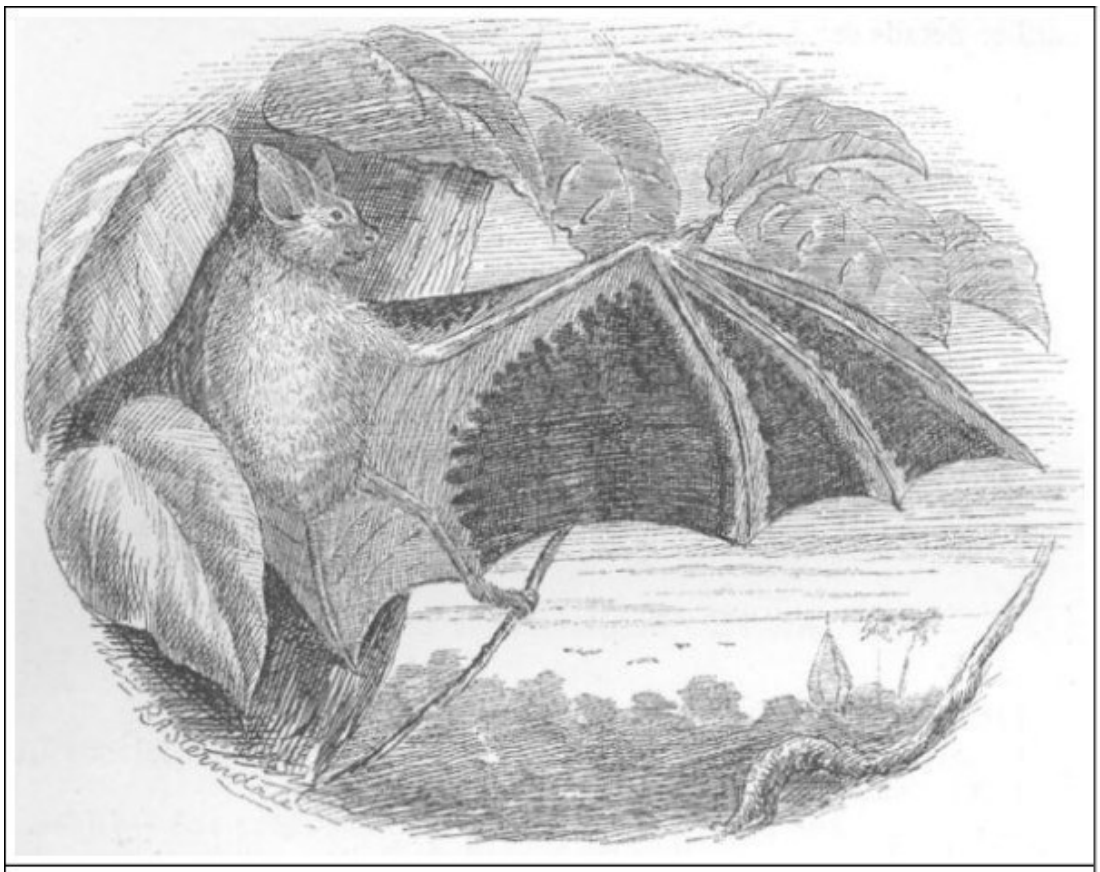
HABITAT.—N.W. Himalayas (Chamba), 3000 feet.

DESCRIPTION.—General form of the ear triangular, with narrow rounded tips; outer margin concave beneath tips; tragus slender and acutely pointed, with a quadrangular lobe at the base of the outer margin; fur dark brown above with light brown tips; dark brown below, almost black with greyish tips.

SIZE.—Head and body, 2·5 inches; tail 2.

NO. 116. VESPERTILIO FORMOSUS

HABITAT.—N.W. Himalayas (Nepal, Darjeeling), Khasia hills.



Vespertilio formosus.

DESCRIPTION.—Wing membrane broad and variegated with orange and rich dark brown; the portions of the dark-coloured membrane are triangular in form, and occupy the spaces between the second and third and third and fourth fingers; all the remaining portions of the membranes, including interfemoral, are orange, as are also the ears; the orange colour extends in narrow lines along each side of the fingers, and is dispersed over the dark triangular space in dots and streaks.

SIZE.—Head and body, 2 inches; tail, 1·1; expanse 11.

NO. 117. VESPERTILIO NEPALENSIS

HABITAT.—Khatmandu, Nepal.

DESCRIPTION.—Fur of head and back long and dense, bicoloured; base black, tips brown; underneath the hairs are two-thirds black, with the remaining upper third pure white.

SIZE.—Head and body, 1·65 inch; tail, 1·35.

NO. 118. VESPERTILIO EMARGINATUS

VARIETY.—*Desertorum*

HABITAT.—Beluchistan.

DESCRIPTION.—The upper third of the outer margin of the ears deeply emarginate; colour of fur light brownish; ears and interfemoral membranes pale yellowish white; membranes dusky white.

SIZE.—Head and body, 2 inches; tail 1·6.

GENUS MINIOPTERUS (Bonaparte)

DESCRIPTION.—Crown of head abruptly and very considerably raised above the face line; ears separate, rhomboidal, the outer margin carried forward to the angle of the mouth; tragus like that in *Vesperugo*; first phalanx of the second or longest finger very short; feet long and slender; tail as long as head and body, wholly contained in the membrane.

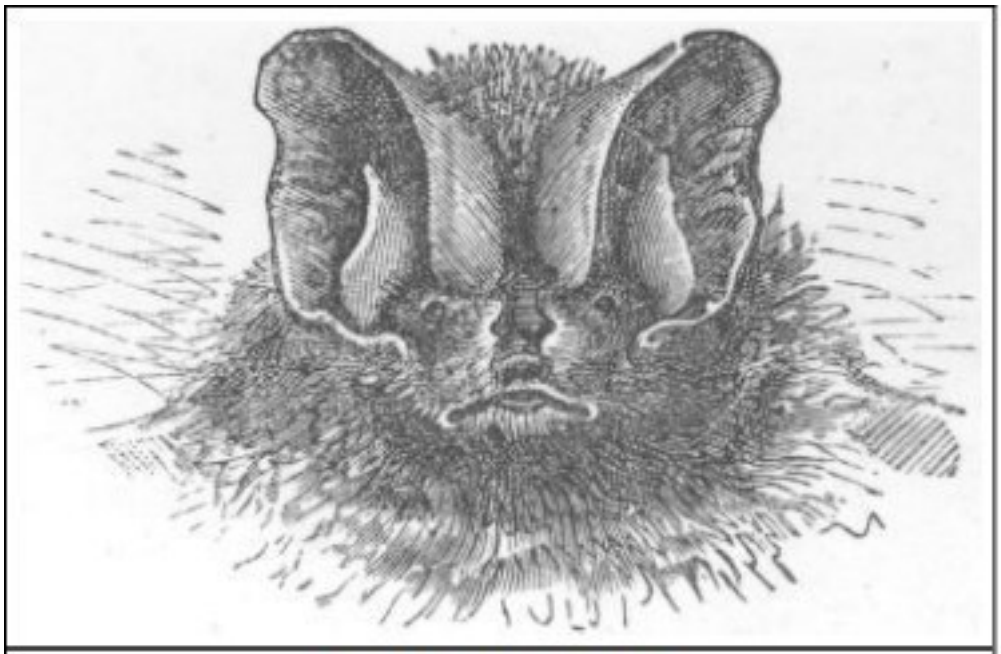
Dentition: Inc., 2—2/6; can., 1—1/1—1, premolars, 2—2/3—3, molars, 3—3/3—3.

NO. 119. MINIOPTERUS SCHREIBERSII

HABITAT.—Burmah and Ceylon.

DESCRIPTION.—Colour of fur varies, the basal half of the hair always dark greyish black, dark brown or black; the extremities varying from light grey to light reddish-grey, dark reddish-brown and black. For further details see Dobson's monograph.

GENUS BARBASTELLUS



Synotus barbastellus.

Ears large, connate at the base in front, triangular, emarginate on the outer margin, broad, concealing the back of the head, hairy in the middle; tragus broad at the base, narrow at the tip, and curved outwardly.

Dentition: Inc., 2—2/6; can., 1—1/1—1; premolars, 2—2/2—2; molars, 3—3/3—3.

NO. 120. BARBASTELLUS COMMUNIS

(Jerdon's No. 65.)

HABITAT.—Himalayas, Nepal and Mussoorie.

DESCRIPTION.—Fur above blackish brown; the hairs fulvous at the tips; abdomen greyish brown; hairs fine silky.

SIZE.—Head and body, 2 inches; tail, 1-2/12; expanse; 10½.—*Jerdon*.

This is the same as the English Barbastelle, and it appears in Dobson's monograph as *Synotus Darjeelinensis*.

NO. 121. NYCTOPHILUS GEOFFROYI

(Jerdon's No. 66.)

HABITAT.—Mussoorie.

Jerdon here goes back to the nose-leafed bats. I can find no trace of it in Dobson's monograph, which is so exhaustive as far as Asiatic species are concerned.

DESCRIPTION.—Over the eyes, at the hind corner, a tuft of black hair; fur dark brown, above throat and flank brownish-white; below black with white tips. A simple transverse nose-leaf; ears large, ovoid, united at base as in *Plecotus*.

SIZE.—Head and body, 1¾ to 2 inches; tail, 1-5/12; expanse, 9¾.

We have now concluded our notice of Indian bats but yet much is to be discovered concerning them. Very little is known of the habits of these small nocturnal animals, only a few of the most familiar large ones are such as one can discourse upon in a popular way; the lives and habits of the rest are a blank to us. We see them flit about rapidly in the dusky evening, and capture one here and there, but, after a bare description, in most cases very uninteresting to all save those who are "bat fanciers," what can be said about them? Many of them have been written about for a century, yet how little knowledge has been gained! It has been no small labour to collate all the foregoing species, and to compare them with various works; it would have been a most difficult task but for the assistance I have received from Dr. Dobson's book, which every naturalist should possess if he desires to have a thorough record of all the Indian Chiroptera.

INSECTIVORA

These are mostly small animals of, with few exceptions, nocturnal habits.

Their chief characteristic lies in their pointed dentition, which enable them to pierce and crush the hard-shelled insects on which they feed. The skull is elongated, the bones of the face and jaw especially, and those of the latter are comparatively weak. Before we come to the teeth we may notice some other peculiarities of this order.

The limbs are short, feet five-toed and plantigrade, with the entire sole placed on the ground in running, and these animals are all possessed of clavicles which in the next order are but rudimentary; in this respect they legitimately follow the Bats. The mammæ are placed under the abdomen, and are more than two. None of them (except *Tupaia*) have a cæcum (this genus has been most exhaustively described in all its osteological details by Dr. J. Anderson: see his 'Anatomical and Zoological Researches'); the snout is usually prolonged and mobile. The dentition is eccentric, and not always easy to determine; some have long incisors in front, followed by other incisors along the sides of their narrow jaws and canines, all shorter than the molars; others have large separated canines, between which are placed small incisors. In Blyth's additions to Cuvier he states that "in this group we are led to identify the canine tooth as simply the first of the false molars, which in some has two fangs, and, as in the Lemurs, to perceive that the second in the lower jaw is in some more analogous in size and character to an ordinary canine than that which follows the incisors. The incisor teeth are never more than six in number, which is the maximum throughout *placental* mammalia (as opposed by *marsupial*), and in several instances one or two pairs are deficient. (It should be remarked that a single tooth with two fangs is often represented by two separate teeth, each with one fang.) The canines, with the succeeding false molars, are extremely variable, but there are ordinarily three tuberculated molars posterior to the representative of the carnivorous or cutting grinder of the true *Carnivora*." All the molar teeth are studded with sharp points or cusps; the deciduous teeth are developed and disappear before birth. This order is divided into four families, viz., *Talpidæ* or Moles, *Sorecidæ* or Shrews, *Erinaceidæ* or Hedgehogs, and the *Tupaiadæ*, Banxrings or Tree-shrews. Of all these well-defined types are to be found in India, but America and Africa possess various genera which we have not, such as the Condylures (*Condylura*, Illiger), the Shrew-moles (*Scalops*, Cuvier), belonging to *Talpidæ*; the Solendons, Desmans, and Chrysochlores to *Sorecidæ*; the Sokinahs, Tenrecs and Gymnures to *Erinaceidæ*; and the Macroscelles or Elephant-mice of the Cape Colony form another group more allied to *Tupaia* than the rest. This last family is the most interesting. Anatomically belonging to

this order, they externally resemble the squirrels so closely as to have been frequently mistaken for them. The grovelling Mole and creeping Shrew are as unlike the sprightly Tupaia, as it springs from branch to branch, whisking its long bushy tail, as it is possible to conceive. I intend further on to give an illustration of this little animal. The first we have on record concerning it is in the papers relating to Captain Cook's third voyage, which are now in the British Museum, where the animal is described and figured as *Sciurus dissimilis*; it was obtained at Pulo Condore, an island 100 miles from Saigon, in 1780.

Sir T. Stamford Raffles was the next to describe it, which he did under the generic name *Tupaia—tupai* being a Malayan word applied to various squirrel-like small animals—but he was somewhat forestalled in the publication of his papers by MM. Diard and Duvaucel. Dr. Anderson relates how Sir T. Raffles engaged the services of these two naturalists to assist him in his researches, on the understanding that the whole of the observations and collections were to be the property of the East India Company; but ultimately on this point there arose a disagreement between them, and the paper that was first read before the Asiatic Society of Bengal on the 10th of March, 1820, was drawn up by MM. Diard and Duvaucel, though forwarded by Sir T. Raffles, whose own paper on the subject was not read before the Linnean Society until the 5th of December of that year, nor published till 1821; therefore to the others belongs the credit of first bringing this curious group to notice.

They regarded it in the light of a true Shrew, disguised in the form and habits of a squirrel, and they proposed for it the name *Sorex-Glis*, i.e. Shrew-squirrel (*Glis* properly means a dormouse, but Linnæus used it for his rodential group which he termed *Glires*); this was afterwards changed by Desmarest and Giebel to *Gli Sorex* and *Glisosorex*, which latter stands for one of the generic terms applied to the group. F. Cuvier, objecting to *Tupaia*, proposed *Cladobates* (signifying branch walkers), and Temminck, also objecting to *Tupaia*, suggested *Hylogale* (from Gr. *hyla*, forest, and *gale*, a weasel), so now we have four generic names for this one small group. English naturalists have however accepted *Tupaia*; and, as Dr. Anderson fairly remarks, though it is a pity that some definite rules are not laid down for the guidance of naturalists for the acceptance or rejection of terms, still those who reject *Tupaia* on the ground of its being taken from a savage tongue should be consistent, and refuse all others of similar origin. He is quite right; but how many we should have to reject if we did so—*Siamanga* in Quadrumana, *Kerivoula* in Cheiroptera, *Tupaia* in Insectivora, *Golunda* in Rodentia, *Rusa* in Ruminantia, and others! At the same time these names are wrong; they convey no meaning; and had they a meaning (which only *Kerivoula* or *Kelivoulha*, i.e. plantain-bat, has) it is not expressed in languages common to all western nations, such as the Latin and Greek. *Tupaia* is an unfortunate selection, inasmuch as it does not apply to one type of animal, but reminds me somewhat of the Madras *puchi*, which refers, in a general way, to most creeping insects, known or unknown.

FAMILY TALPIDÆ—THE MOLES

These animals have a small cylindrical body, very short arm attached to a large shoulder-blade, supported by a stout clavicle or collar-bone. The fore-feet are of great breadth, supported by the powerful muscles of the arm; the palm of the foot or hand is directed outwards or backwards, the lower edge being trenchant, with scarcely perceptible fingers armed with long, flat nails, strong and sharp, with which to tear up the ground and shovel the earth aside. The hind feet are small and weak in comparison, with slender claws. The head tapers to a point, the long snout being provided with a little bone which assists it in rooting, and the cervical muscles are very strong. The eyes are microscopical, and almost concealed in the fur. At one time it was a popular delusion that the mole was devoid of the power of sight, but this is not the case. The sense of hearing is extremely acute, and the tympanum is large, although externally there is no aural development. The tail is short, the fur set vertically in the skin, whence it is soft and velvety. The bones of the pubis do not join, and the young when produced are large. The mammæ are six in number. The jaws are weak, the incisors are six above and eight

below. The canines (false molars?) have two roots. There are four false molars above and three below, and three molars with pointed cusps.

Moles live principally on earth-worms, snails, and small insects, though they are also said to devour frogs and small birds. They are more common in Europe than in India, where the few known species are only to be found in hilly parts. I have, I think, procured them on the Satpura range some years ago, but I cannot speak positively to the fact at this lapse of time, as I had not then devoted much attention to the smaller mammalia, and it is possible that my supposed moles were a species of shrew.

They are seldom if ever trapped in India, for the simple reason that they are not considered worth trapping, and the destruction of moles in England has long been carried on in the same spirit of ignorance which led farmers, both there and in France, to destroy small birds wholesale, till they did themselves much injury by the multiplication of noxious insects. Moles, instead of being the farmers' foes, are the farmers' friends. Mr. Buckland in his notes to Gilbert White's 'Natural History of Selborne'(Macmillan's *édition de luxe* of 1876)—says: "After dinner we went round the sweetstuff and toy booths in the streets, and the vicar, my brother-in-law, the Rev. H. Gordon, of Harting, Petersfield, Hants, introduced me to a merchant of gingerbread nuts who was a great authority on moles. He tends cows for a contractor who keeps a great many of the animals to make concentrated milk for the navy. The moles are of great service; eat up the worms that eat the grass, and wherever the moles have been afterwards the grass grows there very luxuriantly. When the moles have eaten all the grubs and the worms in a certain space, they migrate to another, and repeat their gratuitous work. The grass where moles have been is always the best for cows." In another place he says: "M. Carl Vogt relates an instance of a landed proprietor in France who destroyed every mole upon his property. The next season his fields were ravaged with wire-worms, and his crops totally destroyed. He then purchased moles of his neighbours, and preserved them as his best friends."

The poor little despised mole has had its part to play in history. My readers may remember that William the Third's horse is supposed to have put his foot into a mole-pit, and that the king's death was hastened by the unconscious agency of "the little gentleman in black," who was so often toasted afterwards by the Jacobites.

GENUS TALPA

NO. 122. TALPA MICRURA

The Short-tailed Mole (Jerdon's No. 67)

HABITAT.—The Eastern Himalayan range.

NATIVE NAMES.—*Pariam*, Lepcha; *Biyu-kantyen*, Bhotia (*Jerdon*).

DESCRIPTION.—Velvety black, with a greyish sheen in certain lights; snout nude; eyes apparently wanting. Jerdon says there is no perforation of the integument over the eyes, but this I doubt, and think that by examination with a lens an opening would be discovered, as in the case of the Apennine mole, which M. Savi considered to be quite blind. I hope to have an opportunity of testing this shortly. The feet are fleshy white, also the tail, which, as its specific name implies, is very small. "There are three small upper premolars between the quasi-canine tooth and the large scissor-toothed premolar, which is much developed."

SIZE.—Length, 4¾ to 5 inches; head alone, 1¾; palm with claws, 7/8 inch; tail, 3/16 of an inch or less.

Jerdon says: "This mole is not uncommon at Darjeeling, and many of the roads and pathways in the station are intersected by its runs, which often proceed from the base of some mighty oak-tree to that of another. If these runs are broken down or holes made in them they are generally repaired during the night. The moles do not appear to form mole-hills as in Europe." Jerdon's specimens were dead ones picked up, as the Lepchas do not know how to trap them.

NO. 123. TALPA MACRURA

The Long-tailed Mole (Jerdon's No. 68)

HABITAT.—Sikim.

DESCRIPTION.—Deep slaty blue, with a whitish or hoary gloss, iridescent when wet; the tail covered with soft hair.

SIZE.—Head and body, 4 inches; tail, 1¼ inch; head alone, 1-1/8 inch; palm, ¾ inch.

NO. 124. TALPA LEUCURA (*Blyth*)

The White-tailed Mole

HABITAT.—Sylhet, Burmah (Tenasserim).

DESCRIPTION.—Similar to *micrura*, but with a short tail covered with white hairs, and it has one premolar less.

FAMILY SORECIDÆ

Small animals, which from their size, shape, and nocturnal habits are frequently confounded with rats and mice, as in the case of the common Indian Shrew, known to most of us as the Musk-rat; they have distinct though small eyes, distinct ears, the conch of which is like that of a mouse. The tail *thick* and tapering, whence the generic name *Pachyura*, applied by De Selys Longchamp, and followed latterly by Blyth; but there is also a sub-family of bats to which the term has been applied. "On each flank there is a band of stiff closely-set bristles, from between which, during the rutting season, exudes an odorous fluid, the product of a peculiar gland" (*Cuvier*); the two middle superior incisors are hooked and dentated at the base, the lower ones slanted and elongated; five small teeth follow the larger incisors on the upper jaw, and two those on the lower. There are three molars with sharp-pointed cusps in each jaw, with a small tuberculous tooth in the upper. The feet are five-toed, separate, not webbed like the moles; the snout is long and pointed and very mobile.

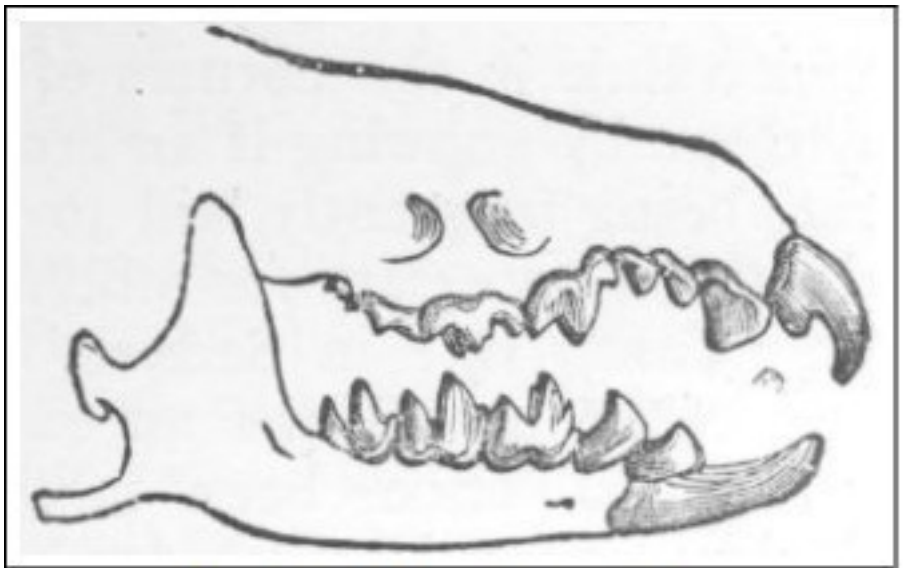
This family has been subdivided in various genera by naturalists, each one having his followers; and it is puzzling to know which to adopt. Simplicity being the great point to aim at in all these matters, I may broadly state that Shrews are divided into land and water shrews (*Sorex* and *Hydrosorex*); the former includes *Crocidura* of Wagner, *Corsira* of Gray, and *Anurosorex* of Milne-Edwards, the latter *Crossopus* and *Chimarrogale*, Gray.

For ages both in the West and East this poor little animal has been the victim of ignorance. In England, even in the last century, it was looked upon as an evil thing, as Gilbert White says: "It is supposed that a shrew-mouse is of so baneful and deleterious a nature that wherever it creeps over a beast, be it horse, cow, or sheep, the suffering animal is afflicted with cruel anguish, and threatened with loss of the use of the limb," the only remedy in such cases being the application of the twigs of a

shrew ash, which was an ash-tree into which a large hole had been bored with an augur, into which a poor little shrew was thrust alive and plugged up (*see* Brand's 'Popular Antiquities' for a description of the ceremonies). It is pleasant to think that such barbarities have now ceased, for though shrew ashes are to be found in various parts of England, I have never heard (in my own county, Derbyshire, at least) of the necessity for their use. In an article I contributed to a magazine some thirteen years ago, I pointed out a coincident superstition prevailing in India. Whilst marching as a Settlement officer in the district of Seonee, I noticed that one of my camels had a sore back and on inquiring into the cause was told by the natives that a musk-rat (our commonest shrew) had run over him. Jerdon also remarks that in Southern India (Malabar) the bite of *S. murinus* is considered venomous, and so it is in Bengal.

GENUS SOREX (Linn.)

SYNONYM.—*Pachyura*, De S. Long; *Crocidura*, Wagner.



Dentition of Shrew (magnified).

DESCRIPTION.—Upper front teeth large; "inferior incisors entire, or rarely so much as the trace of a serrated upper edge;" between these and the first cutting molar four teeth as follows: large, small, middling, very small; teeth wholly white; tail thick and tapering, with a few scattered hairs, some with glands secreting a pungent musky odour, some without.

NO. 125. SOREX CÆRULESCENS

The Common Musk Shrew, better known as Musk-rat

NATIVE NAME.—*Chachhunder*, Hind.; *Sondeli*, Canarese.

HABITAT.—India generally.

DESCRIPTION.—Bluish gray, sometimes slightly mouse-coloured; naked parts flesh-coloured.

SIZE.—Head and body, 6 to 7 inches; tail 3½ to 4 inches.

This little animal is almost too well known, as far as its appearance is concerned, to need much description, though most erroneous ideas prevail about its habits. It is proverbially difficult to uproot an old-established prejudice; and, though amongst my friends I have been fighting its battles for the poor little shrew for years, I doubt whether I have converted many to my opinions. Certainly its appearance and its smell go strongly against it—the latter especially—but even here its powers are greatly exaggerated. I think by this time the old fallacy of musk-rats tainting beer and wine in bottles by simply running over them is exploded. When I came out in 1856 it was a common thing at the mess table, or in one's own house, to reject a bottle of beer or wine, because it was "musk-ratty;" but how seldom is the complaint made now since country-bottled beverages are not used? Jerdon, Kellaart, and every Indian naturalist scouts the idea of this peculiar power to do what no chemist has yet succeeded in, viz., the creation of an essence subtle enough to pass through glass. That musky bottles were frequent formerly is due to impregnated corks and insufficient washing before the bottle was filled. The musk-rat in a quiescent state is not offensive, and its odour is more powerful at certain seasons. I am peculiarly sensitive to smells, and dislike that of musk in particular, yet I have no objection to a musk-rat running about my room quietly if I do not startle him. I never allow one to be killed, and encourage their presence in the house, for I think the temporary inconvenience of a whiff of musk is amply repaid by the destruction of the numerous objectionable insects which lurk in the corners of Indian houses. The notion that they do damage by gnawing is an erroneous one, the mischief done by mice and rats being frequently laid to their charge; they have not the powerful dentition necessary for nibbling through wood and mortar. In my book on 'Camp Life in Seonee,' I say a good word for my little friends, and relate as follows an experiment which I tried many years ago: "We had once been talking at mess about musk-rats; some one declared a bottle of sherry had been tainted, and nobody defended the poor little beast but myself, and I was considerably laughed at. However, one night soon after, as I was dressing before dinner, I heard a musk-rat squeak in my room. Here was a chance. Shutting the door, I laid a clean pocket-handkerchief on the ground next to the wall, knowing the way in which the animal usually skirts round a room; on he came and ran over the handkerchief, and then, seeing me, he turned and went back again. I then headed him once more and quietly turned him; and thus went on till I had made him run over the handkerchief five times. I then took it up, and there was not the least smell. I then went across to the mess house, and, producing the handkerchief, asked several of my brother officers if they could perceive any peculiar smell about it. No, none of them could. 'Well, all I know is,' said I, 'that I have driven a musk-rat five times over that pocket-handkerchief just now.'"

When I was at Nagpore in 1864 I made friends with one of these shrews, and it would come out every evening at my whistle and take grasshoppers out of my fingers. It seemed to be very short-sighted, and did not notice the insect till quite close to my hand, when, with a short swift spring, it would pounce upon its prey.

A correspondent of *The Asian*, writing from Ceylon, gives an account of a musk-rat attacking a large frog, and holding on to it in spite of interference.

McMaster says that these shrews will also eat bread, and adds: "insects, however, form their chief diet, so they thus do us more good than harm. I once disturbed one that evidently had been eating part of a large scorpion."

NO. 126. SOREX MURINUS

The Mouse-coloured Shrew (Jerdon's No. 70)

HABITAT.—India generally, Burmah and Ceylon.

DESCRIPTION.—Brownish-grey above, paler beneath; fur coarser and longer than in the last species, and in the young ones the colour is more of a bluish-grey, browner on the back. The ears are larger than those of *S. cærulescens*; tail nearly equal to the body, thick at the base, and sparsely covered with long coarse hairs; feet and tail flesh-coloured in the living animal.

SIZE.—Head and body about 6 inches; tail, 3½ inches.

"This," as Jerdon says, "is the common musk-rat of China, Burmah, and the Malayan countries, extending into Lower Bengal and Southern India, especially the Malabar Coast, where it is said to be the common species, the bite of which is considered venomous by the natives." Kellaart mentions it in Ceylon as the "common *musk shrew* or rat of Europeans;" but he confuses it with the last species. He gives the Singhalese name as "*koone meeyo*." The musky odour of this species is less powerful, and is almost absent in the young. Blyth states that he was never able to obtain a specimen of it in Lower Bengal, yet the natives here discriminate between the light and dark-coloured shrews, and hold, with the people of Malabar, that the bite of the latter is venomous. Horsfield states that it has been found in Upper India, Nepal, and Assam, and he gives the vernacular name in the last-named country as "*seeka*."

NO. 127. SOREX NEMORIVAGUS

The Nepal Wood Shrew (Jerdon's No. 71)

HABITAT.—Nepal.

DESCRIPTION.—Differs from the last "by a stouter make, by ears smaller and legs entirely nude, and by a longer and more tetragonal tail; colour sooty black, with a vague reddish smear; the nude parts fleshy grey; snout to rump, 3-5/8 inches; tail, 2 inches, planta, 11/16 inch. Found only in woods and coppices."—*Hodgson*.

NO. 128. SOREX SERPENTARIUS

The Rufescent Shrew (Jerdon's No. 72)

HABITAT.—Southern India, Burmah and Ceylon.

DESCRIPTION.—Colour dusky greyish, with rufous brown tips to the hairs (*Blyth*). Above dusky slate colour with rufescent tips to the fur; beneath paler, with a faint rufous tinge about the breast (*Jerdon*). Fur short ashy-brown, with a ferruginous smear on the upper surface; beneath a little paler coloured (*Kellaart*). Teeth and limbs small; tail slender.

SIZE.—Head and body about 4½ inches; tail, 2 inches; skull, 1-2/10 inch.

The smell of this musk shrew is said by Kellaart, who names it *S. Kandianus*, to be quite as powerful as that of *S. cærulescens*. Blyth seems to think that this animal gets more rufescent with age, judging from two examples sent from Mergui. By some oversight, I suppose, he has not included this species in his 'Catalogue of the Mammals of Burmah.'

NO. 129. SOREX SATURATIOR

The Dark Brown Shrew (Jerdon's No. 73)

HABITAT.—Darjeeling.

DESCRIPTION.—"Colour uniform deep brown, inclining to blackish, with a very slight rufescent shade; fur short, with an admixture of a few lengthened piles, when adpressed to the body smooth, but reversed somewhat harsh and rough; tail cylindrical, long, gradually tapering; mouth elongated, regularly attenuated, ears moderate, rounded."

SIZE.—Head and body, 5½ inches; tail, 3 inches.

Jerdon seems to think this is the same as *S. Griffithi* or closely allied; I cannot say anything about this, as I have no personal knowledge of the species, but on comparison with the description of *S. Griffithi* (which see further on) I should say they were identical.

NO. 130. SOREX TYTLERI

The Dehra Shrew (Jerdon's No. 74)

HABITAT.—Dehra Doon.

DESCRIPTION.—"Light rufescent sandy brown, paler beneath; unusually well clad even on the feet and tail, this last being covered with shortish fur having numerous long hairs intermixed; form very robust; basal portion of tail very thick."

SIZE.—Head and body, 4½ inches; tail, 2¾ inches; hind foot, 7/8 inch.

NO. 131. SOREX NIGER

The Neilgherry Wood Shrew (Jerdon's No. 75)

HABITAT.—Ootacamund, Neilgherry hills.

DESCRIPTION.—"Blackish-brown, with a rufescent shade on the upper parts; abdomen greyish; tail equal in length to the entire animal, exclusive of the head, gradually tapering to a point; snout greatly attenuated. Length of head and body, 3½ inches; of the tail, 2½ inches."—*Horsfield*.

NO. 132. SOREX LEUCOPS

The Long-tailed Shrew (Jerdon's No. 76)

HABITAT.—Nepal.

DESCRIPTION.—Uniform blackish-brown colour; tail very long and slender, exceeding in length the head and body, terminating in a whitish tip of half an inch long.

SIZE.—Head and body, 3 inches; tail, 2½ inches. Jerdon supposes that it is found at great altitudes, from Hodgson having in another place described it (MSS.) under the name *nivicola*.

NO. 133. SOREX SOCCATUS

The Hairy-footed Shrew (Jerdon's No. 77)

HABITAT.—Nepal, Sikim, Mussoorie.

DESCRIPTION.—According to Hodgson, nearly the size of *S. nemorivagus*, "but distinguished by its feet being clad with fur down to the nails, and by its depressed head and tumid bulging cheeks (mystaceal region); ears large and exposed; colour a uniform sordid or brownish-slaty blue, extending to the clad extremities; snout to rump, 3½ inches; tail, 2½ inches; planta, 13/16 inch. This animal was caught in a wood plentifully watered, but not near the water. It had no musky smell when brought to me dead."

NO. 134. SOREX MONTANUS

The Ceylon Black Shrew

HABITAT.—Ceylon, mountainous parts.

DESCRIPTION.—"Fur above sooty black without any ferruginous smear, beneath lighter coloured; whiskers long, silvery grey; some parts of legs and feet greyish, clothed with adpressed hairs; claws short, whitish; ears large, round, naked; outer margin lying on a level with the fur of the head and neck, the ears being thus concealed posteriorly; tail tetragonal, tapering, shorter than head and body."—*Kellaart.*

SIZE.—Head and body, 3¾ inches; tail, 2¼ inches; hind feet, 1/3 inch.

NO. 135. SOREX FERRUGINEUS

The Ceylon Rufescent Shrew

HABITAT.—Ceylon, Dimboola, below Newara Elia.

DESCRIPTION.—"Colour uniform dusky or dusky slate, with the tips of the fur rufescent; fur long; large sebaceous anal glands; smell very powerful."—*Kellaart.*

SIZE.—Head and body, 3¾ inches; tail, 2¼ inches.

NO. 136. SOREX GRIFFITHI

The Large Black Shrew

HABITAT.—Khasia hills and Arracan.

DESCRIPTION.—"Deep blackish-brown, with a slight rufous reflection in a certain light; fur short, close, soft, and adpressed; tail thick at the base, with a few long very slender straggling hairs along its entire length; ears small and rounded; snout elongated."—*Horsfield.*

SIZE.—Head and body, 5¾ inches; tail, 2½ inches.

Horsfield puts this down as having been found in Afghanistan by Griffiths, but this is an error owing to Griffiths' Afghanistan and Khasia collections having got mixed up.

NO. 137. SOREX HETERODON

HABITAT.—Khasia hills.

DESCRIPTION.—"Very similar to *S. soccatus* in general appearance, but less dark coloured, with shorter fur, and pale instead of blackish feet and tail underneath; the feet too are broader, especially the hind feet, and they have a hairy patch below the heel" (*Blyth*). The skull is narrower, and the upper incisors less strongly hooked.

GENUS FEROCULUS

Teeth small; upper incisors shorter and less strongly hooked than in restricted *Sorex*; posterior spur large; lower incisors serrated with three coronal points. Feet very large.

NO. 138. FEROCULUS MACROPUS

The Large-footed Shrew

HABITAT.—Ceylon.

DESCRIPTION.—Fur, long, soft uniform blackish—faint rufescent tinge.

SIZE.—Head and body 4¼ inches; tail 2¼.

The following species are of a more diminutive type, and are commonly called "pigmy-shrews;" in other respects they are true shrews.

NO. 139. SOREX HODGSONI

The Nepal Pigmy-Shrew (Jerdon's No. 78)

HABITAT.—Nepal and Sikim.

DESCRIPTION.—Brown, with a slight tinge of chestnut; feet and tail furred; claws white.

SIZE.—Head and body 1½ inch; tail, 1 inch.

Found in coppices and fields; rarely entering houses.

NO. 140. SOREX PERROTETI

The Neilgherry Pigmy-Shrew (Jerdon's No. 79)

HABITAT.—Neilgherry hills, probably also other parts of Southern India.

DESCRIPTION.—"Back deep blackish-brown; belly pale; limbs and feet brown; palms and plantæ clad with hairs; ears large, conspicuous."

SIZE.—Head and body, 1-4/12 inch; tail, 11/12 inch.

NO. 141. SOREX MICRONYX

The Small-clawed Pigmy-Shrew (Jerdon's No. 80)

HABITAT.—West Himalayas, Kumaon, Mussoorie.

DESCRIPTION.—Claws very minute, with fine hairs impending them, only to be detected by a lens; fur paler and more chestnut-brown than any other of these minute shrews, and more silvery below.

SIZE.—Head and body, 1-5/8 inch; tail 1-1/8 inch.

NO. 142. SOREX MELANODON

The Black-toothed Pigmy-Shrew (Jerdon's No. 81)

HABITAT.—Calcutta.

DESCRIPTION.—Called *melanodon* from the remarkable colouring of its teeth, which are piceous and white-tipped; colour uniform fuscous, scarcely paler beneath.

SIZE.—Head and body, 1-7/8 inch; tail, 1-1/16 inch.

NO. 143. SOREX NUDIPES

The Naked-footed Shrew

HABITAT.—Tenasserim.

DESCRIPTION.—"Remarkable for its naked feet and very large ears; also for the odoriferous glands on the sides being strongly developed, whereas we can detect them in no other of these minute species" (*Blyth*). Colour brown above, a little grizzled and glistening, more silvery below.

SIZE.—Head and body, 1¾ inch; tail, 1-1/16 inch.

NO. 144. SOREX ATRATUS

The Black Pigmy-Shrew

HABITAT.—Khasia hills.

DESCRIPTION.—"Very dark colour, extending over the feet and tail which is even *blackish underneath*; fur blackish-brown above, a little tinged rufescent, and with dark greyish underneath; the feet and tail conspicuously furred, beside the scattered long hairs upon the latter."—*Blyth*.

This species was determined by Blyth on a single specimen, which was found without its head, impaled by some shrike upon a thorn at Cherrapunji. The same thing occasionally occurs in England, when the common shrew may be found impaled by the rufous-backed shrike (*Lanius collurio*).

SUB-GENUS SORICULUS (Blyth)

The foregoing species being of the *white-toothed* variety (with the exception of *S. melanodon*, which, however, exhibits coloration decidedly the *reverse* of the following type), we now come to the shrews with teeth tipped with a darker colour; the dentition is as in the restricted shrews, with the peculiarity of colour above mentioned. The hind feet of ordinary proportions, unadapted for aquatic habits, and the tail slender and tapering, like that of a mouse, instead of being cylindrical with a stiff brush at the end.

NO. 145. SORICULUS NIGRESCENS

The Mouse-tailed Shrew (Jerdon's No. 82)

HABITAT.—Sikim and Nepal.

DESCRIPTION.—"Above dark-blackish or blackish-brown, slightly tinged rufescent, and with a silvery cast in certain lights; beneath greyish-black" (*Jerdon*). Feet and claws pale; tail slender, straight and naked.

SIZE.—Head and body, 3¼ inches; tail, 1½ inch; hind foot, 5/8 inch.

Jerdon says that Kellaart named an allied species from Ceylon *Corsira newera ellia*, but I have not been able to find it in his 'Prodromus Faunæ Zeylanicæ,' nor elsewhere.

GENUS CROSSOPUS (Wagner)

The hind feet large; the lower surface, as also of the tail, fringed with stiff hairs; tail somewhat compressed towards the tip; habits aquatic.

NO. 146. CROSSOPUS HIMALAICUS

The Himalayan Water-Shrew (Jerdon's No. 83)

NATIVE NAMES.—*Oong lagniyu*, Lepcha; *Choopitsi*, Bhot.

HABITAT.—Darjeeling.

DESCRIPTION.—Fur dark brown above, paler beneath; rusty brown on the lower part of throat and middle of belly, according to Jerdon; slate coloured back with scattered long hairs, which are longer and white-tipped on the sides and rump, according to Blyth's memoir; ears very small, hairy, concealed; tail long, slender, fringed with stiff whitish hair beneath; whiskers long and brown.

SIZE.—Head and body, 5 to 6 inches; tail about 3½ inches; hind foot, ¾ to 11/12 inch.

Jerdon procured this water-shrew at Darjeeling in the Little Rungeet river; it is said to live on small fish, tadpoles, water insects, &c. The movements of the English water-shrew, when swimming, are very agile. It propels itself by alternate strokes of its hind feet, but with an undulating motion, its sides being in a manner extended, and body flattened, showing a narrow white border on each side; then the fur collects a mass of tiny air bubbles which make the submerged portion glow like silver. It prefers clear still water, but at the same time will make its way up running streams and ditches, and occasionally wanders away into fields, and has been found in houses and barns.

Its food is principally aquatic insects, worms, mollusca, and freshwater crustacea. In Bell's 'British Quadrupeds' its mode of poking about amongst stones in search of fresh-water shrimps (*Gammarus pulex*) is well described. Mr. F. Buckland states that he once dissected a water-shrew and found the intestines to contain a dark fluid pulpy matter, which, on being examined by a microscope, proved to consist entirely of the horny cases and legs of minute water insects. Continental writers declare that it will attack any small animal that comes in its way, giving it quite a ferocious character, and it is said to destroy fish spawn. I can hardly believe in its destroying large fish by eating out their brain and eyes. Brehm, who gives it credit for this, must have been mistaken. I have also read of its attacking a rat in a trap which was dead, and was discovered devouring it, having succeeded in making a small hole through the skin.

In England this animal breeds in May. The young are from five to seven in number, and are brought forth in a small chamber in the bank, which is constructed with several openings, one of which is usually under the level of the water.

Dr. Anderson has very fully described the Himalayan species under the name of *Chimarrogale Himalaica*. He caught a specimen in a mountain stream at Ponsee in the Kakhyen hills, 3500 feet above the sea level, and observed it running over the stones in the bed of the stream and plunging freely into the water hunting for insects.

GENUS NYCTOGALE

Head and skull as in *Soricidæ*, but with palmated feet and compressed tail, as in *Myogalidæ*. Special characteristic, large pads on the soles of the feet, which form sucking discs.

NO. 147. NYCTOGALE ELEGANS

The Thibet Water-Shrew

HABITAT.—Moupin in Thibet.

DESCRIPTION.—Fur of two kinds, a soft under down of slaty grey colour through which pass longer hairs, grey at the base with white tips, "causing the animal to vary considerably in appearance according as these hairs are raised or laid flat;" ears quite concealed, and without a conch; tail stout, longer than the body, quadrangular at the base, then triangular, and finally flattened; feet large and palmated, with large pads on the soles, depressed in the middle, forming sucking discs, which are a peculiar characteristic of this animal.

SIZE.—Head and body about 3½ inches; tail about 4 inches.

Though this is not properly an Indian animal, I have thought fit to include it as belonging to a border country in which much interest is taken, and which has as yet been imperfectly explored.

GENUS CORSIRA

Of Gray, *Amphisorex* of Duvernoy; differs in dentition from the last in having the lower quasi-incisors serrated with three or four coronal points, and the anterior point of the upper incisors not prolonged beyond the posterior spur, tipped with ferruginous; the lateral small teeth in the upper jaw are five in number, diminishing in size from the first backwards. Tail cylindrical, not tapering, and furnished with a stiffish brush at the extremity. The common British land-shrew is of this type.

NO. 148. CORSIRA ALPINA

The Alpine Shrew (Jerdon's No. 84)

HABITAT.—Darjeeling.

DESCRIPTION.—Deep blackish brown, very slightly rufescent in certain lights; tail slender, nearly naked, very slightly attenuated, compressed at the tip.

SIZE.—Head and body, 2½ inches; tail 2½ inches.

This is identical with the European Alpine shrew; the *Sorex caudatus* of Horsfield's Catalogue (No. 148), which was a specimen named by Hodgson, is also the same animal.

GENUS ANUROSOREX

Remarkably for its large head, nude, scaly extremities, and extremely short, nude, scaly tail. "The structure of the ear, limbs and tail has special reference to a burrowing animal—the ear being valvular, so that it may be effectually closed against the entrance of foreign substances, and the feet devoid of hair, but scaly, and the tail reduced to very small dimensions. The eye is also excessively small, and buried deep in the dense silky fur. The hind feet, contrary to what is almost invariably the case in burrowing mammals, are larger than the fore feet."—*Anderson*.

NO. 149. ANUROSOREX ASSAMENSIS

The Assam Burrowing Shrew

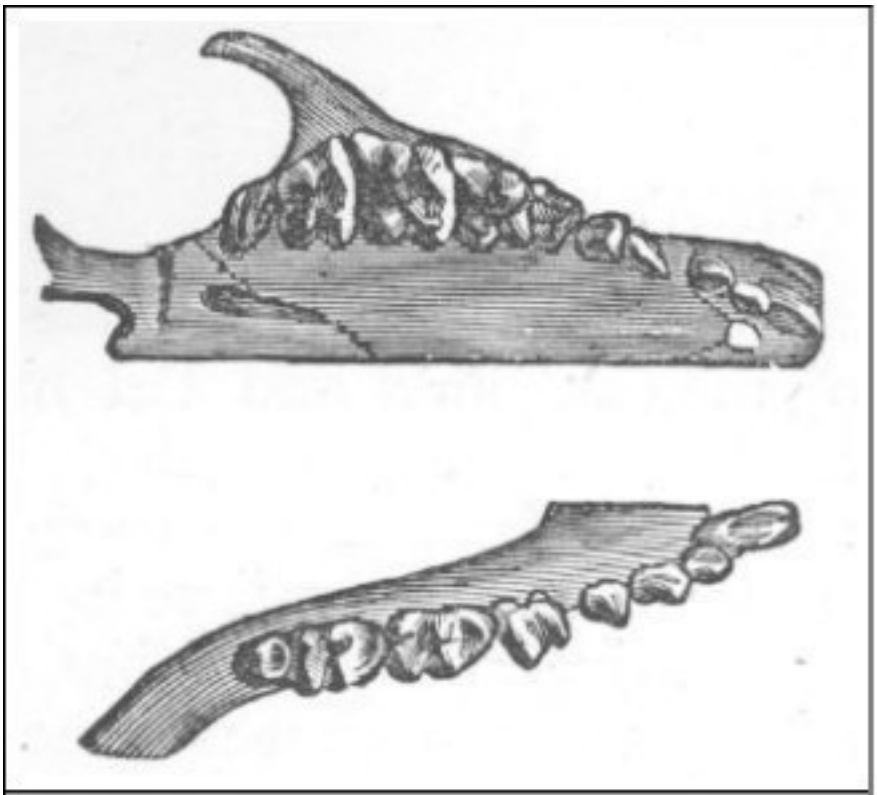
HABITAT.—Assam, Thibet.

DESCRIPTION.—General colour dark slaty, faintly washed with brownish rusty on the long hairs of the rump; fur long and silky, longest over the rump; occasional long brown hairs with pale tips are scattered over the body; long whiskers, yellow claws; naked parts of snout, limbs and tail flesh-coloured.

SIZE.—Head and body nearly 3 inches; tail, ½ inch; forefoot, ½ inch; hind foot, ¾ inch.

The skull and dentition of this animal are essentially soricine. The Thibetan species (*A. squamipes*) is described as being over four inches in length, of a greyish colour, with a greenish-brown tinge; feet and nails whitish. It lives in burrows which it digs in the earth. I think it should properly come after the moles, which it resembles in some particulars.

FAMILY ERINACEIDÆ—THE HEDGEHOGS



Dentition of Hedgehog.

The molar teeth broad; the hinder ones nearly square, the tubercles on their upper surface rounded; the other teeth are three incisors on each side, of which the inner one is considerably larger than the rest; behind these, separated by a little gap, come three premolars gradually increasing in size, then one having much the appearance of a true molar, but furnished with a cutting edge; then three molar teeth, two of which are nearly square with strong tubercles. The last molar is small. In the lower jaw the lowermost incisor is very large, and projects almost horizontally forwards, and it is followed by three small teeth now acknowledged to be premolars, with another large premolar, which is of the nature of a carnassial or cutting tooth acting on the one in the upper jaw. Then three molars as above, two large and one small, but with sharp tubercles. The skull has a more carnivorous form; it has "a complete zygomatic arch, and the tympanic bone forms a bundle-like swelling on each side of the back of the skull." Feet pentadactylous or five-toed; legs very short. The tibia and fibula (two bones of the shank) are joined together. The back is clothed with hair intermixed with sharp spines or bristles. Tail short or wanting entirely.

GENUS ERINACEUS

The European hedgehog is well known to most of us. Few boys who have lived a country life have been without one at some time or other as a pet. I used to keep mine in a hole at the root of an old apple-tree, which was my special property, and they were occasionally brought into the house at the cook's request to demolish the black-beetles in the kitchen. These they devour with avidity

and pursue them with the greatest ardour. They also eat slugs, worms, and snails; worms they seize and eat from end to end, like a Neapolitan boy with a string of maccaroni, slowly masticating, the unconsumed portion being constantly transferred from one side of the mouth to the other, so that both sides of the jaws may come into play. Dr. Dallas quaintly remarks on the process: "This must be an unpleasant operation for the worm, much as its captor may enjoy it." Toads, frogs, mice, and even snakes are eaten by the European hedgehog. It would be interesting to find out whether the Indian hedgehog also attacks snakes; even the viper in Europe is devoured by this animal, who apparently takes little heed of its bite. The European species also eats eggs when it can get them, and I have no doubt does much damage to those birds who make their nests on the ground.

Few dogs will tackle a hedgehog, for the little creature at once rolls itself into a spiny ball, all sharp prickles, by means of the contraction of a set of cutaneous muscles, the most important of which, the *orbicularis panniculi*, form a broad band encircling the body which draws together the edges of the spiny part of the skin. There is a most interesting account of the mechanism of the spines in Mr. F. Buckland's notes to White's 'Natural History of Selborne,' vol. ii., page 76. A jet of water poured on to the part within which the head is concealed will make the creature unroll, and it is said that foxes and some dogs have discovered a way of applying this plan, and also that foxes will roll a hedgehog into a ditch or pond, and thus make him either expose himself to attack or drown. Gipsies eat hedgehogs, and consider them a delicacy—the meat being white and as tender as a chicken (not quite equal to porcupine, I should say); they cook them by rolling them in clay, and baking them till the clay is dry; when the ball is broken open the prickles come off with the crust.

Hedgehog.

Hedgehogs have had several popular fallacies concerning them. They were supposed to suck cows dry during the night and to be proof against poisons. Mr. Frank Buckland tried prussic acid on one with fatal results, but he says the bite of a viper seemed to have no effect. Pallas, I know, has

remarked that hedgehogs will eat hundreds of cantharides beetles with impunity, whereas one or two will cause extreme agony to a cat or dog. The female goes with young about seven weeks, and she has from three to eight in number. The little ones when born have soft spines—which, however, soon harden—are blind, and, with the exception of the rudimentary prickles, quite naked. They are white at birth, but in about a month acquire the colour of the mother.

NO. 150. ERINACEUS COLLARIS

The Collared Hedgehog (Jerdon's No. 85)

HABITAT.—Northern India and Afghanistan. Dallas says from Madras to Candahar; but Jerdon calls it the North Indian hedgehog, and assigns to it the North-west, Punjab, and Sind, giving Southern India to the next species.

DESCRIPTION.—Spines irregularly interwoven, ringed with white and black, with yellowish tips, or simply white and black, or black with a white ring in the middle; ears large; chin white; belly and legs pale brown.

SIZE.—Head and body, 8 to 9 inches; tail, 7/12 inch.

I have found this species in the Punjab near Lahore. One evening, whilst walking in the dusk, a small animal, which I took to be a rat, ran suddenly between my legs. Now I confess to an antipathy to rats, and, though I would not willingly hurt any animal, I could not resist an impulsive kick, which sent my supposed rat high in the air. I felt a qualm of conscience immediately afterwards, and ran to pick up my victim, and was sorry to find I had perpetrated such an assault on an unoffending little hedgehog, which was however only stunned, and was carried off by me to the Zoological Gardens. Captain Hutton writes of them that they feed on beetles, lizards, and snails; "when touched they have the habit of suddenly jerking up the back with some force so as to prick the fingers or mouth of the assailant, and at the same time emitting a blowing sound, not unlike the noise produced when blowing upon a flame with a pair of bellows." He also says they are very tenacious of life, bearing long abstinence with apparent ease; when alarmed they roll themselves up into a ball like the European species.

Hutton also remarks that *E. collaris*, on hearing a noise, jerks the skin and quills of its neck completely over its head, leaving only the tip of the nose free.

NO. 151. ERINACEUS MICROPUS

The Small-footed Hedgehog (Jerdon's No. 86)

HABITAT.—South India.

DESCRIPTION.—"Ears moderately large; form somewhat elongated; tail very short, concealed; feet and limbs very small; head and ears nude, sooty-coloured; belly very thinly clad with yellowish hairs; spines ringed dark brown and whitish, or whitish with a broad brown sub-terminal ring, tipped white."—*Jerdon*.

SIZE.—Head and body about 6 inches. Dr. Anderson considers this as identical with *E. collaris*.

NO. 152. ERINACEUS PICTUS

The Painted Hedgehog

HABITAT.—Central India, Goona, Ulwar, Agra, Kurrachee.

DESCRIPTION.—Similar to the above, but the tips of the spines are more broadly white, and the brown bands below not so dark; the ears are somewhat larger than *micropus*, and the feet narrower and not so long.

NO. 153. ERINACEUS GRAYI

HABITAT.—North-west India.

DESCRIPTION.—The general colour is blackish-brown; the spines are narrowly tipped with black, succeeded by a narrowish yellow band; then a blackish-brown band, the rest of the spine being yellowish; the broad dark-brown band is so strongly developed as to give the animal its dark appearance when viewed from the side; some animals are, however, lighter than others. The feet are large; the fore-feet broad, somewhat truncated, with moderately long toes and powerful claws.

SIZE.—Head and body about 6¾ inches.

NO. 154. ERINACEUS BLANFORDI (*Anderson*)

HABITAT.—Sind, where one specimen was obtained by Mr. W. T. Blanford, at Rohri.

DESCRIPTION.—Muzzle rather short, not much pointed; ears moderately large, but broader than long, and rounded at the tips; feet larger and broader than in the next species, with the first toe more largely developed than in the last. The spines meet in a point on the forehead, and there is no bare patch on the vertex. Each spine is broadly tipped with deep black, succeeded by a very broad yellow band, followed by a dusky brown base; fur deep brown; a few white hairs on chin and anterior angle of ear.

SIZE.—Head and body, 5·36 inches.

NO. 155. ERINACEUS JERDONI (*Anderson*)

HABITAT.—Sind, Punjab frontier.

DESCRIPTION.—Muzzle moderately long and pointed; ears large, round at tip and broad at base; feet large, especially the fore-feet; claws strong. The spines begin on a line with the anterior margins of the ears; large nude area on the vertex; spines with two white and three black bands, beginning with a black band. When they are laid flat the animal looks black; but an erection the white shows and gives a variegated appearance.

SIZE.—Head and body about 7½ inches.

NO. 156. ERINACEUS MEGALOTIS

The Large-eared Hedgehog

HABITAT.—Afghanistan.

More information is required about this species. Jerdon seems to think it may be the same as described by Pallas (*E. auritus*), which description I have before me now ('Zoographica Rosso Asiatica,' vol. i. page 138), but I am unable to say from comparison that the two are identical—the ears and the muzzle are longer than in the common hedgehog. This is the species which he noticed devouring blistering beetles with impunity. It has a very delicate fur of long silky white hairs, covering the head, breast and abdomen, "forming also along the sides a beautiful ornamental border" (*Horsfield*, from a specimen brought from Mesopotamia by Commander Jones, I.N.)

The space to which I am obliged to limit myself will not allow of my describing at greater length; but to those of my readers who are interested in the Indian hedgehogs, I recommend the paper by Dr. J. Anderson in the 'Journal of the Asiatic Society of Bengal' for 1878, page 195, with excellently drawn plates of the heads, skulls and feet of the various species. There is one peculiarity which he notices regarding the skull of *E. collaris* (or, as he calls it, *micropus*): the zygomatic arch is not continuous as in the other species, but is broken in the middle, the gap being caused by the absence of the *malar* or cheek-bone. In this respect it resembles, though Dr. Anderson does not notice it, the *Centetidæ* or *Tanrecs* of Madagascar.

Dr. Anderson's classification is very simple and good. He has two groups: the first, containing *E. micropus* and *E. pictus*, is distinguished by the *second upper premolar simple, one-fanged, the feet club-shaped; soles tubercular*. The second group, containing *E. Grayi*, *E. Blanfordi* and *E. Jerdoni*, has *the second upper premolar compound, three-fanged, and the feet well developed and broad*. The first group has also a division or bare area on the vertex; the second has not.

FAMILY HYLOMIDÆ (*Anderson*)

The following little animal has affinities to both *Erinaceidæ* and *Tupaiidæ*, and therefore it may appropriately be placed here. Dr. Anderson on the above ground has placed it in a separate family, otherwise it is generally classed with the *Erinaceidæ*. Its skull has the general form of the skull of *Tupaia*, but in its imperfect orbit, in the rudiment of a post-orbital process, and in the absence of any imperfections of the zygomatic arch and in the position of the lachrymal foramen it resembles the skull of *Erinaceus*. The teeth are 44 in number: Inc., 3—3/3—3; can., 1—1/1—1; premolars, 4—4/4—4; molars, 3—3/3—3, and partake of the character of both *Tupaia* and *Erinaceus*. The shank-bones being united and the rudimentary tail create an affinity to the latter, whilst its arboreal habits are those of the former.

GENUS HYLOMYS

Head elongate; ears round; feet arboreal, naked below; tail semi-nude; pelage not spiny.

NO. 157. HYLOMYS PEGUENSIS

The Short-tailed Tree-Shrew

HABITAT.—Burmah, Pegu, Ponsee in the Kakhyen hills.
Appears to be identical with the species from Borneo (*H. suillus*).

FAMILY TUPAIIDÆ

These interesting little animals were first accurately described about the year 1820, though, as I have before stated, it was noticed in the papers connected with Captain Cook's voyages, but was then supposed to be a squirrel. Sir T. Stamford Raffles writes: "This singular little animal was first observed tame in the house of a gentleman at Penang, and afterwards found wild at Singapore in the woods near Bencoolen, where it lives on the fruit of the kayogadis, &c." Another species, *T. Javanica*, had, however, been discovered in Java fourteen years before, but not published till 1821. They are sprightly little creatures, easily tamed, and, not being purely insectivorous, are not difficult to feed in captivity. Sir T. S. Raffles describes one that roamed freely all over the house, presenting himself regularly at meal-times for milk and fruit. Dr. Sal. Müller describes the other species (*T. Javanica*) as a confiding, simple little animal, always in motion, seeking its food at one time amongst dry leaves and moss on the ground, and again on the stems and branches of trees, poking its nose into every crevice. Its nest, he says, is formed of moss at some height from the ground, supported on clusters of orchideous plants. Dr. Cantor, in his 'Catalogue of the Mammalia of the Malayan Peninsula,' writes as follows: "In a state of nature it lives singly or in pairs, fiercely attacking intruders of its own species. When several are confined together they fight each other, or jointly attack and destroy the weakest. The natural food is mixed insectivorous and frugivorous. In confinement, individuals may be fed exclusively on either, though preference is evinced for insects; and eggs, fish and earth-worms are equally relished. A short, peculiar, tremulous, whistling sound, often heard by calls and answers in the Malayan jungle, marks their pleasurable emotions, as for instance on the appearance of food, while the contrary is expressed by shrill protracted cries. Their disposition is very restless, and their great agility enables them to perform the most extraordinary bounds in all directions, in which exercise they spend the day, till night sends them to sleep in their rudely-constructed lairs in the highest branches of trees. At times they will sit on their haunches, holding their food between their forelegs, and after feeding they smooth the head and face with both fore-paws, and lick the lips and palms. They are also fond of water, both to drink and to bathe in. The female usually produces one young."

The above description reminds one forcibly of the habits of squirrels, so it is no wonder that at one time these little creatures were confounded with the *Sciuridæ*.

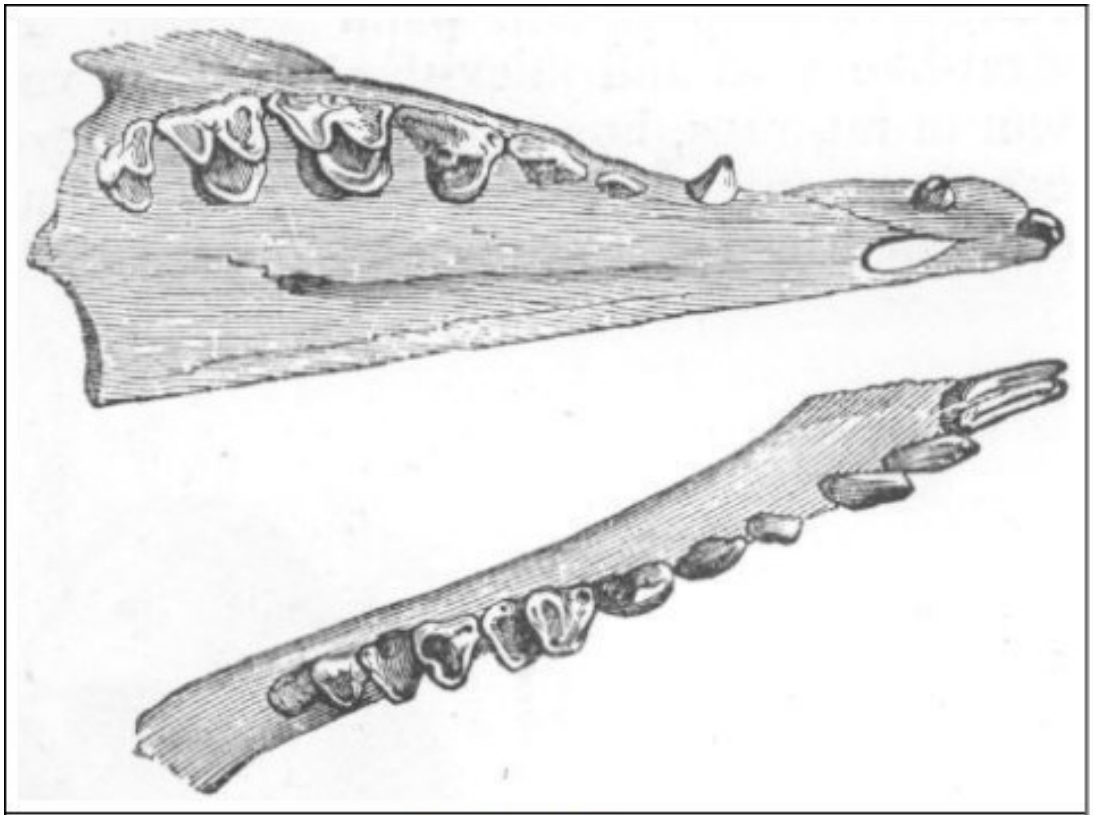
GENUS TUPAIA

The dentition of this genus is as follows: Either four or six incisors in the upper jaw, but always six in the lower; four premolars and three molars in each jaw, upper and lower. The skull has a complete bony orbit, and the zygomatic arch is also complete, but with a small elongated perforation; the muzzle attenuated, except in *T. Ellioti*; ears oval; the stomach possesses a cæcum or blind gut; the eyes are large and prominent, and the tail bushy, like that of a squirrel; the toes are five in number, with strong claws; the shank-bones are not united as in the hedgehogs. The diet is mixed insectivorous and frugivorous.

NO. 158. TUPAIA ELLIOTI

Elliot's Tree-Shrew (Jerdon's No. 87)

HABITAT.—Southern India, Godavery district, Cuttack; the Central Provinces, Bhagulpore range.



Dentition of *Tupaia*.

DESCRIPTION.—Fur pale rufous brown, darker on the back and paler on the sides; the chin, throat, breast and belly yellowish, also a streak of the same under the tail; the upper surface of the tail is of the same colour as the centre of the back; there is a pale line from the muzzle over the eye, and a similar patch beneath it; the fur of this species is shorter and more harsh, and the head is more blunt than in the Malayan members of the family.

SIZE.—Head and body, 7 to 8 inches; tail, 7 to 9 inches.

NO. 159. TUPAIA PEGUANA

Syn.—TUPAIA BELANGERI

The Pegu Tree-Shrew (Jerdon's No. 88)

HABITAT.—Sikim (Darjeeling), Assam and through Arakan to Tenasserim.

Tupaia Peguana.

DESCRIPTION.—Jerdon says: "General hue a dusky greenish-brown, the hairs being ringed brown and yellow; lower parts the same, but lighter; and with a pale buff line; a stripe from the throat to the vent, broadest between the forearms and then narrowing; ears livid red, with a few short hairs; palms and soles dark livid red." Dr. Anderson remarks that the fur is of two kinds of hairs—one fine and wavy at the extremity, banded with black, yellow and black; the second being strong and somewhat bristly, longer than the other, and banded with a black basal half and then followed by rings of yellow and black, then yellow again with a black tip, the black basal half of the hairs being hidden, the annulation of the free portions produces a rufous olive-grey tint over the body and tail.

SIZE.—Head and body about 7 inches; tail, 6½.

Jerdon says of it that those he procured at Darjeeling frequented the zone from 3000 to 6000 feet; they were said by the natives to kill small birds, mice, &c. The Lepcha name he gives is *Kalli-tang-zhing*. McMaster in his notes writes: "The Burmese Tupaia is a harmless little animal; in the dry season living in trees and in the monsoon freely entering our houses, and in impudent familiarity taking the place held in India by the common palm squirrel. It is, however, probably from its rat-like head and thievish expression, very unpopular. I have found them in rat-traps, however, so possibly they deserve to be so." He adds he cannot endorse the statement regarding their extraordinary agility mentioned by Dr. Cantor and quoted by Jerdon, for he had seen his terriers catch them, which they were never able to do with squirrels; and cats often seize them.

Mason says: "One that made his home in the mango-tree near my house at Tonghoo made himself nearly as familiar as the cat. Sometimes I had to drive him off the bed, and he was very fond of putting his nose into the teacups immediately after breakfast, and acquired a taste both for tea and coffee. He lost his life at last by incontinently walking into a rat-trap."

The Burmese name for it is *Tswai* in Arracan. Jerdon states that it is one of the few novelties that had escaped the notice of Mr. Brian Hodgson, but Dr. Anderson mentions a specimen (unnamed) from Nepal in the British Museum which was obtained by Hodgson.

NO. 160. TUPAIA CHINENSIS (*Anderson*)

HABITAT.—Burmah, Kakhyen hills, east of the valley of the Irrawaddy.

DESCRIPTION.—Ferruginous above, yellowish below, the basal two-thirds of the hair being blackish, succeeded by a yellow, a black, and then a yellow and black band, which is terminal; there is a faint shoulder streak washed with yellowish; the chest pale orange yellow, which hue extends along the middle of the belly as a narrow line; under surfaces of limbs grizzled as on the back, but paler; upper surface of tail concolorous with the dorsum.

SIZE.—Head and body, 6½ inches; tail, 6·16.

The teeth are larger than those of *T. Ellioti*, but smaller than the Malayan *T. ferruginea*, and the skull is smaller than that of the last species, and the teeth are also smaller. Dr. Anderson says: "When I first observed the animal it was on a grassy clearing close to patches of fruit, and was so comporting itself that in the distance I mistook it for a squirrel. The next time I noticed it was in hedgerows."

The other varieties of *Tupaia* belong to the Malayan Archipelago—*T. ferruginea*, *T. tana*, *T. splendidula*, and *T. Javanica* to Borneo and Java. There is one species which inhabits the Nicobars.

NO. 161. TUPAIA NICOBARICA

HABITAT.—Nicobar Island.

DESCRIPTION.—Front and sides of the face, outside of fore-limbs, throat and chest, golden yellow; inner side of hind limbs rich red brown, which is also the colour of the hind legs and feet; head dark brown, with golden hairs intermixed; back dark maroon, almost black; upper surface of

the tail the same; pale oval patch between shoulders, dark band on each side between it and fore-limbs, passing forward over the ears.

SIZE.—Head and body, 7·10; tail, 8 inches.

There is a little animal allied to the genus *Tupaia*, which has hitherto been found only in Borneo and Sumatra, but as Sumatran types have been found in Tenasserim, perhaps some day the *Ptilocercus Lowii* may be discovered there. It has a rather shorter head than the true Banxrings, more like *T. Ellioti*, but its dentition is nearly the same, as also are its habits. Its chief peculiarity lies in its tail, which is long, slender and naked, like that of a rat for two-thirds of its length, the terminal third being adorned with a broad fringe of hair on each side, like the wings of an arrow or the plumes of a feather. There is an excellent coloured picture of it in the 'Proc. Zool. Society,' vol. of Plates.

I had almost concluded my sketch of the Insectivora without alluding to one most interesting genus, which ought properly to have come between the shrews and the hedgehogs, the *Gymnura*, which, though common in the Malay countries, has only recently been found in Burmah—a fact of which I was not aware till I saw it included in a paper on Tenasserim mammals by Mr. W. T. Blanford ('Jour. As. Soc. Beng.,' 1878, page 150). Before I refer to his notes I may state that this animal is a sort of link between the *Soricidæ* and the *Erinaceidæ*, and De Blainville proposed for it the generic name of *Echinosorex*, but the one generally adopted is *Gymnura*, which was the specific name given to it by its discoverer, Sir Stamford Raffles, who described it as a *Viverra* (*V. gymnura*); however, Horsfield and Vigors and Lesson, the two former in England and the latter in France, saw that it was not a civet, and, taking the naked tail as a peculiarity, they called the genus *Gymnura*, and the specimen *Rafflesii*. There is not much on record regarding the anatomy of the animal, and in what respects it internally resembles the hedgehogs. Outwardly it has the general soricine form, though much larger than the largest shrew. The long tail too is against its resemblance to the hedgehogs, which rests principally on its spiny pelage.

The teeth in some degree resemble *Erinaceus*, the molars and premolars especially, but the number in all is greater, there being forty-four, or eight more. It would be interesting to know whether the zygomatic arch is perfect and the tibia and fibula united, as in the hedgehogs, or wanting and distinct as in the shrews. I have given a slight sketch in outline of the animal.

NO. 162. GYMNURA RAFFLESII

The Bulau

HABITAT.—Tenasserim (Sumatra, Borneo); Malacca.

Gymnura Rafflesii.

DESCRIPTION.—Long tapering head, with elongated muzzle, short legs, shrew-like body, with a long, round, tapering and scaly rat-like tail, naked, with the exception of a few stiff hairs here and there among the scales. In each jaw on each side three incisors, one canine (those in the upper jaw double-fanged) and seven premolars and molars; feet five-toed, plantigrade, armed with strong claws. Fur of two kinds, fine and soft, with longer and more spiny ones intermixed. The colour varies a good deal, the general tint being greyish-black, with head and neck pale or whitish, and with a broad black patch over the eye. Some have been found almost wholly white, with the black eye-streak and only a portion of the longer hairs black, so that much stress cannot be laid on the colouring; the tail is blackish at the base, whitish and compressed at the tip. Mr. Blanford says: "The small scales covering the tail are indistinctly arranged in rings and sub-imbricate; on the lower surface the scales are convex and distinctly imbricate, the bristles arising from the interstices. Thus the under surface of the tail is very rough, and may probably be of use to the animal in climbing." He also refers to the fact that the claws of his specimen are not retractile, and mentions that in the original description both in Latin and English the retractability of the claws is pointed out as a distinction between *Gymnura* and *Tupaia*. In the description given of the Sumatran animal both by Dallas and Cuvier nothing is mentioned about this feature.

SIZE.—A Sumatran specimen: head and body, 14 inches; tail, 12 inches. Mr. Blanford's specimen: head and body, 12 inches; tail, 8·5.

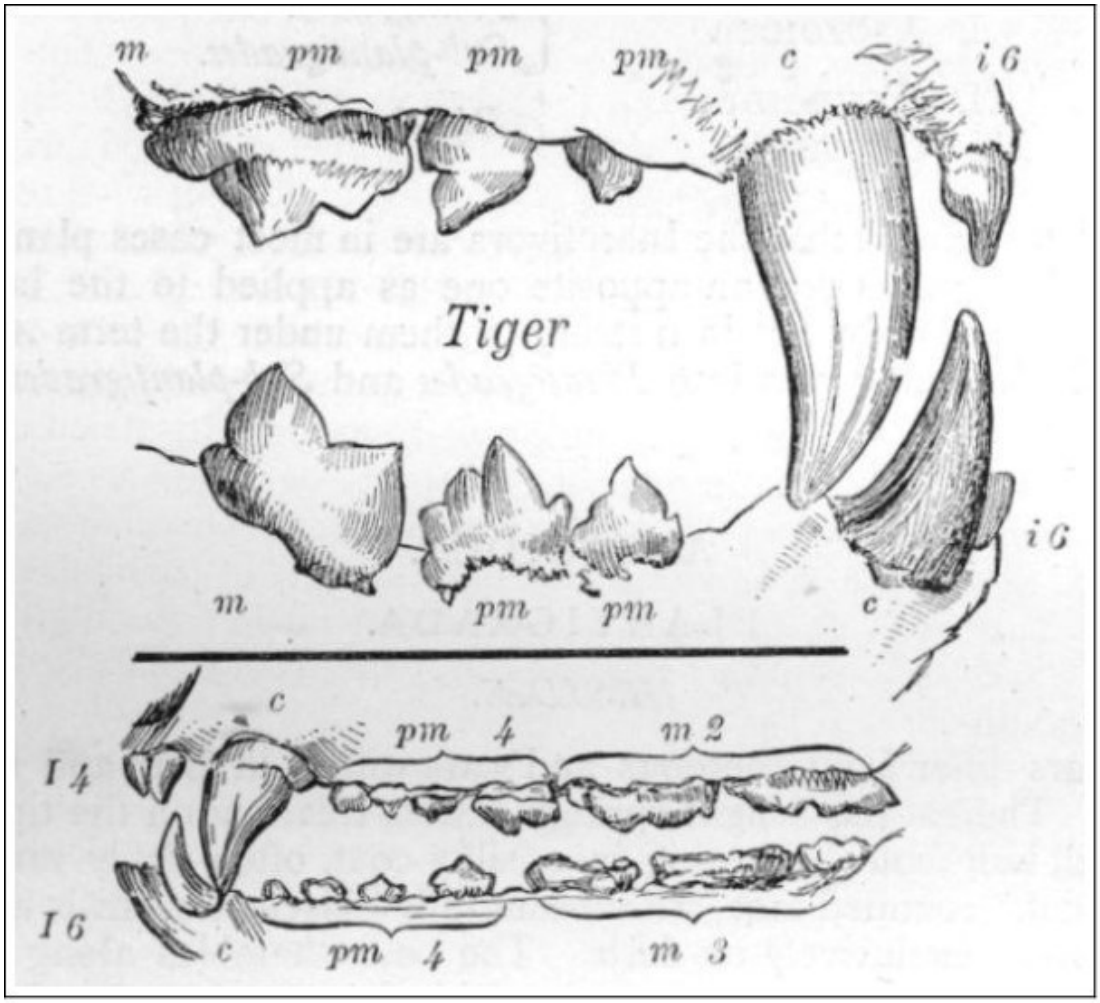
Mr. Blanford was informed by Mr. Davison, who obtained it in Burmah, that the *Gymnura* is purely nocturnal in its habits, and lives under the roots of trees. It has a peculiar and most offensive smell, resembling decomposed cooked vegetables. The Bulau has not the power of rolling itself up like the hedgehog, nor have the similar forms of insectivores which resemble the hedgehog in some respects, such as the Tenrecs (*Centetes*), Tendracs (*Ericulus*), and Sokinahs (*Echinops*) of Madagascar.

CARNIVORA

Speaking generally, the whole range of mammals between the *Quadrumana* and the *Rodentia* are *carnivorous* with few exceptions, yet there is one family which, from its muscular development and dentition, is pre-eminently flesh-eating, as Cuvier aptly remarks, "the sanguinary appetite is combined with the force necessary for its gratification." Their forms are agile and muscular; their circulation and respiration rapid. As Professor Kitchen Parker graphically writes: "This group, which comprises all the great beasts of prey, is one of the most compact as well as the most interesting among the mammalia. So many of the animals contained in it have become 'familiar in our mouths as household words,' bearing as they do an important part in fable, in travel, and even in history; so many of them are of such wonderful beauty, so many of such terrible ferocity, that no one can fail to be interested in them, even apart from the fact likely to influence us more in their favour than any other, that the two home pets, which of all others are the commonest and the most interesting, belong to the group. No one who has had a dog friend, no one who has watched the wonderful instance of maternal love afforded by a cat with her kittens, no one who loves riding across country after a fox, no lady with a taste for handsome furs, no boy who has read of lion and tiger hunts and has longed to emulate the doughty deeds of the hunter, can fail to be interested in an assemblage which furnishes animals at once so useful, so beautiful and so destructive. It must not be supposed from the name of this group that all its members are exclusively flesh-eaters, and indeed it will be hardly necessary to warn the reader against falling into this mistake, as there are few people who have never given a dog a biscuit, or a bear a bun. Still both the dog and several kinds of bears prefer flesh-meat when they can get it, but there are some bears which live almost exclusively on fruit, and are, therefore, in strictness not carnivorous at all. The name must, however, be taken as a sort of general title for a certain set of animals which have certain characteristics in common, and which differ from all other animals in particular ways." I would I had more space at my disposal for further quotations from Professor Parker's 'General Remarks on the Land Carnivora,' his style is so graphic.

The dentition of the Carnivora varies according to the exclusiveness of their fleshy diet, and the nature of that diet.

In taking two typical forms I give below sketches from skulls in my possession of the tiger, and the common Indian black bear; the one has trenchant cutting teeth which work up and down, the edges sliding past each other just like a pair of scissors; the other has flat crowned molars adapted for triturating the roots and herbage on which it feeds. A skull of an old bear which I have has molars of which the crowns are worn almost smooth from attrition. In the most carnivorous forms the tubercular molars are almost rudimentary.



The skull exhibits peculiar features for the attachment of the necessary powerful muscles. The bones of the face are short in comparison with the *cranial* portion of the skull (the reverse of the *Herbivores*); the strongly built zygomatic arch, the roughened ridges and the broad ascending ramus of the lower jaw, all afford place for the attachment of the immense muscular development. Then the hinge of the jaw is peculiar; it allows of no lateral motion, as in the ruminants; the *condyle*, or hinge-bolt of a tiger's jaw (taken from the largest in my collection), measures two inches, and as this fits accurately into its corresponding (glenoid) cavity, there can be no side motion, but a vertical chopping one only. The skeleton of a typical carnivore is the perfection of strength and suppleness. The tissue of the bones is dense and white; the head small and beautifully articulated; the spine flexible yet strong. In those which show the greatest activity, such as the cats, civets and dogs, the spinous processes, especially in the lumbar region, are greatly developed—more so than in the bears. These serve for the attachment of the powerful muscles of the neck and back. The clavicle or collar-bone is wanting, or but rudimentary. The stomach is simple; the intestinal canal short; liver lobed; organs of sight, hearing, and smell much developed.

Now we come to the divisions into which this group has been separated by naturalists. I shall not attempt to describe the various systems, but take the one which appears to me the simplest and best to fit in with Cuvier's general arrangement, which I have followed. Modern zoologists have divided the family into two great groups—the *Fissipedia* (split-feet) or land Carnivora, and the *Pinnipedia* (fin-feet) or water Carnivora. Of the land Carnivora some naturalists have made the following three groups on the characteristics of the feet, *viz.*, *Plantigrada*, *Sub-plantigrada* and *Digitigrada*. The dogs and cats, it is well known, walk on their toes—they are the *Digitigrada*; the bears and allied forms on

the palms of their hands and soles of their feet, more or less, and thus form the other two divisions, but there is another classification which recommends itself by its simplicity and accuracy. Broadly speaking, there are three types of land carnivores—the cat, the dog, and the bear, which have been scientifically named *Æluroidea* (from the Greek *ailouros*, a cat); *Cynoidea* (from *kuon*, a dog); and *Arctoidea* (from *arctos*, a bear). The distinction is greater between the families of *Digitigrades*, the cat and dog, than between the *Plantigrades* and *Sub-plantigrades*, and therefore I propose to adopt the following arrangement:—

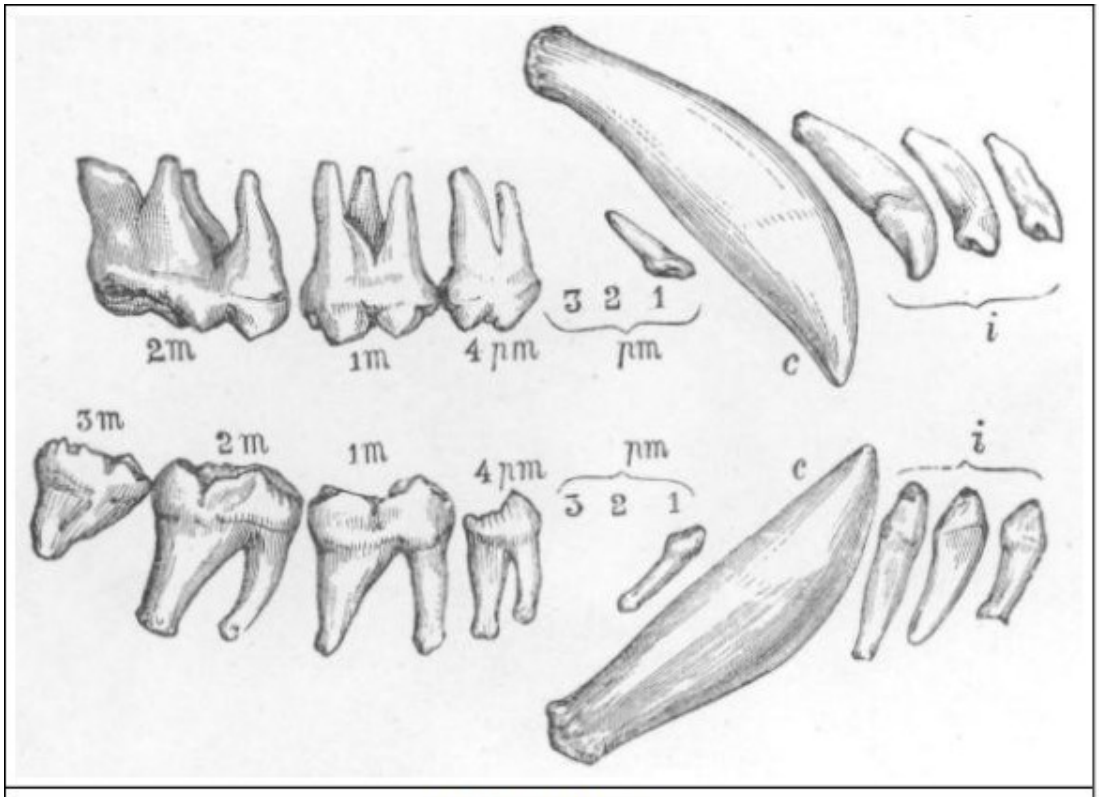
I. ARCTOIDEA	*Plantigrades.* *Sub-plantigrades.*
II. ÆLUROIDEA III. CYNOIDEA	*Digitigrades.*

I may here remark that the Insectivora are in most cases plantigrade, therefore the term is not an apposite one as applied to the bear and bear-like animals only, but in treating of them under the term *Arctoidea* we may divide them again into *Plantigrades* and *Sub-plantigrades*.

ARCTOIDEA

PLANTIGRADA

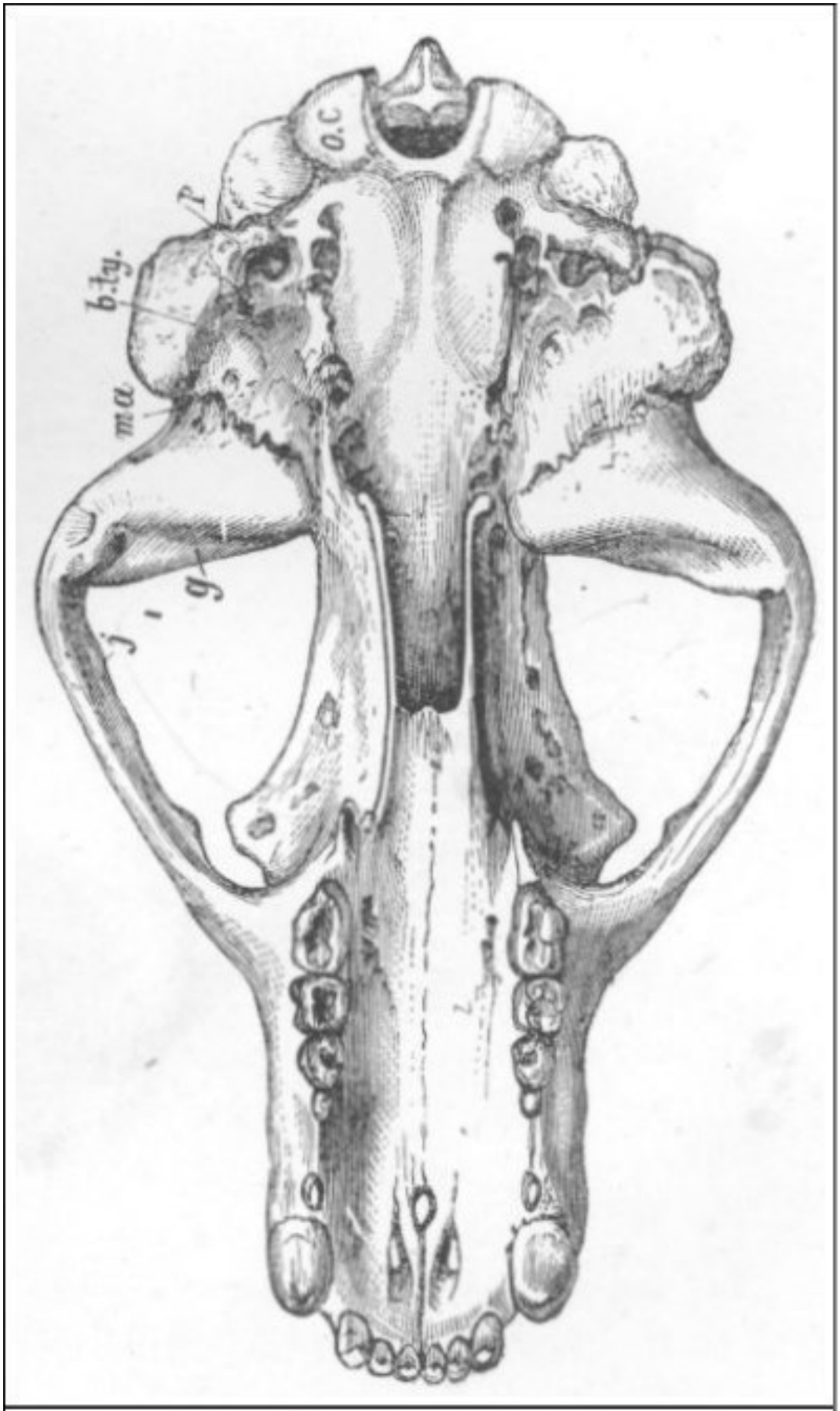
URSIDÆ



Dentition of Bear.

The bears differ from the dogs and cats widely in form and manner, and diet. The cat has a light springy action, treading on the tips of its toes, a well-knit body glistening in a silky coat, often richly variegated, "a clean cut," rounded face, with beautifully chiselled nostrils and thin lips, and lives exclusively on flesh. The bear shambles along with an awkward gait, placing the entire sole of his foot on the ground; he has rough dingy fur, a snout like a pig's, and is chiefly a vegetarian—and in respect to this last peculiarity his dentition is modified considerably: the incisors are large, tri-cuspidate; the canines somewhat smaller than in the restricted carnivora; these are followed by three small teeth, which usually fall out at an early period, then comes a permanent premolar of considerable size, succeeded by two molars in the upper, and three in the under jaw. The dental formula is therefore: Inc., 3—3/3—3; can., 1—1/1—1; premolars, 4—4/4—4; molars, 2—2/3—3. In actual numbers this formula agrees with that for the dogs; but the form of the teeth is very different, inasmuch as the large premolars and the molars have flat tuberculated crowns, constituting them true grinders, instead of the trenchant shape of the cats, which is also, to a modified extent, possessed by the dogs, of which the last two molars have, instead of cutting edges, a grinding surface with four cusps. The trenchant character is entirely lost in the bear, even in the carnivorous species which

exhibit no material difference in the teeth, any more than, as I mentioned at the commencement of this work, do the teeth of the human race, be they as carnivorous as the Esquimaux, or vegetarian as the Hindu.



Skull of Bear (under view).

There is also another peculiarity in the bear's skull as compared with the cat's. In the latter there is a considerable bulging below the aperture of the ear called the *bulla tympani*, or bulb of the drum. This is almost wanting in the bear, and it would be interesting to know whether this much affects its hearing. I myself am of opinion that bears are not acute in this sense, but then my experience has been with the common Indian *Ursus*, or *Melursus labiatus* only, and the skulls of this species in my possession strongly exhibit this peculiarity.[6] The cylindrical bones resemble those of man nearer than any other animal, the *femur* especially; and a skinned bear has a most absurd resemblance to a robust human being. The sole of the hind foot leaves a mark not unlike that of a human print.

The Brown Bear of Europe (*Ursus arctos*) is the type of the family, and has been known from the earliest ages—I may say safely prehistoric ages, for its bones have been frequently found in post-pliocene formations along with those of other animals of which some are extinct. An extinct species of bear, *Ursus spelæus*, commonly called the Cave Bear, seems to have been the ancestor of the Brown Bear which still is found in various parts of Europe, and is said to have been found within historic times in Great Britain.

The bear of which we have the oldest record is almost the same as our Indian Brown or Snow Bear. Our bear (*U. Isabellinus*) is but a variety of *U. Syriacus*, which was the one slain by David, and is spoken of in various parts of the Bible. It is the nearest approach we have to the European *U. arctos*.

GENUS URSUS

NO. 163. URSUS ISABELLINUS

The Himalayan Brown Bear (Jerdon's No. 89)

NATIVE NAME.—*Barf-ka-rich* or *Bhalu*, Hind.; *Harput*, Kashmiri; *Drin-mor*, Ladakhi.

[6] On referring to Mr. Sanderson's interesting book, 'Thirteen Years among the Wild Beasts of India,' and General Shakespear's 'Wild Sports,' I find that both those authors corroborate my assertion that the sloth bear is deficient in the sense of hearing. Captain Baldwin, however, thinks otherwise; but the evidence seems to be against him in this respect.

Ursus Isabellinus.

DESCRIPTION.—A yellowish-brown colour, varying somewhat according to sex and time of year. Jerdon says: "In winter and spring the fur is long and shaggy, in some inclining to silvery grey, in others to reddish brown; the hair is thinner and darker in summer as the season advances, and in autumn the under fur has mostly disappeared, and a white collar on the chest is then very apparent. The cubs show this collar distinctly. The females are said to be lighter in colour than the males."

Gray does not agree in the theory that *Ursus Syriacus* is the same as this species; in external appearance he says it is the same, but there are differences in the skull; the nose is broader, and the depression in the forehead less. The zygomatic arch is wider and stronger; the lower jaw stronger and higher, and the upper tubercular grinders shorter and thicker than in *Ursus Isabellinus*.

"It is found," Jerdon says, "only on the Himalayas and at great elevations in summer close to the snow. In autumn they descend lower, coming into the forests to feed on various fruits, seeds, acorns, hips of rose-bushes, &c., and often coming close to villages to plunder apples, walnuts, apricots, buckwheat, &c. Their usual food in spring and summer is grass and roots. They also feed on various insects, and are seen turning over stones to look for scorpions (it is said) and insects that harbour in such places. In winter they retreat to caves, remaining in a state of semi-torpidity, issuing forth in March and April. Occasionally they are said to kill sheep or goats, often wantonly, apparently, as they do not feed upon them. They litter in April and May, the female having generally two cubs. This bear does not climb trees well."

The next three species belong to the group of Sun Bears; *Helarctos* of some authors.

NO. 164. URSUS (HELARCTOS) TORQUATUS *vel* TIBETANUS

The Himalayan Black Bear (Jerdon's No. 90)

NATIVE NAME.—*Bhalu*, Hind.; *Thom*, Bhot.; *Sona*, Lepcha.
HABITAT.—The Himalayas, Nepal, Assam, Eastern Siberia, and China.

URSUS TIBETANUS.

DESCRIPTION.—Entirely black, with the exception of a broad white V-shaped mark on the chest and a white chin. Neck thick, head flattened; ears large; claws very long and curved; fur short; body and head more slender than the preceding species.

Jerdon remarks that the specific name of this bear is unfortunate, since it is rare in Thibet. However the more appropriate specific name *torquatus* is now more generally adopted. It seems to be common in all the Himalayan ranges, where it is to be found from 5000 to 12,000 feet. Jerdon says it lives chiefly on fruit and roots, apricots, walnuts, apples, currants, &c., and also on various grains, barley, Indian corn, buckwheat, &c., and in winter on acorns, climbing the oak trees and breaking down the branches. They are not afraid of venturing near villages, and destroy not only garden stuff, but—being, like all bears, fond of honey—pull down the hives attached to the cottages of the hill people. "Now and then they will kill sheep, goats, &c., and are said occasionally to eat flesh. This bear has bad eyesight, but great power of smell, and if approached from windward is sure to take alarm. A wounded bear will sometimes show fight, but in general it tries to escape. It is said sometimes to coil itself into the form of a ball, and thus roll down steep hills if frightened or wounded." If cornered it attacks savagely, as all bears will, and the face generally suffers, according to Jerdon; but I have noticed this with the common Indian Sloth Bear, several of the men wounded in my district had their scalps torn. He says: "It has been noticed that if caught in a noose or snare, if they cannot break it by

force they never have the intelligence to bite the rope in two, but remain till they die or are killed." In captivity this bear, if taken young, is very quiet, but is not so docile as the Malayan species.[7]

In *The Asian* of January 7th, 1879, page 68, a correspondent ("N. F. T. T.") writes that he obtained a specimen of this bear which was coal black throughout, with the exception of a dark dirty yellow on the lower lip, but of the usual crescentic white mark she had not a trace. This exceptional specimen was shot in Kumaon. Robinson, in his 'Account of Assam,' states that these bears are numerous there, and in some places accidents caused by them are not unfrequent.

All the Sun Bears are distinguished for their eccentric antics, conspicuous among which is the gift of walking about on their hind legs in a singularly human fashion. Those in the London Zoological Gardens invariably attract a crowd. They struggle together in a playful way, standing on their hind legs to wrestle. They fall and roll, and bite and hug most absurdly.

Captain J. H. Baldwin, in his 'Large and Small Game of Bengal,' puts this bear down as not only carnivorous, but a foul feeder. He says: "On my first visit to the hills I very soon learnt that this bear was a flesh-eater, so far as regards a sheep, goats, &c., but I could hardly believe that he would make a repast on such abominations (i.e. carrion), though the paharies repeatedly informed

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[7] *Since writing the above, the following letter appeared in The Asian* of May 11, 1880:—"THE HIMALAYAN BLACK BEAR"SIR,—Mr. Sterndale, in the course of his interesting papers on the Mammalia of British India, remarks of *Ursus Tibetanus*, commonly known as the Himalayan Black Bear, that 'a wounded one will sometimes show fight, but in general it tries to escape.' This description is not, I think, quite correct. As it would lead one to suppose that this bear is not more savage than any other wild animal—the nature of most of the *feræ* being to try to escape when wounded, *unless* they see the hunter who has fired at them, when many will charge at once, and desperately. The Himalayan Black Bear will not only do this *almost invariably*, but often attacks men without any provocation whatever, and is altogether about the most fierce, vicious, dangerous brute to be met with either in the hills or plains of India. They inflict the most horrible wounds, chiefly with their paws, and generally—as Mr. Sterndale states—on the face and head. I have repeatedly met natives in the interior frightfully mutilated by encounters with the Black Bear, and cases in which Europeans have been killed by them are by no means uncommon. These brutes are totally different in their dispositions to the Brown Bear (*Ursus Isabellinus*), which, however desperately wounded, will never charge. I believe there is no case on record of a hunter being charged by a Brown Bear; or even of natives, under any circumstances, being attacked by one; whereas every one of your readers who has ever marched in the Himalayas must have come across many victims of the ferocity of *Ursus Tibetanus*. As I said before, this brute often, unwounded, attacks man without any provocation whatever. Two cases that I know of myself may not be without interest. An officer shooting near my camp was stalking some thar. He was getting close to them, when a Black Bear rushed out at him from behind a large rock on his right and above him. He was so intent on the thar, and the brute's rush was so sudden, that he had barely time to pull from the hip, but he was fortunate enough to kill the animal almost at his feet. I heard this from him on the morning after it happened. On another occasion, I was shooting in Chumba with a friend. One evening he encamped at a village, about which there was, as usual, a little cultivation on terraces, and a good many apricot-trees. Lower down the khud there was dense jungle. The villagers told us that a Black Bear had lately been regularly visiting these trees, and generally came out about dusk, so that if we would go down and wait, we should be pretty sure of a shot. We went, and took up positions behind trees, about 200 yards apart, each of us having a man from the village with us. Intervening jungle prevented us from seeing each other. I had not been at my post more than ten minutes when I was startled by loud shrieks and cries from the direction of my companion. No shot was fired, and the coolie with me said that the bear had killed some one. In less than a minute I had reached the spot where I had left my friend. He, and the man with him, had disappeared; but, guided by the shrieks, which still continued, I made my way into the thick cover in front of his post, and about fifty yards inside it, much to my relief, came upon him, rifle in hand, standing over the dead body of a man, over which two people—the coolie that had been with my friend and an old woman—were weeping, and shrieking loudly, 'Look out!' said he, as I came up, 'the bear has just killed this fellow!' The first thing to be done was to carry him out into the open. I helped to do this, and directly I touched him I felt that he was stone cold, and a further examination showed he must have been dead some hours. That he had been killed by a bear was also very evident. He was naked to the waist, and had been cutting grass. His bundle lay by him, and the long curved kind of sickle that the hillmen used to cut grass with was stuck in his girdle, showing that he had not had time to draw it to strike one blow in his defence. The mark of the bear's paw on his left side was quite distinct. This had felled him to the ground, and then the savage brute had given him one bite—no more, but that one had demolished almost the whole of the back of his head, and death must have been instantaneous. The man had apparently cut his load of grass, and was returning with it to the village, when he disturbed the bear, which attacked him at once. The old woman was his mother, and the coolie with J– some relation. Her son having been away all day, I suppose the old woman had gone to look for him. She found his body, as described, just below J–'s post, and at once set up a lamentation which brought the coolie, J–'s attendant, down to her, and J– following himself, thought at first that the man had been killed then and there. There was such a row kicked up that no bear came near the apricots that night, and the next day we had to march, as our leave was up. I have heard of many other cases of the Black Bear attacking without any provocation, and from what I know of the brute I quite believe them; and, after all, the animal is not worth shooting. Their skins are always poor and mangy, and generally so *greasy* that they are very difficult to keep until you can make them over to the dresser. The skin of the Snow or Brown Bear, on the other hand, particularly if shot early in the season, is a splendid trophy, and forms a most beautiful and luxurious rug, the fur being extremely soft, and several inches in depth. "SPINDRIFT."

me that such was the case. One day, however, I saw a bear busy making a meal off a bullock that had died of disease, and had been thrown into the bed of a stream." In another page Captain Baldwin states that the Himalayan Bear is a good swimmer; he noticed one crossing the River Pindur in the flood, when, as he remarks, "no human being, however strong a swimmer, could have stemmed such a roaring rapid."

NO. 165. URSUS (HELARCTOS) GEDROSIANUS

Baluchistan Bear

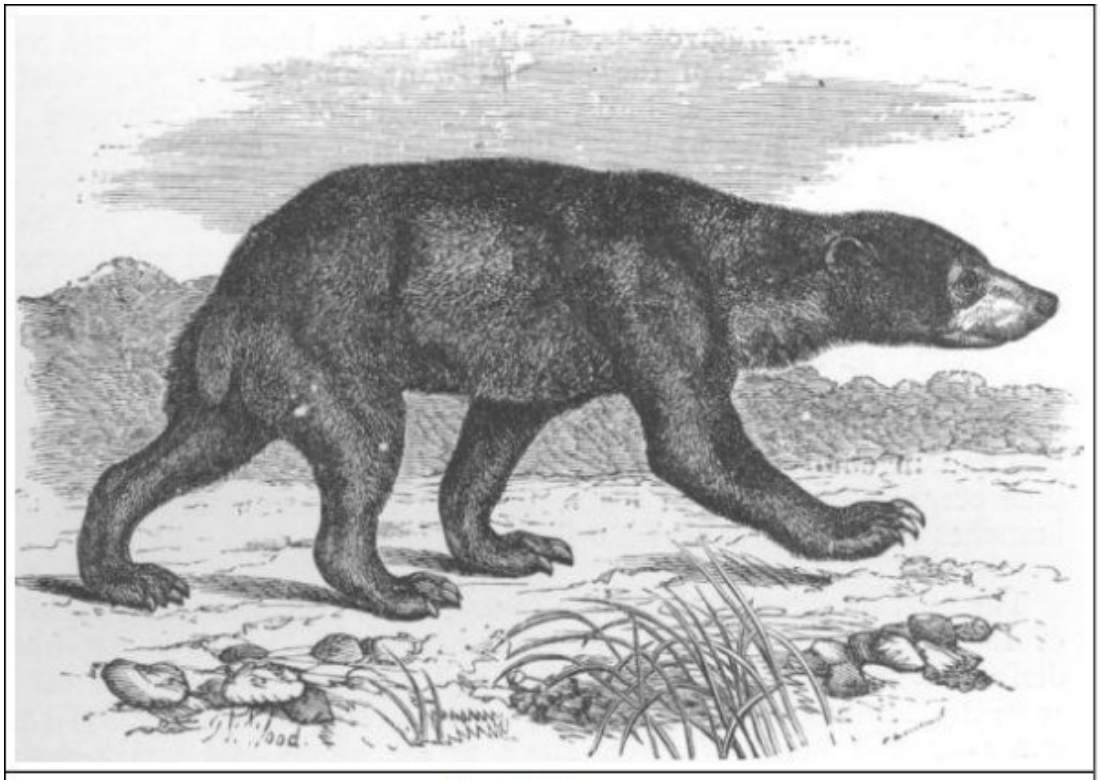
NATIVE NAME.—*Mamh*.
HABITAT.—Baluchistan.
DESCRIPTION.—Fur ranging from brown to brownish-black, otherwise as in last species.

This is a new species, brought to notice by Mr. W. T. Blanford, and named by him. The skull of the first specimen procured was scarcely distinguishable from that of a female of *Ursus torquatus*, and he was for a time apparently in doubt as to the distinctness of the species, taking the brown skin as merely a variety; but a subsequently received skull of an adult male seems to prove that it is a much smaller animal.

NO. 166. URSUS (HELARCTOS) MALAYANUS

The Bruang or Malayan Sun Bear

NATIVE NAME.—*Wet-woon*, Arracan.
HABITAT.—Burmah, Malay Peninsula and adjacent islands.



Ursus Malayanus.

DESCRIPTION.—Smaller than *U. torquatus*, not exceeding four and a half feet in length. Fur black, brownish on the nose; the chest marked with a white crescent, or, in the Bornean variety, an orange-coloured heart-shaped patch; the claws are remarkably long; mouth and lower jaw dirty white; the lower part of the crescent prolonged in a narrow white streak down to the belly, where it is widened out into a large irregular spot. Marsden, in his 'History of Sumatra,' published towards the end of the last century, speaks of this bear under the name of *Bruang* (query: is our *Bruin* derived from this?), and mentions its habit of climbing the cocoa-nut trees to devour the tender part, or cabbage.

It is more tamable and docile than the Himalayan Sun Bear, and is even more eccentric in its ways. The one in the London "Zoo," when given a biscuit, lies down on its back, and passes it about from fore to hind paws, eyeing it affectionately, and making most comical noises as it rolls about. Sir Stamford Raffles writes of one which was in his possession for two years:—"He was brought up in the nursery with the children; and when admitted to my table, as was frequently the case, gave a proof of his taste by refusing to eat any fruit but mangosteens, or to drink any wine but champagne. The only time I ever knew him out of humour was on an occasion when no champagne was forthcoming. He was naturally of a playful and affectionate disposition, and it was never found necessary to chain or chastise him. It was usual for this bear, the cat, the dog, and a small blue mountain bird, or lory, of New Holland, to mess together and eat out of the same dish. His favourite playfellow was the dog, whose teasing and worrying was always borne, and returned with the utmost good humour and playfulness. As he grew up he became a very powerful animal, and in his rambles in the garden he would lay hold of the largest plantains, the stems of which he could scarcely embrace, and tear them up by the roots." The late General A. C. McMaster gives an equally amusing account of his pet of this species which was obtained in Burmah. "Ada," he writes, "is never out of temper, and always ready to play with any one. While she was with me, 'Ada' would not eat meat in any shape; but I was told by one of the ship's officers that another of the same species, 'Ethel' (also presented by me to the Committee of the People's Park of Madras, and by them sent to England), while coming over from

Burmah killed and devoured a large fowl put into her cage. I do not doubt the *killing*, for at that time 'Ethel' had not long been caught, and was a little demon in temper, but I suspect that, while attention was taken off, some knowing lascar secured the body of the chicken, and gave her credit for having swallowed it. 'Ada's' greatest delight was in getting up small trees; even when she was a chubby infant I could, by merely striking the bark, or a branch some feet above her head, cause her to scramble up almost any tree. At this time poor 'Ada,' a Burman otter, and a large white poodle were, like many human beings of different tastes or pursuits, very fast friends." In another part he mentions having heard of a bear of this species who delighted in cherry brandy, "and on one occasion, having been indulged with an entire bottle of this insinuating beverage, got so completely intoxicated that it stole a bottle of blacking, and drank off the contents under the impression that they were some more of its favourite liquor. The owner of the bear told me that he saw it suffering from this strange mixture, and evidently with, as may easily be imagined, a terrible headache."

So much for the amusing side of the picture, now for the other.

Although strictly frugivorous, still it has been known to attack and devour man in cases of the greatest want, and it also occasionally devours small animals and birds, in the pursuit of which, according to Dr. Sal Müller, it prefers those that live on a vegetable diet. The Rev. Mr. Mason, in his writings about Burmah, says "they will occasionally attack man when alone;" he instances a bear upsetting two men on a raft, and he goes on to add that "last year a Karen of my acquaintance in Tonghoo was attacked by one, overcome, and left by the bear for dead." In this case there was no attempt to devour, and it may have been, as I have often observed with the Indian Sloth Bear, that such attacks are made by females with young.

Dr. Sal Müller states: "in his native forests this bear displays much zeal and ingenuity in discovering the nests of bees, and in extracting their contents by means of his teeth from the narrow orifices of the branches of the trees in which they are concealed."

The next species constitutes the genus *Melursus* of Meyer or *Prochilus* of Illiger. It is an awkward-shaped beast, from which it probably derives its name of "Sloth Bear," for it is not like the sloth in other respects. It has long shaggy hair, large curved claws (which is certainly another point of resemblance to the sloth), and a very much elongated mobile snout. Another peculiarity is in its dentition; instead of six incisors in the upper jaw it has only four.

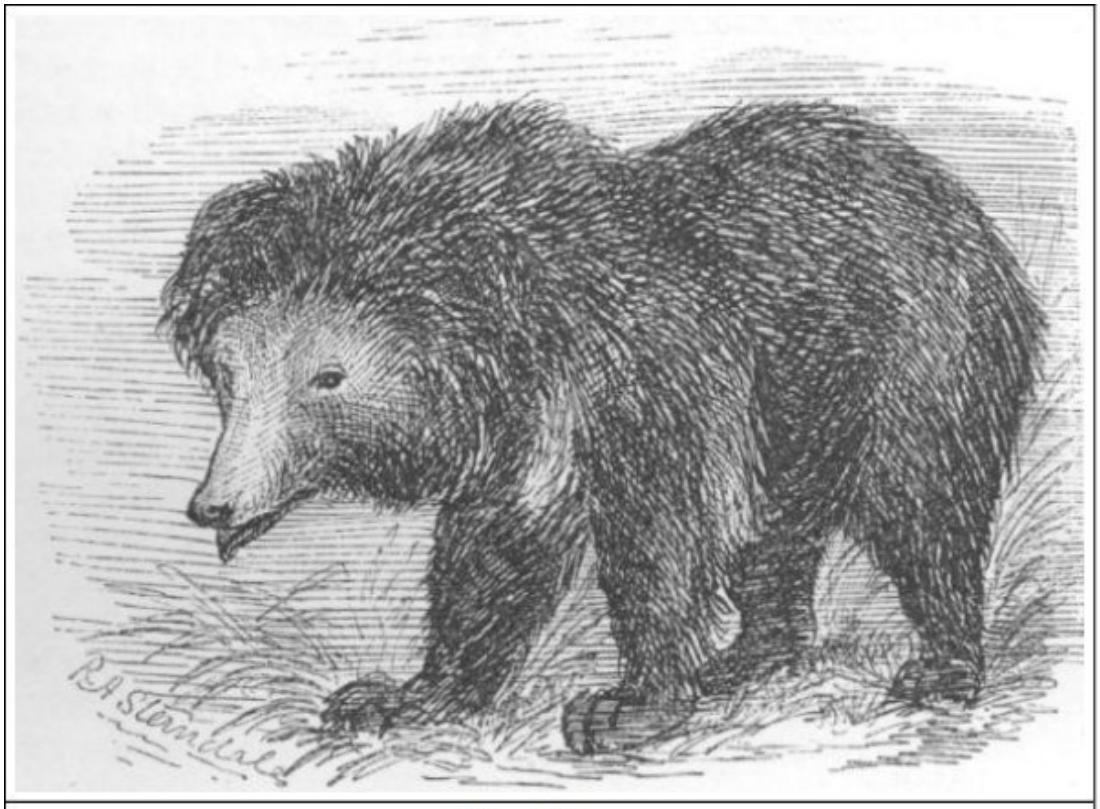
Blyth, in his later writings, adopts Illiger's generic name *Prochilus*.

NO. 167. URSUS (MELURSUS) LABIATUS

The Common Indian Sloth Bear

NATIVE NAMES.—*Bhalu*, Hind.; *Reench*, Hind.; *Riksha*, Sanscrit; *Aswail*, Mahr.; *Elugu*, Tel.; *Kaddi* or *Karadi*, Can.; *Yerid* or *Asol* of the Gonds; *Banna* of the Coles.

HABITAT.—All over the peninsula of India. Blyth says it is not found in Burmah.



Ursus labiatus.

DESCRIPTION.—General shape of the ursine type, but more than usually ungainly and awkward. Hair very long and shaggy, all black, with the exception of a white V-shaped mark on the chest, and dirty whitish muzzle and tips to its feet; snout prolonged and flexible; claws very large.

SIZE.—A large animal of this species will measure from five to six feet in length, and stand nearly three feet high, weighing from fifteen to twenty stones.

Our old friend is so well known that he hardly requires description, and the very thought of him brings back many a ludicrous and exciting scene of one's jungle days. There is frequently an element of comicality in most bear-hunts, as well as a considerable spice of danger; for, though some people may pooh-pooh this, I know that a she-bear with cubs is no despicable antagonist. Otherwise the male is more anxious to get away than to provoke an attack.

This bear does not hibernate at all, but is active all the year round. In the hot weather it lies all day in cool caves, emerging only at night. In March and April, when the *mohwa*-tree is in flower, it revels in the luscious petals that fall from the trees, even ascending the branches to shake down the coveted blossoms. The *mohwa* (*Bassia latifolia*) well merits a slight digression from our subject. It is a large-sized umbrageous tree, with oblong leaves from four to eight inches long, and two to four inches broad. The flowers are globular, cream coloured, with a faint greenish tint, waxy in appearance, succulent and extremely sweet, but to my taste extremely nasty, there being a peculiar disagreeable flavour which lingers long in the mouth. However not only do all animals, carnivorous as well as herbivorous, like them, but they are highly appreciated by the natives, who not only eat them raw, but dry them in the sun and thus keep them for future consumption, and also distil an extremely intoxicating spirit from them. The fresh refuse, or *marc*, after the extraction of the spirit is also attractive to animals. Some years ago I sent to Mr. Frank Buckland, for publication in *Land and Water*, an account of a dog which used to frequent a distillery for the purpose of indulging in this refuse, the result of which was his becoming completely intoxicated. This *marc*, after further

fermentation, becomes intensely acid, and on one occasion I used it successfully in cleaning and brightening a massive steel and iron gate which I had constructed. I made a large vat, and filling it with this fermented refuse, put the gate in to pickle. The seeds of the *mohwa* yield an oil much prized by the natives, and used occasionally for adulterating *ghee*. The wood is not much used; it is not of sufficient value to compensate for the flower and fruit, consequently the tree is seldom cut down. When an old one falls the trunk and large limbs are sometimes used for sluices in tanks, for the heart wood is generally rotten and hollow, and it stands well under water. If you ask a Gond about the *mohwa* he will tell you it is his father and mother. His fleshly father and mother die and disappear, but the *mohwa* is with him for ever! A good *mohwa* crop is therefore always anxiously looked for, and the possession of trees coveted; in fact a large number of these trees is an important item for consideration in the assessment of land revenues. No wonder then that the villager looks with disfavour on the prowling bear who nightly gathers up the fallen harvest, or who shakes down the long-prayed-for crop from the laden boughs.

The Sloth Bear is also partial to mangos, sugar-cane, and the pods of the *amaltas* or *cassia*(*Cathartocarpus fistula*), and the fruit of the jack-tree (*Artocarpus integrifolia*).

It is extremely fond of honey, and never passes an ant-hill without digging up its contents, especially those of white ants. About twenty years ago my first experience of this was in a neighbour's garden. He had recently built himself a house, and was laying out and sowing his flower-beds with great care. It so happened that one of the beds lay over a large ants' nest, and to his dismay he found one morning a huge pit dug in the centre of it, to the total destruction of all his tender annuals, by a bear that had wandered through the station during the night. Tickell describes the operation thus: "On arriving at an ant-hill the bear scrapes away with the fore-feet till he reaches the large combs at the bottom of the galleries. He then with violent puffs dissipates the dust and crumbled particles of the nest, and sucks out the inhabitants of the comb by such forcible inhalations as to be heard at two hundred yards distant or more. Large larvæ are in this way sucked out from great depths under the soil."

Insects of all sorts seem not to come amiss to this animal, which systematically hunts for them, turning over stones in the operation.

The Sloth Bear has usually two young ones at a birth. They are born blind, and continue so till about the end of the third week. The mother is a most affectionate parent, defending her offspring with the greatest ferocity. A she-bear with cubs is always an awkward customer, and she continues her solicitude for them till they are nearly full grown. The young ones are not difficult to rear if ordinary care be taken. The great mistake that most people make in feeding the young of wild animals is the giving of pure cows' milk. I mentioned this in 'Seonee' in speaking of a bear:—

"The little brute was as savage as his elders, and would do nothing but walk to the end of the string by which he was attached to a tent peg, roll head over heels, and walk in a contrary direction, when a similar somersault would be performed; and he whined and wailed just like a child; one might have mistaken it for the puling of some villager's brat. Milford was going to give it pure cows' milk when Fordham advised him not to do so, but to mix it with one half the quantity of water. 'The great mistake people make,' he said, 'who try to rear wild animals, is to give them what they think is best for them, viz., good fresh cows' milk, and they wonder that the little creatures pine away and die, instead of flourishing on it. Cows' milk is too rich; buffalos' milk is better, but both should be mixed with water. It does not matter what the animal is: tiger-cub, fawn, or baby monkey—all require the same caution.'"

I had considerable experience in the bringing up of young things of all sorts when in the Seonee district, and only after some time learnt the proper proportions of milk and water, and also that regularity in feeding was necessary—two-thirds water to one of milk for the first month; after that half and half.

The Sloth Bear carries her cubs on her back, as do the opossums, and a singular little animal called the koala (*Phascolarctos cinereus*)—and she seems to do this for some time, as Mr. Sanderson writes he shot one which was carrying a cub as large as a sheep-dog.

In that most charming of all sporting books ever written, Campbell's 'Old Forest Ranger,' there is an amusingly-told bit with reference to this habit of cub-carrying which I am sure my readers will forgive me for extracting. Old Dr. Jock M'Phee had been knocked over by a she-bear, and is relating his grievances to Charles:—

"Well, as I was saying, I was sitting at my pass, and thinking o' my old sweethearts, and the like o' that, when a' at ance I heard a terrible stramash among the bushes, and then a wild growl, just at my very lug. Up I jumps wi' the fusee in my hand, and my heart in my mouth, and out came a muckle brute o' a bear, wi' that wee towsie tyke sitting on her back, as conciety as you please, and haudin' the grip like grim death wi' his claws. The auld bear, as soon as she seed me, she up wi' her birse, and shows her muckle white teeth, and grins at me like a perfect cannibal; and the wee deevil he sets up his birse too, and snaps his bit teeth, and tries to grin like the mither o't, with a queer auld farrant look that amaist gart me laugh; although, to tell the blessed truth, Maister Charles, I thought it nae laughing sport. Well, there was naething else for it, so I lets drive at them wi' the grit-shot, thinking to ding them baith at ance. I killed the sma' ane dead enough; but the auld one, she lets a roar that amaist deeved me, and at me she comes like a tiger. I was that frighted, sir, I did na ken what to do; but in despair I just held out the muzzle o' the fusee to fend her off, and I believe that saved my life, for she gripped it atween her teeth, dang me o'er the braid o' my back, and off she set, trailing me through the bushes like a tether-stick; for some way or other I never let go the grip I had o' the stock. I was that stupefied I hae nae recollection what happened after this, till I found mysel' sticking in the middle o' a brier-bush, wi' my breeks rived the way you see, and poor old 'Meg' smashed in bits—de'el be in her skin that did it."

Poor old Jock M'Phee! On the whole he did well to escape with but injury to his garments. I have seen several men mauled by she-bears; one of them was scalped and torn to such an extent that it was a long time before he recovered; and I always marvelled to think he got over it at all.

The British soldier is rather fond of a bear cub as a pet; and Captain Baldwin tells an amusing story of one which followed the men on to the parade ground, and quite disorganised the manoeuvres by frightening the colonel's horse. In 1858 I was quartered for a time with a naval brigade; and once, when there was an alarm of the enemy, Jack went to the front with all his pets, including Bruin, which brought up the rear, shuffling along in blissful ignorance of the bubble reputation to be found at the cannon's mouth.

Although as a rule vegetarian, yet this species is not altogether free from the imputation of being a devourer of flesh when it comes in its way. In such cases it possibly has been impelled by hunger, and I doubt whether it ever kills for the sake of eating. I have known even ruminants eat meat, and in their case hunger could not have been urged as an excuse. Mr. Sanderson mentions an instance when a Barking Deer he shot was partially devoured by a bear during the night.

Very few elephants, however steady with tigers, will stand a bear. Whether it is that bears make such a row when wounded, or whether there be anything in the smell, I know not, but I have heard many sportsmen allude to the fact. A favourite elephant I had would stand anything but a bear and a pig. Few horses will approach a bear, and this is one difficulty in spearing them; and for this reason I think bear dancers should be prohibited in towns. Calcutta used to swarm with them at one time. It always makes me angry when I see these men going about with the poor brutes, whose teeth and claws are often drawn, and a cruel ring passed through their sensitive nostrils. I should like to set an old she-bear after the *bhalu-wallas*, with a fair field and no favour.

The bear rising to hug its adversary is a fallacy as far as this species is concerned; it does not squeeze, but uses its claws freely and with great effect.

I think we have now exhausted our Indian bears. Some have spoken of a dwarf bear supposed to inhabit the Lower Himalayas, but as yet it is unknown—possibly it may be the *Ailuropus*. We now come to the Bear-like animals, the next in order, being the Racoons (*Procyon*), Coatis (*Nasua*), Kinkajous (*Cercoleptes*), and the Cacomixle (*Bassaris*) of North and South America, and then our own Panda or Cat-Bear (*Ailurus fulgens*).

This, with the above-mentioned Racoons, &c., forms a small group of curious bear-like animals, mostly of small size. Externally they differ considerably, especially in their long bushy tails, but in all essential particulars they coincide. They are plantigrade, and are without a cæcum or blind gut; the skull, however it may approach to a viverrine or feline shape, has still marked arctoid characteristics. The ear passage is well marked and bony, as in that of the bear, but the bulb of the drum (*bulla tympani*) is much developed, as in the dogs and cats. The molars are more tuberculated than in the bears, resembling the hinder molars of a dog.

AILURIDÆ

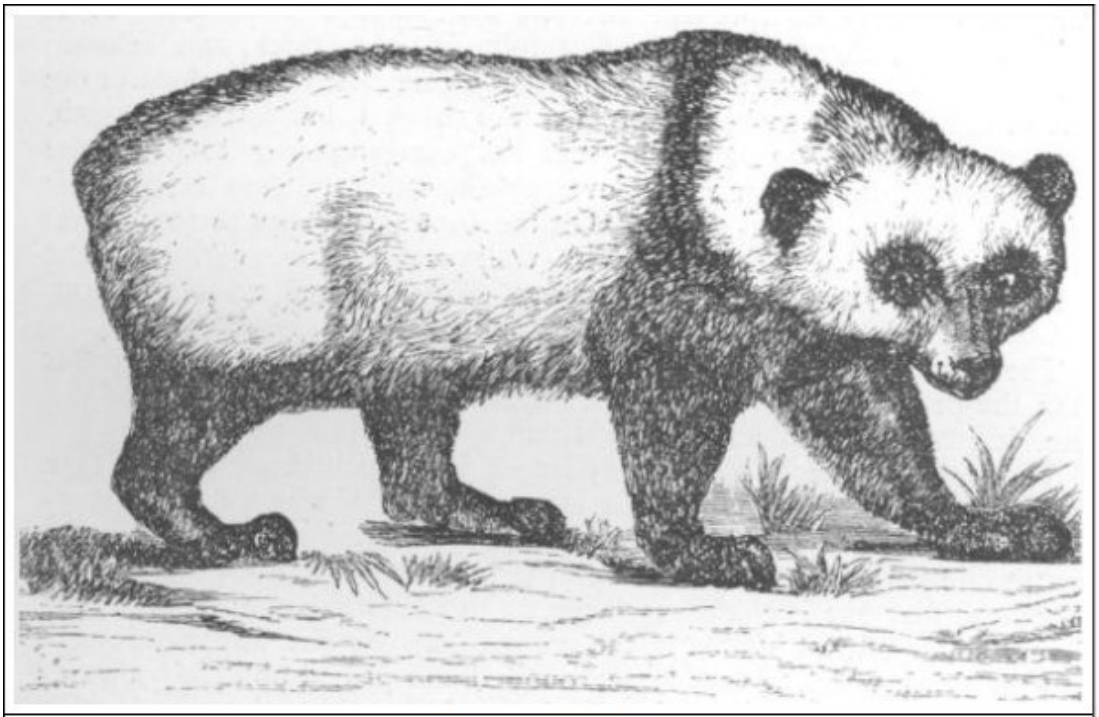
F. Cuvier, who received the first specimen of the type of this family from his son-in-law, M. Duvaucel, was not happy in his selection of a name, which would lead one to suppose that it was affixed to the cats instead of the bears. It certainly in some degree resembles the cat externally, and it has also semi-retractile claws, but in greater measure it belongs to the Arctoidea. There are only two genera as yet known—the Red Cat-Bear, *Ailurus fulgens*, and the Thibetan *Ailuropus melanoleucos*.

GENUS AILUROPUS

This very rare and most curious animal should properly come between the bears and *Ailurus*, as it seems to form a link between the two. Such also is the idea of a naturalist friend of mine, who, in writing to me about it, expressed it as being a link between *Helarctos Malayanus* and *Ailurus fulgens*. Very little is, however, known of the creature, which inhabits the most inaccessible portions of a little-known country—the province of Moupin in Eastern Thibet. It was procured there by the Abbé David, who, after a prolonged residence in China, lived for nearly a year in Moupin, and he sent specimens of the skull, skin, &c., to M. Alphonse Milne-Edwards, from whose elaborate description in his 'Recherches sur les Mammifères' I have extracted the following notice. The original article is too long to translate *in extenso*, but I have taken the chief points.

NO. 168. AILUROPUS MELANOLEUCOS

HABITAT.—The hilly parts Moupin, Eastern Thibet.



Ailuropus melanoleucos.

DESCRIPTION.—The *Ailuropus* has a thick-set heavy form. His head is short, rather slender in front, but extremely enlarged in the middle and after part; the nose is small and naked at its extremity; the forehead very large and convex; the eyes are small; the ears short, wide between and rounded at the ends; neck thick and very strong; the body is squat and massive; the tail is so short as to be hardly distinguishable. The feet are short, very large, nearly of the same length, terminated by five toes very large and with rounded ends, the general conformation of which recalls in all respects those of the bears, but of which the lower parts, instead of being completely placed on the sole in walking and entirely naked or devoid of hair, are always in great measure raised, and abundantly clad with fur to almost their full extent.

On the hind feet can be noticed at the base of the toes a transverse range of five little fleshy pads, and towards the anterior extremity of the metatarsal region another naked cushion placed transversely; but between these parts, as well as the posterior two-thirds of the planta, the hair is as abundant and as long almost as on the upper part of the foot. In the fore-limbs the disposition is much the same, though the metacarpal cushion may be larger; and there is another fleshy pad without hair near the claws.

The *Ailuropus* is thus an animal not strictly plantigrade, like the Bears in general, or the same as the Polar Bear, of which the feet, although placed flat on the earth, are not devoid of hair; but, on the contrary, the *Ailuropus* resembles the *Ailurus*, which is semi-plantigrade, yet hairy under Its soles.

The colouring of the *Ailuropus* is remarkable: it is white with the exception of the circumferences of the eyes, the ears, the shoulders, and the lower part of the neck which are entirely black. These stand out clearly on a groundwork of slightly yellowish-white; the spots round the eyes are circular, and give a strange aspect to the animal; those on the shoulders represent a sort of band placed transversely across the withers, widening as they descend downwards to lower limbs. The hinder limbs are also black from the lower part of the thigh down to the toes, but the haunches, as also the greater part of the tail, are as white as the back and belly; the colouring is the same in young and old. The fur is long, thick, and coarse, like that of the bears.

From the general form of the skull it would seem impossible to determine the family to which this animal belongs. In effect the head differs considerably from the *Ursidæ* and the *Mustelidæ*, and

presents certain resemblances to that of the hyæna; but there are numerous and important particulars which indicate a special zoological type, and it is only by an inspection of the dental system that the natural affinities of the *Ailuropus* can be determined.

In the upper jaw the incisors are, as usual, in three pairs. They are remarkable for their oblique direction; the centre ones are small and a little widened at the base; the second pair are stronger and dilated towards the cutting edge; the external incisors are also strong and excavated outside to admit the canines of the lower jaw. The canines are stout, but short, with a well-marked blunt ridge down the posterior side, as in the Malayan bears.

The molars are six in number on each side, of which four are premolars, and two true molars. The first premolar, situated behind, a little within the line of the canine, is very small, tuberculiform, and a little compressed laterally. The second is strong and essentially carnassial; it is compressed laterally and obliquely placed. It is furnished with three lobes: the first lobe is short, thick, and obtuse; the second is raised, triangular and with cutting edges; the third of the size of the first, but more compressed—in short, a double-fanged tooth. This molar differs considerably from the corresponding tooth of the bear by its form and relative development, since in that family it is one-fanged, very low and obtuse. On the contrary, it approaches to that of the hyænas and felines. With the panda (*Ailurus fulgens*) the corresponding premolar is equally large, double-fanged and trenchant, but the division in lobes is not so marked.

The third or penultimate molar of the *Ailuropus* is larger and thicker than the preceding, divided in five distinct lobes—three outer ones in a line, and two less projecting ones within.

The last premolar is remarkably large; it is much larger behind than in front, and its crown is divided into six lobes, of which five are very strong; the three external ones are much developed and trenchant, the centre one being the highest and of a triangular shape. Of the internal lobes, the first one is almost as large as the external ones; the second is very small, almost hidden in the groove between the last mentioned; and the third, which is very large, rounded and placed obliquely inwards in front, and outwards behind. Professor Milne-Edwards remarks that he knows not amongst the carnivora a similar example of a tooth so disposed. That of *Ailurus* shows the least difference, that is to say it is nearest in structure, having also six lobes, but more thick-set or depressed.

The true molars are remarkable for their enormous development: the first is almost square, with blunt rounded cusps, four-fanged, and presenting a strange mixture of characteristics, in its outward portion resembling an essentially carnivorous type, and its internal portion that of molars intended to triturate vegetable substances. Amongst bears, and especially the Malayan bears, this character is presented, but in a less striking degree; the panda resembles it more, with certain restrictions, but the most striking analogy is with the genus *Hyænarctos*.

The last molar is peculiar in shape, longer than broad, and is tuberculous, as in the bears, but it differs in this respect from the pandas, in which the last molar is almost a repetition of the preceding one, and its longitudinal diameter is less than its transverse.

In the lower jaw the first premolar, instead of being small and tuberculate, as its corresponding tooth in the upper jaw, is large, double-fanged, trenchant and tri-lobed, resembling, except for size, the two following ones. The second is not inserted obliquely like its correspondent in the upper jaw, its axis is in a line with that of its neighbours; tricuspidate, the middle lobe being the highest. The third premolar is very large, and agrees with its upper one, excepting the lobule on the inner border.

The first true molar is longer than broad, and wider in front; the crown, with five conical tubercles in two groups, separated by a transverse groove; the next molar is thicker and stouter than the preceding one, and the last is smaller, and both much resemble those of the bears, and differ notably from the pandas.

From what M. Milne-Edwards describes, we may briefly epitomise that the premolarial dentition of the *Ailuropus* is ailuroid or feline, and that the true molars are arctoid or ursine.

The skull is remarkable for the elongation of the cranium and the elevation of the occipital crest, for the shortness of the muzzle, for the depression of the post-frontal portion, and for the enormous development of the zygomatic arches. In another part M. Milne-Edwards remarks that there is no carnivorous animal of which the zygomatic arches are so developed as in the *Ailuropus*. He states that it inhabits the most inaccessible mountains of Eastern Thibet, and it never descends from its retreats to ravage the fields, as do the Black Bears; therefore it is difficult to obtain. It lives principally on roots, bamboos and other vegetables; but we may reasonably suppose from its conformation that it is carnivorous at times, when opportunity offers, as are some of the bears, and as is the *Ailurus*. I have dwelt at some length on this animal, though not a denizen of India proper; but it will be a prize to any of our border sportsmen who come across it on the confines of Thibet, and therefore I have deemed it worthy of space.

SIZE.—From muzzle to tail, about four feet ten inches; height about twenty-six inches.

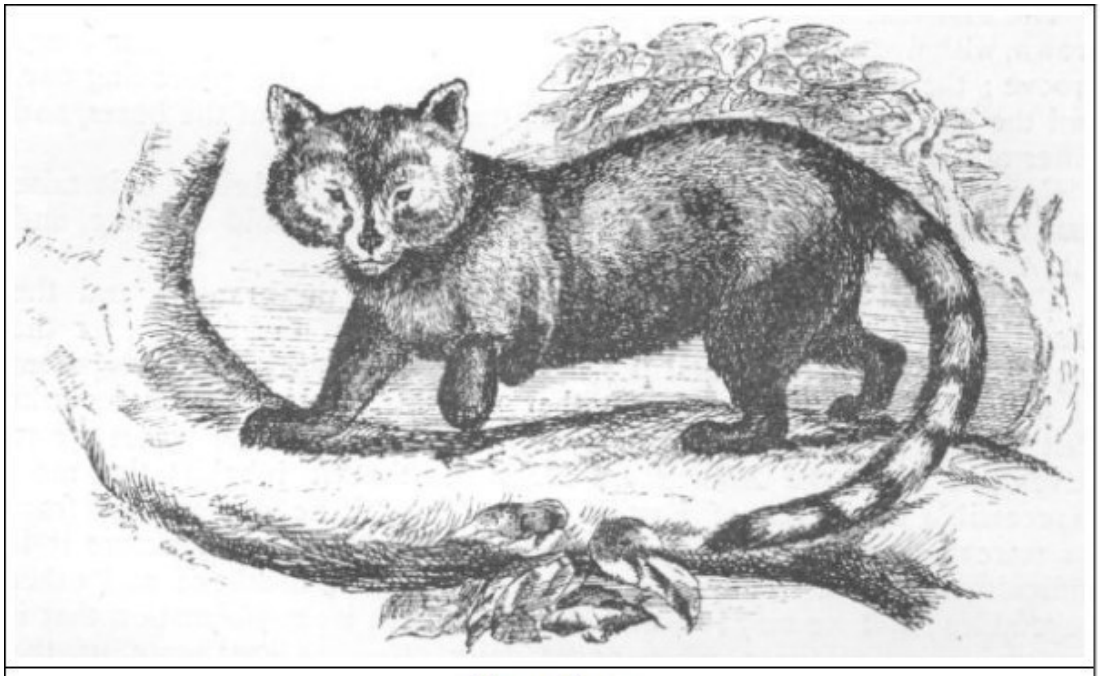
GENUS AILURUS

NO. 169. AILURUS FULGENS

The Red Cat-Bear (Jerdon's No. 92)

NATIVE NAMES.—*Wah*, Nepal; *Wah-donka*, Bhot.; *Sunnam* or *Suknam*, Lepch.; *Negalya*, *Ponya* of the Nepalese (*Jerdon*). In the Zoological Gardens in London it is called the *Panda*, but I am unable just now to state the derivation of this name.

HABITAT.—Eastern Himalayas and Eastern Thibet.



Ailurus fulgens.

DESCRIPTION.—"Skull ovate; forehead arched; nose short; brain case ovate, ventricose; the zygomatic arches very large, expanded; crown bent down behind" (*Gray*). The lower jaw is very massive, and the ascending ramus unusually large, extending far above the zygomatic arch, forming almost a right angle with equal arms. Hodgson's description is: "Ursine arm; feline paw; profoundly cross-hinged, yet grinding jaw, and purely triturative and almost ruminant molar of *Ailurus*; tongue smooth; pupil round; feet enveloped in woolly socks with leporine completeness. It walks like the marten; climbs and fights with all the four legs at once, like the *Paradoxuri*, and does not employ its forefeet—like the racoon, coatis, or bears—in eating."

Jerdon's outward description is: "Above deep ochreous-red; head and tail paler and somewhat fulvous, displayed on the tail in rings; face, chin, and ears within white; ears externally, all the lower surface and the entire limbs and tip of tail jet-black; from the eye to the gape a broad vertical line of ochreous-red blending with the dark lower surface; moustache white; muzzle black."

The one at present in the London "Zoo" is thus described: "Rich red-chestnut in colour on the upper surface, jet black as to the lower surface, the limbs also black, the snout and inside of ears white; the tail bushy, reddish-brown in colour and indistinctly ringed."

SIZE.—Head and body 22 inches; tail 16; height about 9; weight about 8 lbs.

Jerdon has epitomised Hodgson's description of the habits of this animal as follows: "The Wah is a vegetivorous climber, breeding and feeding chiefly on the ground, and having its retreat in holes and clefts of rock. It eats fruits, roots, sprouts of bamboo, acorns, &c.; also, it is said, eggs and young birds; also milk and ghee, which it is said to purloin occasionally from the villages. They feed morning and evening, and sleep much in the day. They are excellent climbers, but on the ground move rather awkwardly and slowly. Their senses all appear somewhat blunt, and they are easily captured. In captivity they are placid and inoffensive, docile and silent, and shortly after being taken may be suffered to go abroad. They prefer rice and milk to all other food, refusing animal food, and they are free from all offensive odour. They drink by lapping with the tongue, spit like cats when angered, and now and then utter a short deep grunt like a young bear. The female brings forth two young in spring. They usually sleep on the side, and rolled into a ball, the head concealed by the bushy tail." (For the full account see 'Jour. As. Soc. Beng.' vol. xvi. p. 1113.)

Mr. Bartlett, who has studied the habits of the specimen in the London Gardens, says that in drinking it sucks up the fluids like a bear instead of licking it up like a dog or cat, which disagrees with what Hodgson states above. "When offended it would rush at Mr. Bartlett, and strike at him with both feet, the body being raised like a bear's, and the claws projecting."

General Hardwicke was the first to discover this animal, which he described in a paper read before the Linnæan Society on the 6th of November 1821, but it was not published for some years, and in the meanwhile M. Duvaucel sent one to M. F. Cuvier, who introduced it first to the world. Some years ago I had a beautiful skin of one offered to me for sale at Darjeeling by some Bhotias, but as it was redolent of musk and other abominations quite foreign to its innocent inodorous self, I declined to give the high price wanted for it.

SEMI-PLANTIGRADES

These form part of the Plantigrada of Cuvier and part of the Digitigrada; they walk on their toes, but at the same time keep the wrist and heel much nearer to the ground than do the true Digitigrades, and sometimes rest on them. Of those Semi-plantigrades with which we now have to deal there are three sections, viz., the *Mustelidæ*, containing the Gluttons, Martens, Weasels, Ferrets, Grisons, &c., the *Melidæ*, *Melididæ* and *Melinidæ* of various authors: i.e. Badgers, Ratels, and Skunks; and the *Lutridæ* or Otters. Some writers bring them all under one great family, *Mustelidæ*, but the above tripartite arrangement is, I think, better for ordinary purposes. To the mind of only moderate scientific

attainments, a distinct classification of well-defined groups is always an easier matter than a large family split up into many genera defined by internal anatomical peculiarities.

Of the Semi-plantigrades at large Jerdon remarks: "None of them have more than one true molar above and another below, which, however, vary much in development, and the flesh tooth is most marked in those in which the tuberculate is least developed, and *vice versa*. The great and small intestines differ little in calibre, and many of them (i.e. the family) can diffuse at will a disgusting stench." This last peculiarity is a specialty of the American members of the family, notably the skunk, of the power of which almost incredible stories are told. I remember reading not long ago an account of a train passing over a skunk, and for a time the majority of the passengers suffered from nausea in consequence. Sir John Richardson writes: "I have known a dead skunk thrown over the stockades of a trading port produce instant nausea in several women in a house with closed doors, upwards of a hundred yards distant." The secretion is intensely inflammatory if squirted in the eye.

MELIDIDÆ; OR, BADGER-LIKE ANIMALS

This group is distinguished by a heavier form, stouter limbs, coarse hair, and slower action; in most the claws are adapted for burrowing. None of them are arboreal, although in olden times marvellous tales were told of the wolverene or glutton as being in the habit of dropping down from branches of trees on the backs of large animals, clinging on to them and draining their life blood as they fled. Some of them are capable of emitting a noisome smell. The teledu of Java (*Mydaus meliceps*) is the worst of the family in this respect, and almost equals the skunk. It is possible that this animal may be found in Tenasserim.

GENUS ARCTONYX

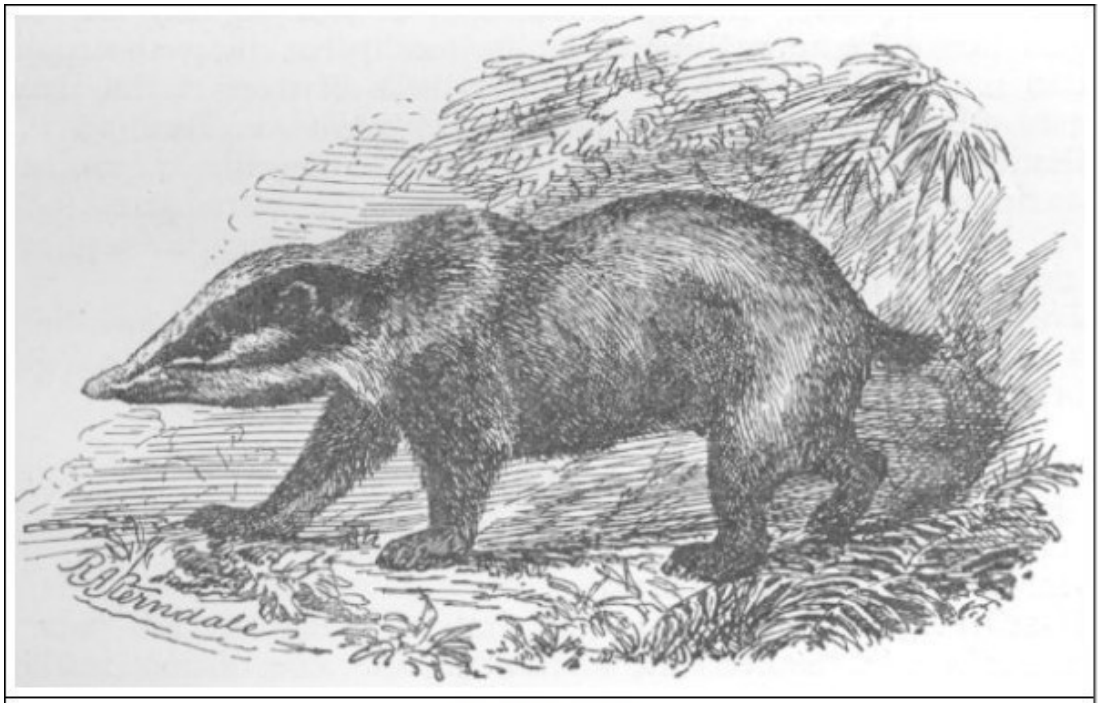
Dentition much the same as that of the Badger (*Meles*). Incisors, 6/6; can., 1—1/1—1; premolars, 3—3/3—3; molars, 1—1/1—1. The incisors are disposed in a regular curve, vertical in the upper jaw, obliquely inclined in the lower; canines strong, grinders compressed; general form of the badger, but stouter. Feet five-toed, with strong claws adapted for digging, that of the index finger being larger than the other.

NO. 170. ARCTONYX COLLARIS

The Hog-Badger (Jerdon's No. 93)

NATIVE NAMES.—*Balu-suar*, Hind., Sand-pig, or, as Jerdon has it, *Bhalu-soor*, Hind., i.e. Bear-pig; *Khway-too-wet-too*, Arakanese.

HABITAT.—Nepal, Sikim, Assam, Sylhet, Arakan, extending, as Dr. Anderson has observed, to Western Yunnan. The late General A. C. McMaster found it in Shway Gheen On the Sitang river in Pegu. I heard of it in the forests of Seonee in the Central Provinces, but I never came across one.



Arctonyx collaris.

DESCRIPTION.—"Hair of the body rough, bristly, and straggling; that of the head shorter, and more closely adpressed. Head, throat, and breast yellowish white; on the upper part this colour forms a broad regularly-defined band from the snout to the occiput; ears of the same colour; the nape of the neck, a narrow band across the breast, the anterior portion of the abdomen, the extremities, a band arising from the middle of the upper lip, gradually wider posteriorly, including the eyes and ears, and another somewhat narrower arising from the lower lip, passing the cheek, uniting with the former on the neck, are deep blackish-brown" (*Horsfield*). The tail is short, attenuated towards the end, and covered with rough hairs.

SIZE.—From snout to root of tail, 25 inches; tail, 7 inches; height at the rump, 12 inches.

M. Duvaucel states that "it passes the greatest part of the day in profound somnolence, but becomes active at the approach of night; its gait is heavy, slow, and painful; it readily supports itself erect on its hind feet, and prefers vegetables to flesh."

Jerdon alludes to all this, and adds, "one kept in captivity preferred fruit, plantains, &c., as food, and refused all kinds of meat. Another would eat meat, fish, and used to burrow and grope under the walls of the bungalow for worms and shells." My idea is *Balu-suar*, or Sand-pig is the correct name, although *Bhalu-suar* or Bear-pig may hit off the appearance of the animal better, but its locality has always been pointed out to me by the Gonds in the sandy beds of rivers in the bamboo forests of Seonee; and Horsfield also has it *Baloo-soor*, Sand-pig.

Bewick, who was the first to figure and describe it, got, as the vulgar phrase hath it, the wrong pig by the lug, as he translates it *Sand-bear*. McMaster also speaks of those he saw as being in deep ravines on the Sitang river.

The stomach of Arctonyx is simple; there is no cæcum, as is the case also with the bears; the liver has five lobes; under the tail it has glands, as in the Badgers, secreting a fatty and odorous substance.

NO. 171. ARCTONYX TAXOIDES

The Assam Badger

HABITAT.—Assam and Burmah.

DESCRIPTION.—Smaller than the last, with longer and finer fur, narrower muzzle, smaller ears, shorter tail, and more distinct markings. The measurement of the respective skulls show a great difference. The length of a skull of a female of this species given by Dr. Anderson is 4·75 inches against 6·38 of a female of *A. collaris*. The breadth across the zygomatic arch is 2·38 against 3·64 of *A. collaris*. The breadth of the palate between the molars is only 0·81 against 1·07.

GENUS MELES

SUB-GENUS TAXIDIA

This sub-genus is that of the American type of Badger, to which Hodgson, who first described the Thibetan *T. leucurus*, supposed his species to belong; but other recent naturalists, among whom are Drs. Gray and Anderson, prefer to class it as *Meles*. Hodgson founded his classification on the dentition of his specimen, but Blyth has thrown some doubt on its correctness, believing that the skull obtained by Hodgson with the skin was that of *Meles albogularis*. Hodgson, however, says: "from the English Badger type of restricted *Meles* our animal may be at once discriminated without referring to skulls by its inferior size, greater length of tail, and partially-clad planta or foot-sole."

NO. 172. MELES (TAXIDIA) LEUCURUS

The Thibetan White-tailed Badger

NATIVE NAME.—*Tampha*.

HABITAT.—The plains of Thibet.

DESCRIPTION.—"Fur long, flaccid, dark iron-grey and white mixed; hair long, white, with a broad sub-lunate black band and a white tip; under fur abundant, long, white; a streak on each side of the forehead blackish grey, varied; chin, throat, legs and under side of the body black; tail, sides of head, and body whitish."—*Gray*.

The aspect, according to Hodgson, is entirely that of a long-tailed Badger (Gray remarks: "it most resembles the European animal "), with somewhat smaller head, with longer, finer fur than usual; the entire sole of the foot is not naked, but only about two-thirds, and the toe-pads are very much developed, thus raising the powerful long fossorial claws from the ground in walking.

SIZE.—Total length 37 inches, of which the tail, with the hair, is 10 inches, and without the hair 7 inches; the longest hair of the body is 4½ inches.

There is not much known about the *Tampha*. According to what Hodgson was able to gather concerning his habits, "he dwells in the more secluded spots of inhabited districts, makes a comfortable, spacious and well-arranged subterraneous abode, dwells there in peace with his mate, who has an annual brood of two to four young, molests not his neighbour, defends himself

if compelled to it with unconquerable resolution, and feeds on roots, nuts, insects and reptiles, but chiefly the two former—on vegetables, not animals—a point of information confirmed by the prevalent triturant character of the teeth." The colouring of this animal is almost identical with the English badger, only that his tail is longer and whiter.

NO. 173. MELES ALBOGULARIS

The White-throated Thibetan Badger

HABITAT.—Thibet.

DESCRIPTION.—Smaller and much less tufted ears than the last species; a shorter and much less bushy tail; and the fur shorter and coarser, though of finer texture than in the European badger, with much woolly hair at its base. Both the English badger and *M. leucurus* are black throated; this one is white throated. The English animal has a broad band of brownish-black, which begins between the muzzle and the eye, and runs through the eye and ear till it fades off on the neck; the space of white between these two bands on the forehead runs back and contracts behind the ears. In the Thibetan animal it contracts just behind the eyes, and is continued as a faint narrow streak only as far as the ears. In the English one the cheeks are broadly white between the eye-band and the black throat; in the Thibetan there is a little white below the eye, and this is bordered by a narrow black stripe, beneath which is the white throat.

There is another Thibetan badger mentioned by Professor Milne-Edwards in his 'Recherches sur les Mammifères,' a white-throated one, *M. obscurus*, but it appears to be the same as *M. albogularis*.

GENUS MELLIVORA

Tubercular grinder transverse; flesh-tooth larger, with a small internal lobe, and with a single tubercle; lower flesh-tooth tricuspidate, sharp-edged; head depressed; nose blunt; ears not visible externally; body stout, depressed; legs short, and strong; feet plantigrade, five-toed; front claws elongated and strong; the bald sole of the hind foot occupying the whole under surface, only slightly divided across about one-third of its length from the front; tail very short, with powerfully offensive glands; it has a thick loose skin and a subcutaneous layer of fat, which doubtless protect it from stings of bees, on which this genus is supposed to feed whenever it can.

NO. 174. MELLIVORA INDICA

The Indian Ratel or Honey-Badger (Jerdon's No. 94)

NATIVE NAME.—*Biju*, Hind.; *Biyu-khawar*, Telegu; *Tavakaradi*, Tamil; *Bajru-bhal*, at Bhagulpore (Santali?); *Bharsiah*, Nepalese.

HABITAT.—Throughout India.

Mellivora Indica.

DESCRIPTION.—The upper half of its body is ashy-grey; the lower half, muzzle, limbs, and tail black; the general appearance is that of a black animal with a grey cloak on its back. The only difference between the Indian and the Cape Ratel is, that the grey cloak of the latter has a conspicuous white border which is wanting in the Indian species; the tail also of the latter is shorter, otherwise they are the same, and were for a long time considered the same.

SIZE.—Head and body, 26 to 32 inches; tail, 5 to 6 inches.

Jerdon says it is chiefly found in hilly districts, and that he has not found it in Lower Bengal nor on the Malabar coast. In Central India it is not uncommon. It has got a reputation for digging into graves, and is called in some parts "the grave-digger;" but I do not believe in its carnivorous propensities to this extent; it lives principally on small fry, insects, and small animals, honey and vegetable food. Jerdon says it is destructive to poultry, which is probable, for it will eat small birds. Both it and the Cape species will eagerly look out for bees, but it is not to be supposed, as some books would make out, that bees and honey form the staple diet. Its thick and loose skin, the stiffness of the hair above, and the layer of fat below, effectually preserve it from the effects of the stings. The tail glands contain a very strong and pungent secretion.

Some years ago, before I knew exactly what they were, the Ratels in the London Zoological Gardens used to interest me greatly. They had a low cage, on the ground I think, and their peculiar antics never failed to draw a crowd. They used to run round in an idiotic sort of way, and always at one point gravely turn head over heels and then proceed as before and repeat. In Cassell's 'Natural History' this is alluded to, only the writer says that now they are in fresh quarters, and the flitting seems to have disturbed them. He adds: "We have often watched one of them run round and round the cage in the usual purposeless manner of captive animals, but with this peculiarity: when he reached a particular corner of the den, he quietly, and without effort, turned head over heels, and then went on again. On one occasion, after he had been doing this with great regularity for some rounds he seemed to become abstracted, and passed the usual spot without the somersault; when, however, he had proceeded a few paces he recollected himself, stopped for a moment, returned to the exact place, turned over as usual, and proceeded without further let or hindrance." The African species is said to live largely on bees—I suppose ground bees, such as our English humble bee, for these animals are not arboreal—and it is said to exhibit great skill in tracking the flying insects to their nest. "Sparrman states that it seats itself on a hillock to look for the bees, and shades its eyes with one forepaw against the rays

of the setting sun." Here is something for our Indian naturalists to observe. Some other animals are said to do the same; whether the Biju does it or not I cannot say. McMaster says of it: "Two that I saw in confinement appeared very good-tempered, and much more playful than tame bears would have been. They were, I think, fed entirely upon vegetables, rice and milk." This animal is the same as Hodgson's *Ursitaxus inauritus*, the *Bharsiah* which figures as a separate genus in Cuvier. The skull is very like that of the wolverenes in general form.

GENUS GULO—THE GLUTTON OR WOLVERENE

This animal was placed by Linnæus among the *Ursidæ*, and is classed by some with the *Melididæ*, but its dentition is more that of the Martens, which occupy the next group. The true Glutton (*Gulo luscus*) is not known in India, but we have some so-called Wolverenes (*Helictis*) to which I shall presently allude. Still a few remarks about the typical animal, which is by no means an uninteresting creature, may not be out of place. The Glutton inhabits a wide tract of country in the Northern Hemisphere, the colder regions of Europe, Asia, and America; it is abundant in Siberia and Kamschatka, and is the pest of the trappers in North America. Fabulous stories were told of this animal in olden days, some of which are still propagated at the present time. It was supposed to be of insatiable appetite, and to attack its prey (deer, &c.) by dropping down from the branch of a tree on to the back of its victim, and to eat its way into a vital part, whilst being carried along—a decided fallacy, for neither the Glutton nor our Indian species of *Helictis* are arboreal in their habits. Then it was accused of eating to such a pitch of distention that it had to squeeze itself between two close-growing trees for relief ere it returned again to the repast. There is no doubt, however, that it is to a great extent voracious and extremely cunning; and what it cannot eat it will carry off and hide. The trappers complain bitterly of it, and spare no pains to kill every one they can come across; but it is not easily to be caught, and only a very cunningly-devised bait will succeed.

Were I to relate some of the stories recorded of this animal I might get accused, if not of being a romancer myself, at all events of being a too credulous propagator of other people's romances. It is told of it that it will discover hidden stores, and, digging them up out of the snow, carefully smooth the surface over again; that it will avoid every trap set for itself, and, going round to the back of spring guns, gnaw through the string connected with the trigger before it drags away the bait. It follows up the lines laid down by the trappers, taking the martens out, and devouring them, or hiding what it cannot eat, and by wearying out the patience of the hunters, compel them to strike a new "marten-road."

It is said by Dr. Coues to possess a singular habit of sitting down on its haunches, shading its eyes with a forepaw, and gazing earnestly at the approaching enemy before it takes to flight. I have already alluded to the Cape ratel doing this on the look-out for bees. The Indian form of Wolverene is a slighter and much smaller animal, with a still more weasel-like appearance. The Glutton is comparatively a large beast, the body being about 2½ feet, and the tail 10 inches; the *Helictis* is only half the size, and there is a slight difference in the dentition.

GENUS HELICTIS

"Head tapering; nose acute, conical; muzzle bald, obliquely truncated; other side hairy, with a central groove; nostrils inferior; ears ovate; body slender; legs short; toes 5·5; front claws elongate, curved; hinder short and acute; sole of foot hairy behind, bald in front, and rhombic for half the length of the foot, with three large oblong pads on the front, and three small ones on the hinder edge; toes elongate; thumb short; fur black, like *Herpestes*; tail moderate, sub-cylindrical; teeth, 38; premolars, 4—4/4—4; grinders, 5/6."—Gray.

There are four species of this genus, and of these two come within the geographical limits of these papers, viz., *Helictis Nipalensis* and *H. moschata*; the third, *H. orientalis*, belongs to Java; and the fourth, *H. subaurantiaca*, to Formosa.

NO. 175. HELICTIS NIPALENSIS

The Nepal Wolverene (Jerdon's No. 95)

NATIVE NAME.—*Oker*, Nepalese; *Kyoung-pyan*, Arakanese.

HABITAT.—Nepal, Arakan, and Pegu.

DESCRIPTION.—Hodgson, who first described this animal in the 'Journal of the Asiatic Society of Beng.' (vol. v. pp. 237-38), says: "Above earthy brown; below, with the edge of the upper lip, the insides of the limbs, and terminal half of the tail, yellow; a white mesial stroke from the nape to the hips, and a white band across the forehead, spreading on the cheeks, and confluent with the pale colour of the animal's lower surface; head and body vermi-formed; digits and nails of the anterior extremities stronger; half way from the os calcis to the fingers hairy; fur of two sorts and abundant, but not lengthened, nor harsh, nor annulated; tail cylindrico-tapered, pointed, half the length of the animal." He goes on to add: "The anterior limbs are decidedly fossorial, and the hinder suited for walking in a sub-plantigrade manner; both wholly unfitted for rapatory or scansorial purposes."

SIZE.—Head and body 16 inches; tail 7½ inches, 9 inches, including hair.

The habits of this animal are nocturnal. Swinhoe mentions this in his account of the Formosan species, and Dr. Anderson relates that he is aware that the Nepal one is similar in its ways, and that it not unfrequently enters Bhotia huts at night; and on one occasion he killed one in a Bhotia hut, thinking it was a large rat, greatly to the chagrin of his host, who informed him that the animal was in the habit of visiting him nightly, and was most useful in destroying cockroaches and other insects.

NO. 176. HELICTIS MOSCHATA

The Chinese Wolverene

HABITAT.—China, also Burmah (Pegu, Yunnan).

DESCRIPTION.—Similar to the last, but differing in dentition and the formation of certain points in the skull. The teeth are smaller, and the infra-orbital foramen much larger. Both the above species are noted for long skulls and palate, whereas *H. orientalis* has a short skull and palate. The following are the chief characteristics:—

Short head and palate, large teeth, *small* infra-orbital foramen = *H. orientalis*.

Long head and palate, large teeth, *small* infra-orbital foramen = *H. Nipalensis*.

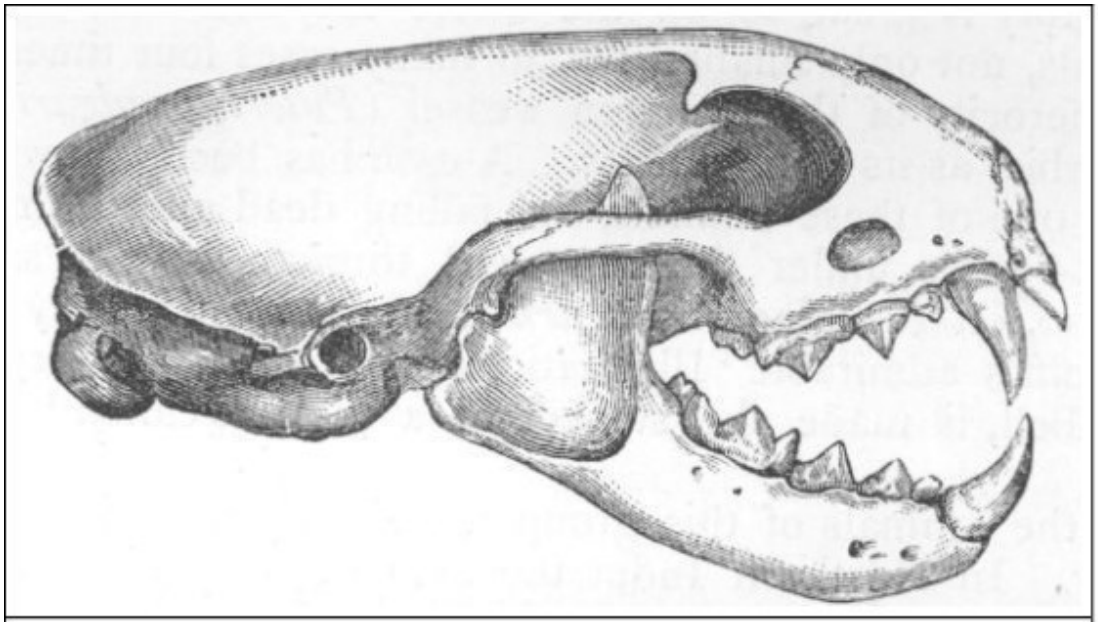
Long head and palate, *small* teeth, *large* infra-orbital foramen = *H. moschata*.

Dr. Anderson obtained a specimen of this species at an elevation of 5000 feet, at Teng-yue-chow in Yunnan.

MUSTELIDÆ—MARTENS AND WEASELS

In India the members of this family are restricted to the Weasels and Martens, but in other countries are included the Grisons, Zorillas, Skunks, &c. They are small animals of elongated form, with short legs, commonly expressed as vermiform; where the head of a weasel will go his body

will follow—at least that was my experience in my boyish days, when I was particularly interested in vermin, and the gamekeeper was my first instructor in natural history. The face is rounded like a cat, but the skull behind the eye is very long and pear-shaped when viewed from above; in proportion to a cat's skull the brain case is a fourth longer. They are most sanguinary in their habits, and their agility is great, so on the whole they are most formidable to many animals, not only smaller, but in many cases four times their own size. The ferocity of the common weasel (*Putorius vulgaris*) ought to be as proverbial as its watchfulness. A case has been known of a kite carrying off one of these animals, but falling dead after a time with the large blood-vessels under the wing cut through by the savage little prisoner, who, on reaching *terra firma*, escaped apparently unhurt. I think in Wolff's admirable 'Illustrations of Natural History' this fact, related by Bell, is made the subject of a picture called "Catching a Tartar."



Skull of *Putorius*.

Most of the animals of this group are eagerly sought for on account of their fur. In Northern India the skin of one species, probably a variety of *Martes abietum*, is sold in the bazaars at Peshawur and Lahore. In 1868 I bought sufficient to line a large overcoat, which proved most comfortable in travelling in the cold weather in the Punjab, as well as in subsequent wanderings on the European continent in winter.

Dr. E. Coues, in his monograph on the North American Mustelidæ, gives the following interesting information regarding the number of skins of various species sold by the Hudson's Bay Company in London during the century 1769-1868:—

Sables, 1,240,511; otters, 674,027; wolverenes, 68,694; minks, 1,507,240; skunks, 218,653; badgers, 275,302; sea otters, 5349. In 1868, which appears to have been a prosperous year, the Company sold: Sables, 106,254; otters, 14,966; wolverenes, 1104; minks, 73,473; skunks, 6298; badgers, 1551; sea otters, 123.[8]

When one considers the number of those whose skins are damaged and cast aside, the number that fall victims to larger predatory animals, and the operations of disease, from which no animals, small or great, are free, we may form some idea of the immense multitude of these little creatures.

[8] In the same year were sold by other firms, 22,000 otter skins and 4500 sables. See Appendix *C* for further statistics.

The ordinary divisions of the restricted Mustelidæ are the Martens (*Martes*), Pole-cats (*Putorius*), and Weasels (*Mustela*), but Gray has further subdivided them chiefly on the characteristics of the feet.

The Martens have four more teeth than the rest, which are distinguished as follows:—

Putorius.—Short ovate head; feet very hairy, especially between the pads; body stout; underside blackish.

Mustela.—Narrow, elongated head; feet very hairy between the pads; slender body; under-side yellow or white.

Vison.—Head elongate, narrow; feet slightly hairy; pads exposed; body rather slender; under-side same colour as upper.

Gymnopus.—Head elongate, narrow; feet rather naked, bald beneath, between, and rather behind the pads; toes largely webbed; soles hairy behind; body slender.

It is doubtful whether these distinctions are of sufficient importance to warrant so much subdivision; and unnecessary multiplication of genera is a thing to be avoided as much as possible.

GENUS MARTES—THE MARTENS

A more or less arboreal group of larger size, and possibly less sanguinary habits than the weasels, although in this respect I do not think there is much difference. The tail is longer, though not so long as the head and body, and it is bushy; the fur is fine and in general highly prized; the dentition differs from the typical *Mustela* in having four more teeth and an additional false molar on either side in each jaw; and the inner side of the carnassial or flesh tooth has a tubercle which is not present in the weasels; head elongate; feet very hairy; space between the pads hairy, often covering them from sight, except in the case of *Martes flavigula*

Конец ознакомительного фрагмента.