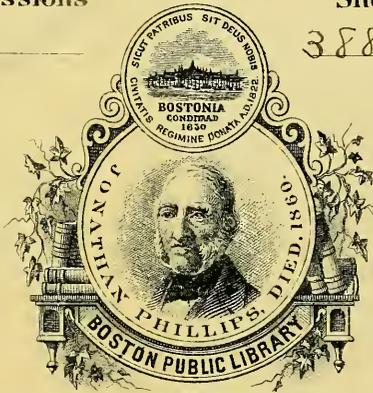




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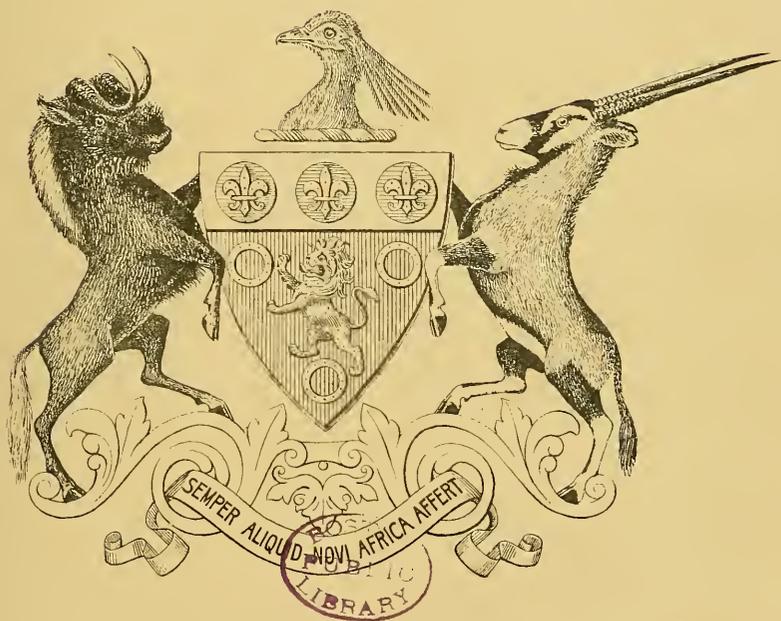
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THE
FAUNA OF SOUTH AFRICA



EDITED BY
W. L. SCLATER, M.A., F.Z.S.
Director of the South African Museum, Cape Town



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THE
MAMMALS OF SOUTH AFRICA

BY

W. L. SCLATER, M.A., F.Z.S.

Director of the South African Museum, Cape Town

VOL. II.

RODENTIA, CHIROPTERA, INSECTIVORA,
CETACEA AND EDENTATA

WITH ILLUSTRATIONS

London
R. H. PORTER
7, PRINCES STREET, DAVENPORT SQUARE, W.

1901

LONDON
PRINTED BY
JOHN BALE, SONS AND DANIELSSON, LTD.
83-89, GT. TITCHFIELD STREET
W.

Phis.

Dec. 17, 1900.

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THE FAUNA OF SOUTH AFRICA.

MAMMALIA.

Order RODENTIA.

THIS order, containing the gnawing animals such as the squirrels, rats, and hares, is very well defined, being readily characterised by the large chisel-like incisors of both the upper and lower jaws and by the absence of canines. Other distinguishing features are as follows :—

Feet plantigrade or semi-plantigrade, generally provided with five-clawed toes; incisors growing continually during life from persistent pulps; those of the lower jaw only two in number; premolars reduced, usually only one above and below, arranged in an unbroken series with the molars which may be rooted or rootless; skull with the orbit communicating freely with the temporal fossa and with the condyle of the mandible elongated antero-posteriorly so as to allow of a backward and forward, and also a small lateral movement of the lower jaw; clavicles present as a rule; cerebral hemispheres smooth and not overlapping the cerebellum; intestines usually with a large caecum; testes inguinal or abdominal; uterus two-horned, placenta discoidal and deciduate.

The rodents are mostly small animals of herbivorous habits adapted to terrestrial, arboreal, subterranean and occasionally to natatorial life; the order contains a much greater number of species than any other, upwards of 1,900 species out of a total of 7,224 being recognised by Trouessart in his list of recent and fossil Mammals.

Rodents are cosmopolitan, being found all over the world, though perhaps more abundantly represented in South America at the present day than elsewhere.

The genera are here arranged according to a list drawn up by Mr. Thomas (Proc. Zool. Soc., 1896, p. 1012).

Key of the South African Suborders and Families.

- A. With only two incisors in the upper jaw [Simplicidentata].
- a. Angular portion of the mandible arising from the lower edge of the bony socket of the incisor.
- a¹. Zygomatic arch composed chiefly of the malar bone [Sciuromorpha]; tail long and very bushy; distinct postorbital processes *Sciuridae*, p. 3.
- b¹. Zygomatic arch composed chiefly of, and supported by, a backwardly directed process of the maxilla; no postorbital processes [Myomorpha].
- a². Tail long and bushy; premolars $\frac{1}{2}$ *Gliridae*, p. 10.
- b². Tail generally naked and scaly; its hairs when present very short; no premolars *Muridae*, p. 16.
- b. Angular portion of the mandible arising from the outer side of the socket of the incisor [see fig. 100, p. 70].
- a¹. Fur soft; adapted to underground life, eyes rudimentary, premolars $\frac{1}{2}$ *Bathyergidae*, p. 69.
- b¹. Fur soft; fore limbs short, hind limbs much elongated with four digits, adapted to jumping; molars of the upper jaw with external, of the lower jaw with internal folds *Pedetidæ*, p. 79.
- c¹. Fur harsh; hind limbs not elongated; molars with both external and internal enamel folds *Octodontidae*, p. 83.
- d¹. Part of the fur modified to form a covering of very strong spines..... *Hystrioidæ*, p. 89.
- B. With four incisors in the upper jaw, two very small and placed behind the others [Duplicidentata] *Leporidae*, p. 92.

Suborder **SIMPLICIDENTATA.**

With only two incisors in the upper jaw, the enamel covering of which is confined to the front surface; incisive foramina of moderate size distinct from one another; fibula not articulating with the calcaneum.

Division SCIUROMORPHA.

In the zygomatic arch the jugal bone is not supported below by a backward continuation of the maxillary process ; the angle of the mandible springs from below the bony casing of the large lower incisor ; the incisive foramina are small and confined to the pre-maxillary bone ; the clavicles are perfect, and the tail is (in all African forms) cylindrical and hairy.

This group includes the squirrels, flying squirrels, chipmunks, marmots and beavers, and is not a predominant one in the South African fauna, being only represented by two genera and four species all included in the large family *Sciuridae*.

Family SCIURIDAE.

Skull with small but distinct postorbital processes ; antorbital foramina small and rounded ; palate broad ; premolars $\frac{1 \text{ to } 2}{1}$ the anterior of which is always small and often deciduous or absent ; molars rooted, tubercular when young, the crown when worn showing deep, and often wavy, lines of enamel.

Key of the South African Genera.

- A. Fur harsh, sometimes spiny ; external ear absent
or very small..... *Xerus*, p. 3
- B. Fur soft ; external ears well developed and
conspicuous *Funisciurus*, p. 6.

Genus **XERUS**.

Type.

Xerus, *Hemprich & Ehrenberg, Symb. Phys.* pl. ix (1832)...*X. rutilus*.

Fur harsh, often spiny ; external ears short or absent ; no cheek pouches ; forelimbs with four toes, all clawed, of which the two middle ones are considerably larger than the others, and a rudimentary pollex with a flat nail ; hind foot with five toes all clawed ; all the claws long and nearly straight ; skull large and broad, with very small postorbital processes.

Dentition.—i. $\frac{1}{1}$, c. $\frac{0}{0}$, pm. $\frac{2}{1}$ or $\frac{1}{1}$, m. $\frac{3}{3}$ = 20 or 22. Molars semi-hypsodont (*i.e.*, with high crowns) and lophodont (*i.e.*, with regular transverse ridges and valleys), not tubercular.

This genus is confined to Africa; there are two or three other species found in the north-eastern and western parts of the continent.

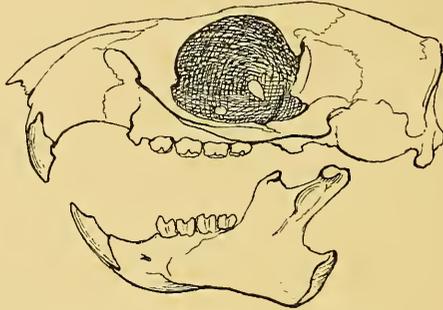


FIG. 81.—Skull of *Xerus capensis*.

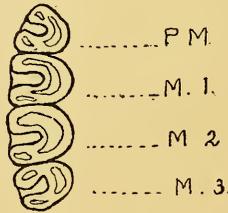


FIG. 82.—Right upper molars of *Xerus capensis*, enlarged.

96. *Xerus capensis*. THE GROUND SQUIRREL.

Sciurus capensis, Kerr, *Linn. Anim. Kingd.* p. 266 (1792); A. Smith, *S. Afr. Quart. Journ.* ii, p. 127 (1834).

Sciurus namaquensis, A. A. H. Lichtenstein, *Cat. Rer. Nat.* p. 2 (1793).

Sciurus levaillantii, Kuhl, *Beitr. Zool.* i, p. 67 (1820).

Sciurus setosus, Smuts, *Enum. Mamm. Cap.* p. 33 (1832).

Xerus setosus, Layard, *Cat. Mamm. S. Afr. Mus.* p. 47 (1862).

Xerus capensis, Jentink, *Notes Leyd. Mus.* iv, p. 48 (1882); Noack, *Zool. Jahrb.* iv, p. 131, pl. iii, fig. 10 (skull), (1889) [Kalahari and Damara-land]; W. Sclater, *Ann. S. A. Mus.* i, p. 182 (1899).

LITERATURE.—Pennant (1781) No. 290 of *History of Quadrupeds*, described as the "Earless Dormouse"; le Vaillant (1796), iii, p. 277, described as the Aguimp of the Namaquas from north of the Orange River; Burchell (1822), ii, p. 241, described as *Sciurus capensis*, the Meerkat, with account of habits as observed.

Description.—General colour above and on the sides pale rufous brown, sparingly speckled with black, the hairs being short, coarse, and close-lying; a narrow white stripe runs from the shoulders to the haunches; below dull white; skin black; head broad; whiskers black; eyes large and prominent with a dull whitish line above and below; ear conch completely absent, the ear opening being a narrow diagonal slit, half-an-inch in length; limbs somewhat paler than



FIG. 83.—The Ground Squirrel (*Xerus capensis*).

the body, with four claws on the fore and five on the hind feet, the thumb being shorter and bearing a rudimentary flat nail; the claws are large, nearly straight, and black in colour; tail a little shorter than the head and body, near the root coloured like the body, beyond very bushy and distichous, mixed black and white, the individual hairs being chiefly white with two distinct black bands.

Skull with the bony palate extending a quarter of an inch beyond

the level of the posterior molars, nasals broad and zygomatic arches stout.

Incisors white, premolars $\frac{1}{2}$ only.

Dimensions.—From a skin; head and body 11·0; tail 9·0, with terminal hairs 10·0; hind foot 2·33; from ear-opening to nose 2·0; skull length about 2·0, breadth about 1·40; upper cheek teeth ·49.

Distribution.—The central and drier parts of the Colony, extending northwards through the Kalahari and Bechuanaland to Matabeleland and Damaraland; not found far to the eastwards. The South African Museum possesses examples from Namaqualand, Colesberg, and Griqualand West in the Colony.

Habits.—This animal was first mentioned by Pennant, whose example is described as having come from the karoo north of the Sneeuwberg in Graaff Reinet; on Pennant's account Kerr based his description.

This is a purely terrestrial form, never climbing trees, but living on the open dry karoo plains of the interior, where it associates in large communities, forming burrows, at the bottom of which are the nests in which it brings up its young. It is often seen sitting up on its haunches sunning itself, but on the first appearance of danger scuttles off with great chattering into its burrow.

Its food consists entirely of the bulbous roots with which South Africa abounds, these it is able to dig up with its long and powerful claws.

When captured it soon becomes tame and forms a gentle and amusing pet.

By the colonists this animal is frequently, owing to the similarity of its habits, general size and appearance, confused with the meerkats, but it can, of course, be at once distinguished by the possession of the two chisel-edged incisor teeth, and by the absence of canines.

Genus **FUNISCIURUS.**

Type.

Funisciurus, (sub-genus), *Trouessart, Le Naturaliste*,

i, p. 293 (1880)**F. lemniscatus.**

Paraxerus (sub-genus), *Forsyth Major, Proc. Zool.*

Soc. 1893, p. 189**F. cepapi.**

Fur soft, never spiny; external ears well developed; no cheek pouches; toes as in *Xerus*, but the claws short and curved; skull

much as in *Xerus*, with very small postorbital processes ; dentition as in *Xerus*.

Dr. Forsyth Major, in his paper on squirrels, quoted above, placed the three South African tree squirrels, together with certain other African and Asiatic species, in the genus *Xerus*, in consequence of their resemblance to the members of that genus in certain characters of the molars and skull.

If, however, it is necessary to separate these squirrels from the old genus *Sciurus*, it seems better, as proposed by Mr. Thomas, to form a new genus for them, as *Xerus* is a very compact group separated from *Sciurus* by definite though perhaps somewhat superficial characters.

*Key of the South African Species.**

A. Not striped.

- a. Head the same colour as the body, below dull white *F. cepapi*, p. 7.
- b. Head, underside of body and tail rufous..... *F. palliatus*, p. 8.

B. A pale stripe along the side of the body from the shoulder to the haunch

F. congicus, p. 9.

104. *Funisciurus cepapi*. THE GREY-FOOTED SQUIRREL.

Sciurus cepapi, A. Smith, *App. Report Exped. Explor. S. Afr.* p. 43 (1836); *id. Illustr. Zool. S. Afr. Mamm.* pl. v (1838); *Layard, Cat. Mamm. S. Afr. Mus.* p. 46 (1862); *Jentink, Notes Leyd. Mus.* iv, p. 26 (1882); *Lorentz, Ann. kk. Hofmus. Wien*, ix, *notiz.* p. 65 (1894) [Limpopo river banks]; *de Winton, Ann. Mag. N. H.* (6). xix, p. 573 (1897).

Funisciurus cepapi, Thomas, *Proc. Zool. Soc.* 1897, p. 933; *W. Sclater, Ann. S. A. Mus.* i, p. 184 (1899).

LITERATURE.—Livingstone (1857), p. 603, on its habits.

VERNACULAR NAME.—Idsindi of Mashonas (Marshall).

Description.—General colour speckled yellowish grey and black ; fur short, soft, and close, most of the hairs on the back and sides black at the base and also ringed subterminally with the same colour, below from the chin much paler, nearly white, the hairs not ringed ; whiskers black ; iris black ; ears oval and moderate, measuring about .7 in. in length, covered with sparse hairs ; limbs paler than the back with quite short curved claws ; tail about as long as the head and body, bushy and very dark, composed of long

* A fourth species *Funisciurus frerei* (Gray) somewhat intermediate in coloration between *F. palliatus* and *F. cepapi* has been recently rediscovered in Zululand by the Woodward brothers ; the original specimen was erroneously stated to have come from Zanzibar.

pale yellow hairs, each with a double ring of black; skull with the palate extending only as far as the level of the posterior molars; upper incisors orange-coloured, ungrooved; premolars $\frac{2}{3}$, the anterior upper ones small; molars somewhat resembling those of *Xerus capensis*.

Dimensions.—From the skin of a female; head and body 8.50; tail 6.50 without, 7.75 with terminal hairs; hind foot 1.75; from ear to nose 1.53; another recorded in the flesh by Mr. Marshall measured head and body 6.80; tail 6.80; hind foot 1.70; ear .75; skull length about 1.70, breadth 1.0; upper cheek teeth .28.

Distribution.—This species was first discovered by Sir Andrew Smith on the banks of the Limpopo River, in what is now the Rustenburg district of the Transvaal; it has also been recorded from Damaraland and the Zambesi River; north of this it has been obtained from Nyasaland, but the squirrels from East Africa usually identified with this species have recently been shown by de Winton to be distinct.

The type of the species is now in the British Museum; the South African Museum has recently received an example from Mr. Marshall obtained in the Umfuli district of Mashonaland.

Habits.—Very little is known about the habits of this squirrel. Sir A. Smith says that it is occasionally discovered on the ground but more usually on trees; when it happened to be surprised in the former situation it invariably endeavoured to reach the latter, and attempted to conceal itself either in the forks of the branches or in holes; it is extremely active in its movements and makes a perpendicular ascent with great rapidity; it is both nocturnal and diurnal in habits. Dr. Livingstone found in a hole in a Mopani tree a quantity of seed covered with a number of fresh leaves collected by this squirrel as a store for the hot weather; its food consists of berries, fruits and seeds.

Mr. Marshall also states that this species is only found where the Mopani tree grows, and that it is regarded as a great delicacy by the Mashonas.

105. *Funisciurus palliatus*. THE RED-HEADED SQUIRREL.

Sciurus palliatus, *Peters, Bericht Akad. Berlin*, p. 273 (1852); *id. Reise Mossamb. Säugeth.* p. 134, pl. xxxi, fig. 1, pl. xxxii, fig. 3 (1852); *Jentink, Notes Leyd. Mus.* iv, p. 16 (1882).

Sciurus ornatus, *Gray, Proc. Zool. Soc.* 1864, p. 13, pl. i [Natal].

Funisciurus palliatus, *W. Sclater, Ann. S. Afr. Mus.* i, p. 185 (1899).

VERNACULAR NAMES.—Pocoluti of Zulus (Fosbrooke apud Gray); Inchindau ebomvu of Swazis and Tshindi at Inhambane (Francis).

Description.—General colour above and on the outsides of the limbs speckled yellow and black, the hairs black at the base and subterminally with intermediate reddish-yellow bands and paler yellow tips; head speckled rufous and black; below including the cheeks, chin, inside and lower halves of the limbs bright rufous, the hairs being the same colour throughout; tail dark rufous with long hairs, which are very pale at the base with two black rings following, the terminal half alone being dark rufous; whiskers black; eyes dark brown; ears in the only specimen examined nearly bare of hairs, though said in the original description to be thickly covered.

Incisors smooth and dark orange; premolars $\frac{2}{3}$; the anterior upper one small and deciduous.

Dimensions.—From a skin, probably a male; head and body 8·25; tail without terminal hairs 4·50, with 6·50; hind foot 1·80; from ear to nose 1·75; a female in the flesh, recorded by Mr. Francis, measures head and body 8·0; tail without hairs 6·90; ear ·62; skull length (about) 1·90; breadth 1·20; upper cheek teeth 40.

Distribution.—East and South-east Africa from Gallaland through German East Africa, Nyasaland and Mozambique to Zululand and, perhaps Natal; the South African Museum possesses skins from the Umgoye Forest in Zululand, and from Inhambane in Portuguese East Africa.

The type described by Peters from Mozambique is now in the Berlin Museum.

Habits.—On the ticket of the Inhambane specimen Mr. Francis writes:—"Common in the district, can be seen of a morning hopping from branch to branch among the trees; has a peculiar way of jerking the tail upwards and forwards."

106. *Funisciurus congicus*. THE WESTERN STRIPED SQUIRREL.

Sciurus congicus, *Kuhl, Beitr. Zool.* p. 66 (1820); *Jentink, Notes Leyd. Mus.* iv, p. 33 (1882) (in part); *Thomas, Proc. Zool. Soc.* 1882, p. 265 [Cunene River].

Funisciurus congicus, *W. Sclater, Ann. S. Afr. Mus.* i, p. 185 (1899).

Description.—General colour above yellowish brown, brighter on the shoulders, below very pale yellow; hairs of the back black

at the base, and many of them with black tips; along the sides from the shoulder to the hind limbs runs a narrow pale yellow stripe, below which is a similar dark one; an incomplete white ring round the eye; ears moderate, whiskers black; limbs pale, toes covered with long hairs nearly concealing the claws; tail a little shorter than the head and body, bushy, composed of long hairs which are bright yellow with a subterminal pale yellow band.

Anterior upper premolars present; incisors orange-coloured and not grooved.

Dimensions.—From a skin; head and body 7·75; tail without terminal hairs 5·75, with 6·25; hind foot 1·5; from ear opening to nose 1·4; skull length 1·42, breadth ·90; upper cheek teeth ·30.

Distribution.—West and South-west Africa from the Congo, whence came the type, through Angola to Ovampoland; there is an example obtained by Mr. Eriksson from Ombongo in Ovampoland in the South African Museum.

Division MYOMORPHA.

Skull with a slender zygomatic arch formed chiefly by the backwardly directed process of the maxilla on which rests the slender jugal bone; no postorbital processes; the angle of the mandible arises from the inferior surface of the bony case of the lower incisor, except in the *Bathyergidae*; tibia and fibula united.

Family GLIRIDAE.

Small arboreal animals with long and hairy tails; eyes and ears large; forelimbs small and slender.

Skull with frontals much contracted, antorbital opening moderate and triangular; mandible with a long and slender coronoid process.

Dentition i. $\frac{1}{1}$, c. $\frac{0}{0}$, pm. $\frac{1}{1}$, m. $\frac{3}{3}$ = 20; incisors not grooved, premolars slightly smaller than the molars, which are all rooted and provided with transverse enamel folds, somewhat difficult to detect.

This family includes the dormice and their allies, and is confined to the Palaearctic and Ethiopian regions. All the South African species, five in number, are now usually referred to the genus *Graphiurus*.

Genus **GRAPHIURUS.***Type.*

Graphiurus, *F. Cuvier & Geoffroy, Hist. Nat. Mamm. livr. 60 (1829)*.....*G. ocellaris.*

Tail very bushy and somewhat distichous.

Dentition.—i. $\frac{1}{1}$, c. $\frac{0}{0}$, p.m. $\frac{1}{1}$, m. $\frac{3}{3}$ = 20; incisors not grooved; molars rooted, exceedingly small, especially the premolar, which is about half the width of the other teeth; the crowns of the molars are hollowed out, the rims being formed of a ridge of enamel; scarcely any traces of infoldings can be distinguished.

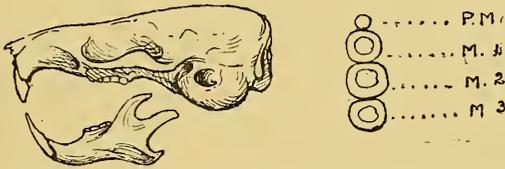


FIG. 84.—Skull (life size) and left upper molars (enlarged) of *Graphiurus ocellaris.*

This genus is confined to the Ethiopian region; the smaller species were formerly placed in the genus *Eliomys*, of which the garden dormouse of Europe (*E. melanurus*) is the type, but they are now considered to be more appropriately assigned to the present genus originally formed for the reception of the large grey dormouse of South Africa.

In addition to the species described below, some half-dozen have been recorded from other parts of Africa.

Key of the South African Species.

- A. Large, about 6 in., head with black and white markings *G. ocellaris*, p. 12.
 B. Intermediate, about 4 in.; no conspicuous markings on the head.
 a. Tail-tip not white, skull long and narrow *G. murinus*, p. 13.
 b. Tail-tip white; skull broad and flat ... *G. platyops*, p. 14.
 C. Small, about $3\frac{1}{2}$ in.; tail-tip white *G. nanus et kelleni*, pp. 15, 16.

107. *Graphiurus ocularis*. THE LARGE GREY DORMOUSE.

Sciurus ocularis, *A. Smith, Zool. Journ.* iv, p. 439 (May, 1829).

Graphiurus capensis, *F. Cuvier & Geoffroy, Hist. Nat. Mamm., livr.* 60 (September, 1829); *Smuts, Enum. Mamm. Cap.* p. 32 (1832); *A. Smith, Illustr. Zool. S. Afr. Mamm.* pl. xxxix (1843); *Layard, Cat. Mamm. S. Afr. Mus.* p. 49 (1862); *Reuvens, Myoxidae*, p. 50, pl. i, fig. 13, pl. iii, fig. 14 (1890); *Lorenz, Ann. lk. Hofmus. Wien*, ix, *notiz*, p. 65 (1894) [Marico dist. S.A.R.].

Graphiurus typicus, *A. Smith, S. Afr. Quart. Journ.* ii, p. 145 (1834).

Graphiurus elegans, *Ogilby, Proc. Zool. Soc.* 1838, p. 5 [Damaraland].

Graphiurus ocularis, *de Winton, Ann. Mag. N. H.* (7), ii, p. 3 (1898);

W. Sclater, Ann. S. A. Mus. i, p. 186 (1899).

Description.—General colour ashy grey, fur soft and thick, dark slaty at the base, dull white mixed with black at the apex; patch on the snout and chin white with a reddish tinge; cheeks, a patch in front of the shoulder, and a spot on the head at the base of the inner angle of the ear conch, white, a black patch runs from the root of the whiskers through the eye and is continued along the front of the ear; ears large, rounded, nearly naked but thinly covered round the margin with fine black hairs; under surface from the chest downwards and the sides between the limbs dull white, the slaty bases of the fur showing clearly; extremities very slender, tail rather short, bushy throughout and distichous, white mixed with black above, black below, the individual hairs above being black for their basal and white for their terminal halves.

Female with four pairs of mammae.

Dimensions.—From a mounted specimen; head and body 6·30; tail 3·85; with terminal hairs 4·90; from ear-opening to tip of nose 1·14; hind foot ·80; skull length 1·34; breadth ·78; upper cheek teeth ·14.

Distribution.—This large dormouse seems to be confined to South Africa, where it is widely distributed in suitable localities; the South African Museum possesses examples from Clanwilliam, Ceres, Worcester and Beaufort West in the west, and from Colesberg, Albany, and Uniondale in the east of the Colony; it is further recorded from Damaraland and the Marico district of the Transvaal.

The type described by Smith, from Plettenberg Bay (Knysna district of the Colony) is now in the British Museum.

Habits.—Little has been recorded on this subject. Sir A. Smith describes this dormouse as living in trees; Layard states that it is

partial to old walls and dwelling-houses, and is said to utter a loud shrill call, and that one which was kept for some months in confinement devoured meat with avidity.

108. **Graphiurus murinus.** THE CAPE DORMOUSE.

Myoxus murinus, *Desmarest, Mamm. Suppl.*, p. 542 (1822); *Smuts, Enum. Mamm. Cap.* p. 34 (1832); *A. Smith, S. Afr. Quart. Journ.* ii, p. 146 (1834); *Peters, Reise Mossamb. Säugeeth.* p. 136, pl. xxxv, fig. 1 (1852); *Layard, Cat. Mamm. S. Afr. Mus.* p. 48 (1862).

Myoxus coupei, *F. Cuvier, Hist. Nat. Mamm. livr.* xxxvii (1822) [Senegal].

Myoxus lalandianus, *Schinz, Thierreich* iv, p. 393 (1825).

Myoxus erythrobronchus, *A. Smith, Zool. Journ.* iv, p. 438 (1829).

Myoxus cinerascens, *Rüppell, Mus. Senck.* iii, p. 136 (1842) [Natal].

Graphiurus murinus, *Alston, Proc. Zool. Soc.* 1875, p. 317 [rufous var.]; *W. Sclater, Ann. S. A. Mus.* i, p. 187 (1899).

Eliomys murinus, *Reuvens, Myoxidae*, p. 40, pl. i, figs. 4, 6, 7, pl. ii, fig. 9, pl. iii, figs. 5, 6, 7 (1890).

Eliomys microtis, *Noack, Zool. Jahrb.* ii, p. 248 (1887).

Description.—General colour above mouse-grey, the hair very soft and thick, dark slaty at the base with ashy-brown tips; below, including the cheeks, chin, and insides of the limbs, dull white, these hairs too being slaty at the base; in some adult specimens the chin, cheeks, and breast have a distinct rusty red tinge; feet very slender, covered with sparse pale hairs and furnished below with the usual pads, five to the fore and six to the hind limbs; from the root of the whiskers to the eyes, and round these extends a dark ring, not always well marked; the ears fairly large, rounded, and nearly naked; tail almost as long as the head and body, bushy, covered with long hairs which become much longer towards the apex, but the hairs are fairly evenly distributed, so that the tail can hardly be called distichous, its colour is the same as that of the back, the hairs being of one colour throughout; four pairs of mammae, one pair axillary, one pectoral, two inguinal.

Varieties having a general rufous tinge sometimes occur.

Dimensions.—From a skin; head and body 4·1; tail without terminal hairs 2·77, with 3·55; hind foot ·65; from ear opening to nose ·95; skull length 1·10, breadth ·63; upper cheek teeth ·15.

Distribution.—Western and Central Africa from Senegal and Kilima-njaro southwards to Cape Colony; in South Africa this dormouse is found in the more wooded districts, especially in the

east. The South African Museum possesses examples from the Beaufort West, Griqualand West, George and Port Elizabeth divisions, also from Pondoland, Natal, and Zululand.

The type obtained by Delalande in Cape Colony and described by Desmarest is now in the Paris Museum.



FIG. 85.—The Cape Dormouse (*Graphiurus murinus*).

Habits.—From what is known of the habits of this animal it appears to resemble the English dormouse; it is usually found in holes in the trunks of trees, or sometimes in the roofs of native huts, where it builds a rounded nest of leaves and grass, in which it usually brings up four young ones. M. Cuvier relates that an individual which he possessed in captivity in Paris hibernated exactly in the same way as the English dormouse, though whether it has the same habit in a wild condition does not seem to be ascertained.

109. *Graphiurus platyops*. DARLING'S DORMOUSE.

Graphiurus platyops, Thomas, *Ann. Mag. N. H.* (6), xix. p. 388 (1897);
W. Sclater, *Ann. S. Afr. Mus.* i, p. 188 (1899).

Description.—In external appearance closely resembling *G. murinus*, but a little larger, and with the tail distinctly white tipped.

Skull very different from that of *G. murinus*, being broad and flat, with long nasals, narrow interorbital region, and broad and depressed brain case; the molars are rather smaller than those of the other species.

This form appears to be doubtfully distinct from *G. murinus*.

Dimensions.—Of the type; head and body 4·20; tail 2·75; hind foot ·90; skull length 1·05, breadth ·68; upper cheek teeth ·12.

Distribution.—The type and only specimen known, was obtained at Enkeldorn, in Mashonaland, by Mr. J. ffolliott Darling, and is now in the British Museum.

110. *Graphiurus nanus*. THE DWARF DORMOUSE.

Myoxus (*Eliomys*) *nanus*, *de Winton, Proc. Zool. Soc.* 1896, p. 799;
W. Sclater, Ann. S. Afr. Mus. i, p. 189 (1899).

VERNACULAR NAME.—Sindiwara of Mashonas (Darling).

Description.—Smaller than *G. murinus*, general colour rather more ashy, the wood-brown tinge being much less evident, below dull white; a black patch on the face extending from the whisker roots to round the eyes; tail club-shaped, very slender at the base and bushy at the apex, of the same colour as the body above, below somewhat paler; tip of the tail distinctly white.

Skull like that of *G. murinus*, but smaller.

Dimensions.—Of a specimen measured in the flesh by Mr. Marshall, now in the South African Museum; head and body 3·30 (of dried skin 3·52); tail without hairs 2·55, with 3·12; hind foot ·60, from ear-opening to tip of nose ·85; skull length ·90, breadth ·51; upper cheek teeth ·12.

Distribution.—This species was described by Mr. de Winton from a single specimen obtained at Mazoe, in Mashonaland, by Mr. J. ffolliott Darling, now in the British Museum. The South African Museum has recently received a male and two young ones from Salisbury, presented by Mr. G. A. K. Marshall.

Habits.—Mr. Marshall, in a letter addressed to me when sending the dormice, writes as follows:—“These animals have a curious habit of utilising the nests of the larger of our two sociable spiders (*Stegodyphus sp. inc.*) for their own dwellings. Whether this is their invariable habit I cannot say, but I have taken them in this way on three occasions, and in three or four instances I have found old spiders' nests which have been evidently used by dormice. The

structure made by the spiders varies from a single chamber about the size of a small hen's egg to a mass of very tough felted silk as large as a man's head, and intersected throughout by passages and chambers. In this the dormice hollow out a chamber of a suitable size, which they line with feathery grass heads, the downy seeds of various flowers, and even a few stray feathers. Judging by the case in which I found the nest with young ones in it, I believe they do not only use the old nest, but even drive the spiders out, for it was the spiders that first attracted my attention in this instance. I noticed about 200 of them on a small bush, evidently in a great state of agitation, and busily engaged in forming a fresh nest, which surprised me, as these creatures are usually crepuscular in their habits, and not given to exposing themselves unduly. The old nest I found in a bush some two yards off, connected of course by silk threads with the new one, and in it there were four young dormice. Judging by the attitude of the spiders they could only have been turned out that day or perhaps the day before, in which case the mother dormouse must have carried her young there, as they were too big to have been born so short a time."

111. **Graphiurus kelleni.** THE DAMARALAND DORMOUSE.

Eliomys kelleni, *Reuvens, Myoxidae*, p. 35, pl. i, fig. 1, pl. iii, fig. 3 (1890).
Graphiurus kelleni, *W. Selater, Ann. S. Afr. Mus.* i, p. 189 (1899).

Description.—Closely resembling *G. nanus* in size and coloration, but the hairs on the body above have pale rings with dark brown tips. It is doubtfully distinct.

Dimensions.—(Of the type); head and body 2.50; tail with hairs 3.38, without 2.62; hind foot .62; skull length .70, breadth .48; upper cheek teeth .12.

Distribution.—This species was described from a single specimen (preserved in alcohol) in the Leyden Museum, obtained in Damaraland by M. Kellen, and is not represented in the South African Museum.

Family MURIDAE.

Animals mostly of terrestrial habits and usually of moderate size; nearly all have scaly and naked, or but scantily clothed tails and a rudimentary pollex (1st digit of hind foot); skull with con-

tracted frontals and without postorbital processes; the anterior portion of the zygomatic arch is usually flattened into a perpendicular plate so that the antorbital foramen forms a somewhat T shaped opening when viewed from in front, being wide and rounded above and narrow below. Dentition in all South African species, i. $\frac{1}{1}$, c. $\frac{0}{0}$, pm. $\frac{0}{0}$, m. $\frac{3}{3} = 16$; no premolars, molars rooted or rootless, tuberculate or with angular enamel folds.

This is a cosmopolitan family with a very large number of genera and species, including more than a third of all existing Rodents.

In the following key the characters given apply only to South African genera, and the arrangement is entirely artificial, being only intended to guide the reader in finding out the genus of an unknown form, it being necessary in all cases to confirm this by a careful reference to the full description. Further, it may be added that an examination of the skull is almost always necessary to determine an unknown rat.

Key of the South African Species.

- A. Upper incisors with a longitudinal groove.
- a. Tail longer than the head and body.
- a¹. Hind limbs elongated, molars transversely laminated, at least in the adults *Gerbillus*, p. 18.
- b¹. Hind limbs not elongated, molars with tubercles more or less arranged in pairs ... *Dendromys*, p. 29.
- b. Tail shorter than the head and body, but exceeding half its length.
- a¹. Incisors slender, inconspicuously grooved, sole with one large pad, molars transversely laminated *Pachyurromys*, p. 23.
- b¹. Incisors well grooved, soles with five pads, molars with a triple row of tubercles *Golunda*, p. 65.
- c. Tail less than half the length of the head and body
- a¹. Molars in laminae, the posterior upper and the anterior lower the longest *Otomys*, p. 25.
- b¹. Molars with tubercles arranged in an incomplete triple row.
- a². Tarsus naked *Steatomys*, p. 33.
- b². Tarsus hairy *Malacothrix*, p. 34.
- B. Upper incisors smooth not grooved
- a. Upper molars with a triple row of tubercles.
- a¹. Tail more than half the length of the head and body
- a². Fur smooth and usually soft not spiny.

- a*³. Antorbital plate produced forwards in hooked shape..... *Dasymys*, p. 59.
- b*³. Antorbital plate rounded or straight in front not hooked.
- a*⁴. Coloration plain, 1st and 5th digits not shortened..... *Mus*, p. 37.
- b*⁴. Coloration with lines or spots; 1st, and 5th digits much shortened *Arvicanthus*, p. 61.
- c*³. Antorbital plate but little developed, foramen oval, large animals with cheek pouches *Cricetomys*, p. 53.
- a*². Fur on the back spiny *Acomys*, p. 58.
- b*¹. Tail less than half the length of the head and body; small animals with cheek pouches *Saccostomus*, p. 54.
- b*. Upper molars with a double line of tubercles; tail less than half the length of the body; tarsus hairy *Mystromys*, p. 66.

Subfamily GERBILLINAE.

Genus GERBILLUS.

Type.

Gerbillus, *Desmarest, N. Dict. d'Hist. Nat.* (1), xxiv.,
 tabl. p. 22 (1804) *G. aegyptius*.

Rat-like animals with somewhat pointed muzzles and moderate-sized ears, sparsely covered with hairs; tail long, hairy, and usually

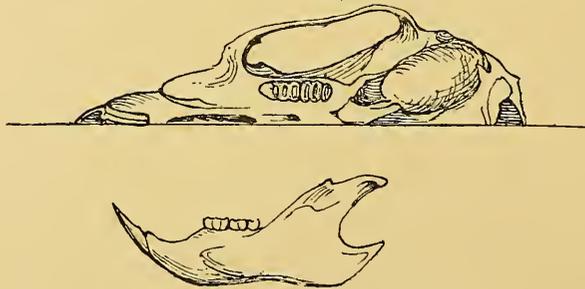


FIG. 86.—Left half of palate and lower jaw of *Gerbillus afer* ($1\frac{1}{2}$ nat. size).

slightly tufted; hind feet elongated, usually with four rounded tarsal pads; skull with large and swollen bullae; upper incisors grooved (in all South African species); molars at first tubercular,

but after wear consisting of a series of transverse or elliptical laminae; the anterior tooth in each jaw consisting of three, the middle of two, the posterior of one only.

This genus which is a very large one, and spread over the greater part of the Old World, has been studied in considerable detail by Lataste; the South African species, however, are still in a good deal of confusion, which cannot well be rectified until a re-examination of the old types and a comparison of them with freshly collected material has taken place.

A recent paper by Mr. de Winton has thrown some light on the subject; he recognises four species as existing in South Africa; of these, three are closely allied and difficult to distinguish; the fourth, *G. paeba*, is considerably smaller and of a rather different colour.

112. *Gerbillus paeba*. THE RED GERBILLE.

Gerbillus paeba, *A. Smith, App. Report Exped. Explor. S. Afr.* p. 43 (1836); *de Winton, Ann. Mag. N. H.* (7), ii, p. 3 (1898); *W. Sclater, Ann. S. A. Mus.* i, p. 190 (1899).

Gerbillus tenuis, *A. Smith, Illustr. Zool. S. Afr. Mamm.* pl. xxxvi., fig. 2 (1842); *Thomas, Proc. Zool. Soc.* 1832, p. 265 [Damaraland].

? *Gerbillus tenuis*, *var. schinzi*, *Noack, Zool. Jahrb.* iv, p. 134, pl. iii, figs. 13-16 (1889).

? *Meriones* (*Rhombomys*) *caffer*, *Wagner, Arch. f. Naturg.* viii, pt. i, p. 18 (1842); *id. Schreber, Säugeth. Suppl.* iii, p. 432 (1843).

Description.—General colour above a reddish orange, a little darker along the back owing to the admixture of a few long black hairs; fur long and soft with dark slaty bases, below and inside of the limbs pure white throughout; ears moderately long and oval; carpus hairy with a large swelling, on which is a small round naked tubercle at the base of the rudimentary pollex; tarsus covered below with short white hairs; at the base of the toes which are also hairy, is a single large pad partially divided into three portions; tail slender, cylindrical and tapering clothed with short stiff hairs, becoming a good deal longer towards the tip, pale brown above and white below.

Upper incisors yellow, paler than in *G. afer*, with a longitudinal groove slightly to the outer side of the tooth; molars with the middle lamina of the anterior tooth of both jaws, and the anterior lamina of the middle tooth of the upper jaw completely

separated in the middle line into two tubercles in the specimens examined.

Dimensions.—From an example in spirit; head and body 3·1 (type according to Smith 4·0); tail 4·50; hind foot 1·0; ear ·5; skull length 1·1; breadth ·5; upper cheek teeth ·2.

Distribution.—The types of this species were obtained by Sir A. Smith north of Litakun, in what is now Bechuanaland; they are preserved in the British Museum. Noack and Thomas have identified gerbilles from Damaraland and the Kalahari, and de Winton others from Namaqualand with this species. The present description is drawn up from an animal procured at Dabenoris in Namaqualand, now preserved in the South African Museum, which appears to be referable to this species.

113. *Gerbillus afer*. THE CAPE GERBILLE.

Gerbillus afer, Gray, *Spicileg. Zool.* p. 10 (1830); *A. Smith, S. Afr. Quart. Journ.* ii, p. 159 (1834); *F. Cuvier, Trans. Zool. Soc.* ii, p. 143, pl. xxvi, figs. 5-9 (1838); *A. Smith, Illustr. Zool. S. Afr. Mamm.* pl. xxxv. (1842); *Layard, Cat. Mamm. S. Afr. Mus.* p. 51 (1862); *de Winton, Proc. Zool. Soc.* p. 800 (1896) [Rhodesia]; *id. Ann. Mag. N.H.* (7), ii, p. 3 (1898); *W. Sclater, Ann. S. A. Mus.* i, p. 191 (1899).

Meriones schlegelii, *Smuts, Enum. Mamm. Cap.* p. 41, pl. i, pl. iii, figs. 1-5 (1832) [Port Elizabeth].

VERNACULAR NAME.—Duin Rat or Nacht Muis of the Colonists (Smith).

Description.—General colour fawn brown, darker owing to the intermixture of black hairs on the back, lighter on the sides; fur soft and thick, pale slaty at the base, the tips lightish brown; below from the chin backwards pure white, the fur being the same colour throughout; head rather pointed, ears oval and large, sparsely covered with fine brown hairs; front limbs short, brown outside, white inside and on the hands, with four pale yellow or white claws and five prominent carpal pads; hind limbs long, the tarsus and toes especially so, the former naked, the latter covered with white hairs, the three middle toes much the longest and the first the shortest, all with long, pale claws; there are four tarsal pads, the one at the base of the first digit being smaller than the others; tail about as long as the head and body, fairly thickly covered with stiff hairs, brown above, pale below.

Upper incisors orange, with a prominent, well-marked groove

running along slightly nearer the outer than the inner edge of the tooth; lower incisors paler and ungrooved.

Dimensions.—Of a specimen in alcohol; head and body 5·0; tail 5·50; from ear-opening to tip of snout 1·45; hind foot 1·50, with middle claw 1·63. An example from Mashonaland measured in the flesh by Mr. Darling is given by de Winton as follows: Head and body 5·90; tail 6·30; hind foot 1·25; skull length 1·45; breadth about ·86; length of upper molars ·27.

Distribution.—The Cape gerbille is not uncommon in the neighbourhood of Cape Town and has been recorded by Smuts from Port Elizabeth; it is probably found all over the Colony, and, if Mr. de Winton's identification is correct, it extends northwards to Mashonaland.

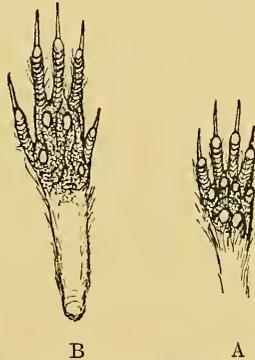


FIG. 87.—Palm (A) and sole (B) of *Gerbillus afer*, to show the arrangement of the pads.

There are specimens of this Gerbille in the South African Museum from the Cape, Knysna and Clanwilliam divisions of the Colony and from Pietersburg in the Transvaal.

Habits.—According to Sir A. Smith this animal is nocturnal; it is commonly found in open plots of ground clothed with short grass and situated near brushwood, where a number of animals congregate and form their burrows, extending them in different directions so as not to interfere with one another. The courses of the burrows are at first oblique, but after reaching into the soil about a foot, they run horizontally for three or four yards and often communicate with one another. When young are about to be brought forth, a nest of soft grass is formed at the further extremity of the subterranean passage in which they are placed.

This animal is migratory, usually performing its journeys at night.

According to Mr. Layard its food consists of bulbs and seeds, and it is said to be very destructive to young plantations; it stores up grain in holes in the upper part of the ridges so as to escape the drainage into the furrows of the fields.

114. *Gerbillus brantsi*. BRANTS' GERBILLE.

Gerbillus brantsii, *A. Smith, Report Exped. Explor. S. Afr.* p. 43 (1836); *de Winton, Ann. Mag. N. H.* (7), ii, p. 4 (1898); *W. Sclater, Ann. S. A. Mus.* i, p. 192 (1899).

Gerbillus montanus, *A. Smith, Illustr. Zool. S. Afr. Mann.* pl. xxxvi, fig. 1 (1842).

Meriones (*Rhombomys*) *maccalinus*, *Sundevall, Oefvers. Akad. Forh. Stockholm* 1846, p. 120 (1847).

Description.—General colour above light rufous-brown, freely pencilled with darker brown, paler on the sides, below dull white; head short and somewhat bulky posteriorly; nose-tip black-brown; ears oval, thinly covered with hairs; tarsi ashy grey; toes shorter than in *G. afer*; tail reddish-brown above, with blackish hairs intermixed, a little shorter than the head and body.

Incisors above Dutch-orange, below white, much larger than in *G. afer*, and the distance between them and the molars less (Smith).

Dimensions.—Head and body 6·0; tail 5·0 (Smith); from an old skin in the South African Museum, head and body 5·75; tail 5·25; hind foot 1·25.

Distribution.—Sir A. Smith's specimens were obtained near the sources of the Orange and Caledon Rivers in what is now Basutoland; the type of *M. maccalinus*, was collected by Wahlberg in the Maccali (*i.e.*, Magaliesberg) Mountains in the Rustenburg district of the Transvaal. This gerbille has also been recorded from the Transvaal by Mr. de Winton. An old skin in bad condition, from near Kimberley, now in the South African Museum, seems referable to this species.

115. *Gerbillus lobengulæ*. LOBENGULA'S GERBILLE.

Gerbillus leucogaster, *de Winton, Proc. Zool. Soc.* 1896, p. 806 (*nec Peters*).

Gerbillus lobengulæ, *de Winton, Ann. Mag. N. H.* (7), ii, p. 4 (1898); *W. Sclater, Ann. S. A. Mus.* i, p. 193 (1899).

Description.—General colour above pale fawn, finely grizzled with dull black along the back, pure along the sides; below pure white, the two colours abruptly separated; in other external characters resembling *G. afer*.

Skull with a narrow facial portion across the nasals and maxillae between the infraorbital foramina.

First upper molar persistently cuspidate, the second lobe being divided into a pair of cusps outer and inner, in fairly adult specimens (de Winton).

Dimensions.—Head and body 5·30; tail 6·30; hind foot 1·33 (de Winton).

Distribution.—This form was obtained by Mr. F. C. Selous, at Essex Vale, near Bulawayo, and was at first identified by Mr. de Winton with *G. leucogaster* of Peters, and subsequently considered to be a distinct species; the type is in the British Museum. Gerbilles from Mazoe and Salisbury presented to the South African Museum by Messrs. Darling and Marshall agree very well with the description above given.

Genus **PACHYUROMYS.**

Type.

Pachyuromys, *Lataste, Le Naturaliste*, ii, p. 313 (1880) ...P. duprasi.

This genus contains animals allied to the Gerbilles, distinguished by their short tails and their peculiarly shaped skulls in which the tympanic bulla is enormously swollen and enlarged, so that it projects back behind the level of the occipital condyles, and can be seen at the two posterior angles of the skull when viewed from above. The antorbital plate is not nearly so well developed as in *Gerbillus*.

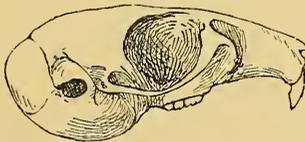


FIG. 88.—Skull of *Pachyuromys auricularis*, to show the enlarged tympanic bulla.

The incisors are almost white and very faintly grooved down the middle; the molars are small and transversely laminated like those of *Gerbillus*, from which they do not differ in any essential respect.

In addition to the South African species, one other only, *P. duprasi*, from North Africa is included in this genus.

116. *Pachyuromys auricularis*. THE NAMAQUALAND GERBILLE.

Gerbillus auricularis, *A. Smith, S. Afr. Quart. Journ.* ii, p. 160 (1834);
id. Illustr. Zool. S. Afr. Mamm. pl. xxvi (1840); *de Winton, Ann. Mag. N. H.* (7) ii, p. 5 (1898).

Gerbillus brevicaudatus, *F. Cuvier, Trans. Zool. Soc.* ii, p. 144, pl. xxvi, figs. 10-13 [skull] (1838).

Pachyuromys auricularis, *Huet, Le Naturaliste*, iii, p. 339 (1881);
Thomas, Proc. Zool. Soc., 1882, p. 265 [Damaraland]; *W. Sclater, Ann. S. A. Mus.* i, p. 194 (1899).

Description.—Form short and thick; head triangular and very large as compared with the body; general colour above tawny brown, mottled and pencilled with dull black, the sides somewhat lighter; fur slaty at the base, ochraceous yellow in the middle, and dark brown at the tips; sides of the muzzle, eyebrows, sides of the head, beneath from the chin backwards, fore legs and tarsus pure white; toes short, claws small and pale yellow in colour; sole of the hind foot with the proximal half bare, the distal half towards the toes hairy; between the outer and inner toes is a large swelling longitudinally divided and transversely striated forming a single pad; behind the ear at the base a conspicuous white spot; ears small, oval and flesh-coloured, a few white hairs on the inner surface; tail short and thick, covered with short, stiff hairs, above pale brown, beneath reddish white.

Female with four pairs of mammae (2-2 = 8).

Dimensions.—From a female in alcohol; head and body 3.75; tail 3.0; hind foot .92; ear .4; from ear to nose-tip 1.17; skull, extreme length 1.4; from condyle to incisors 1.15; breadth .80; upper cheek teeth .19.

Distribution.—The original specimen described by Smith, came from the Kamiesberg in Namaqualand; the species is also recorded from Otjimbique, in Damaraland, and from the neighbourhood of Kimberley. The South African Museum has recently received examples from near Douglas just north of the Orange River in Griqualand West.

Habits.—This gerbille is described by Smith as being nocturnal and migratory, forming burrows in sandy grassy places and feeding on insects.

Sub-family OTOMYINAE.

Genus OTOMYS.

*Type.***Otomys**, *F. Cuvier, Dents des Mamm.* p. 168 (1825)... *O. irroratus*.**Euryotis**, *Brants, Het Geslacht der Muizen* p. 93
(1827) *O. irroratus*.

Rat-like animals with short tails, clad with bristles and scales ; hind feet short and ears usually large ; skull with a moderate bulla and an arched nasal profile, upper incisors grooved, molars composed of a series of laminae of enamel united by cement, posterior

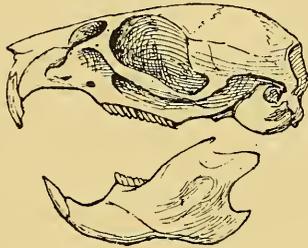


FIG. 89.—Skull of *Otomys unisulcatus* ($1\frac{1}{5}$ nat. size).

molar of upper and anterior molar of lower jaw the largest, the former consisting of from four to nine lamellae.

The genus is purely African ; in addition to the South African forms described below, only one other species, *O. jacksoni*, from British East Africa, is known.

Key of the South African Species.

- A. Both upper and lower incisors longitudinally grooved, ears large..... *O. irroratus*, p. 26.
 B. Upper incisors grooved, lower incisors very faintly marked or smooth.
 a. Greyish brown, ears large *O. unisulcatus*, p. 28.
 b. Yellowish brown, ears small *O. brantsi*, p. 29.

117. *Otomys irroratus*. THE VLEY OTOMYS.

Euryotis irrorata, *Brants, Het Geslacht der Muizen* p. 94 (1827); *Lichtenstein, Darstellung Säugeth.* pl. xxx. (1834); *A. Smith, Illustr. Zool. S. Afr. Mamm.* pls. xxii, xxv, fig. 1 (1840); *Grill, K. Vet. Akad. Handl. Stockholm* ii, 2, p. 17 (1858); *Layard, Cat. Mamm. S. Afr. Mus.* p. 53 (1862).

Otomys bisulcatus, *F. Cuvier, Hist. Nat. Mamm. livr.* 61 (1829).

Otomys irroratus, *Smuts, Enum. Mamm. Cap.* p. 45 (1832); *de Winton, Proc. Zool. Soc.* 1896, p. 801 [Mashonaland]; *id. Ann. Mag. N. H.* (7), ii, p. 5 (1898); *W. Selater, Ann. S. A. Mus.* i, p. 195 (1899).

Euryotis typicus, *A. Smith, S. Afr. Quart. Journ.* ii, p. 149 (1834).

Euryotis obscura, *Lichtenstein, Verzeich. Säugeth. u. Vögeln Kaferrlande*, p. 10 (1842).

VERNACULAR NAMES.—Vley Muis of the Colonists (Smith); Nappy of the Mashonas (Darling).

Description.—General colour above and on the sides dark speckled brown, the bases of the fur slaty, the tips mingled pale brown and black in varying proportions so that there are darker and lighter individuals, below paler the bases of the fur still slaty, and the tips whitish; ears large, rounded, about $\frac{3}{4}$ inch in length and breadth, anteriorly fairly well covered with hair; fore limbs short and slender with five carpal pads, and a rudimentary first digit; hind foot short with six tarsal pads, of which the proximal one is somewhat elongated as in the true rats; tail less than half the length of the head and body, covered with short stiff bristles hardly showing any tendency to form a tuft at the tip, black above, dirty white below. Nasal bones of the skull very much expanded in front.

Incisors much curved, very stout, about .2 in. across the tips, chrome-yellow, each with a deep, well-marked groove running its length about one-third of the breadth of the whole tooth from the outside edge; lower incisors also stout and chrome-yellow, strongly grooved nearer the outer edge than those of the upper jaw; the molars consist of a series of parallel laminae of enamel the number of which to each tooth can be best expressed in the following formula beginning with the anterior tooth $\frac{3-2-6 \text{ to } 9}{4 \text{ to } 6-2-2}$.

Dimensions.—Of a skin; head and body 8.0; tail 3.25; hind foot 1.1; from ear-opening to tip of nose 1.55. Of a male measured in the flesh by Mr. Ayres, of Potchefstroom, head and body 6.75; tail 3.5; hind foot 1.12; skull, length 1.60; breadth .85; upper cheek teeth .40.

Variation.—This otomys varies a good deal in colour throughout its range, and Mr. Thomas has shown that the specimens from East Africa (Mianzini) and Nyasaland differ from those of the Cape Colony in possessing an extra lamella to the posterior upper and anterior lower molar, making the number 7 and 5, instead of 6 and 4, as in the typical variety; in two skulls from Entafufu, in Pondoland, preserved in the South African Museum, the lamella-formulae are $\frac{3-2-7}{4-2-2}$ and $\frac{3-2-9}{6-2-2}$. The skins belonging to these two skulls do not seem to differ in any very marked respect from the typical variety, and they were both collected in the same locality about the same time, so that until other evidence is forthcoming we may conclude that variation in the number of lamellae is not of specific importance.

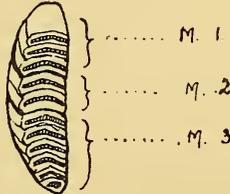


FIG. 90.—Right upper molars of *Otomys irroratus*, to show the lamellae.

Distribution.—The vley otomys is found over a considerable portion of Africa from Somaliland southwards through British East Africa, German East Africa, Nyasaland and Angola to South Africa.

The first collector of this animal was M. Delalande, whose specimens were described by M. Cuvier under the name of the "Otomie Namaquois," in the belief that they came from Namaqualand. The South African Museum possesses examples from the neighbourhood of Cape Town, from the Clanwilliam, Knysna, Bedford, Albany and Pondoland divisions of the Colony, and from Potchefstroom and Zoutspansberg, in the Transvaal, also from Salisbury and Nyasaland; the species is common in Natal.

Habits.—The vley otomys, as its name implies, is usually found in marshy places in the neighbourhood of water; it forms short and tortuous burrows among the bushes in which the female makes a nest and brings forth her young; it is a vegetable-feeder living on the roots of rushes and other like materials.

118. *Otomys unisulcatus*. THE BUSH OTOMYS.

Otomys unisulcatus, *F. Cuvier, Hist. Nat. Mamm.* livr. 60 (1829); *Smuts, Enum. Mamm. Cap.* p. 46 (1832); *de Winton, Ann. Mag. N. H.* (7), ii, p. 5 (1898); *W. Selater, Ann. S. A. Mus.* i, p. 196 (1899).

Euryotis unisulcatus, *A. Smith, S. Afr. Quart. Journ.* ii, p. 149 (1834); *id. Illustr. Zool. S. Afr. Mamm.* pls. xxiii, xxv, fig. 2 (1840).

Euryotis pallida, *Wagner, Archiv Naturg.* vii, pt. 1, p. 134 (1841).

Euryotis rufifrons, *Wagner, Schreber Säugeth. Suppl.* iii, p. 507 (1843).

Description.—General colour dark grey-brown, paler on the sides and becoming a dirty white below, rather lighter in colour than *O. irroratus*; the fur is soft, dark slate at the base, and pale yellow and black at the tips; ears very large and rounded, measuring about .9 in., thinly covered with hair; limbs and toe-pads much as in *O. irroratus*; tail less than half the length of the head and body, covered with short bristles, dark above, light below.

Female with two pairs of inguinal mammae only.

Skull with the superior and anterior edges of the perpendicular plate of the antorbital foramina forming almost a right angle; the nasal bones only slightly expanded in front.

Upper incisors narrower than in the last species (about .15 in. broad at their tips), paler, and with the groove much nearer the outer edge; lower incisors ungrooved; formula of the molar laminae $\begin{matrix} 3-2-4 \\ 4-2-2 \end{matrix}$.

Dimensions.—From a mounted specimen; head and body 8.25; tail 3.50; hind foot 1.08; from ear-opening to tip of snout 1.55; skull length 1.40, breadth .70; upper cheek teeth .34.

Distribution.—To M. Delalande's collections and M. Cuvier's description we are also indebted for our first knowledge of this species, and, except for Sir A. Smith, the animal seems to have attracted little attention since; the South African Museum possesses examples from Garies in Namaqualand, Clanwilliam and Malmesbury, and from Touws River in the Worcester division, and Sir A. Smith records specimens from George.

Habits.—Sir A. Smith tells us that this otomys is found in sandy districts where there is a certain amount of shrubby vegetation; its existence or non-existence in a locality is readily ascertained; if it exists large hemispherical or irregular masses, composed of an aggregation of small dry twigs will be seen surrounding the shrubs and often advancing high among their

branches ; these masses are formed by the animal and traversed in all directions by its burrows, which also extend underneath into the ground ; it is usually in the subterranean burrows that the females make their nests of soft dry grass and bring forth their young.

119. *Otomys brantsi*. BRANTS' OTOMYS.

Euryotis brantsi, *A. Smith, S. Afr. Quart. Journ.* ii, p. 150 (1834) ;
id. Illustr. Zool. S. Afr. Mamm. pls. xxiv, xxv, fig. 3 (1840).

Otomys brantsi, *de Winton, Ann. Mag. N. H.* (7) ii, p. 6 (1898) ; *W. Sclater, Ann. S. A. Mus.* i, p. 197 (1899).

Description.—General colour yellowish brown, lighter on the sides and below ; as in the other species the fur is slaty at the base with yellowish brown intermingled with less abundant black tips ; ears markedly smaller than in the other two species, about half an inch in length and breadth, fairly thickly clothed with hairs ; limbs somewhat stouter and broader than those of *O. unisulcatus* ; tail thickly clothed with somewhat stout yellow bristles with a dark dorsal band more marked towards the tip, which is almost black ; two pairs of mammae inguinal in position : tarsal pads six, all circular.

Nasal bones not expanded, normal ; upper incisors moderate, the groove well to the outer side of the tooth, the outer edge pale, almost white ; lower incisors sometimes faintly grooved, generally smooth ; formula of molar laminae $\frac{3-2-4}{4-2-2}$.

Dimensions.—From an example in spirit ; head and body 5·60 (of a skin 7·0) ; tail 3·40 ; hind foot 1·15 ; from ear-opening to tip of nose 1·60 ; skull length 1·50, breadth ·75 ; upper cheek teeth ·30.

Distribution.—Namaqualand ; Sir Andrew Smith's specimen came from the neighbourhood of the Orange River ; there are a considerable number of examples in the South African Museum obtained by Mr. Péringuey at Klipfontein, near O'okiep in Namaqualand.

Subfamily DENDROMYINAE.

Genus **DENDROMYS**.

Type.

Dendromus, *A. Smith, Zool. Journ.* iv, p. 438

(1829) *D. mesomelas*.

Small, slender, mouse-like animals with long, scaly, and sparsely-haired tails, rather large ears, and with slender limbs

with the three middle digits of each elongated. Skull with the infraorbital opening triangular, hardly at all narrowed below.

Upper incisors grooved, molars small, the anterior upper one as long as the second and third taken together; the tubercles fairly distinctly arranged in pairs, especially in the anterior upper molar where there are six tubercles arranged in pairs, with a small extra seventh on the inside of the middle one.

This is a purely Ethiopian genus with four species, in addition to those below described, from Western and Eastern Africa.

Key of the South African Species.

- A. Chestnut, with three clawed toes to the fore and four to the hind feet.
- a. Larger, about $3\frac{1}{2}$ in.; sometimes with, sometimes without the black dorsal stripe *D. mesomelas*, p. 30.
- b. Smaller, about $2\frac{1}{2}$ in.; always without the black dorsal stripe *D. pumilio*, p. 31.
- B. Grey, with only three claws to both fore and hind feet; small, about $2\frac{3}{4}$ in. *D. melanotis*, p. 31.

120. *Dendromys mesomelas*. THE CHESTNUT TREE-MOUSE.

Mus mesomelas, *Brants, Het Geslacht der Muizen*, p. 122 (1827).

Dendromus typus, *A. Smith, Zool. Journ.* iv, p. 439 (1829).

Dendromys mesomelas, *Smuts, Enum. Mamm. Cap.* p. 40 (1832);

W. Selater, Ann. S. A. Mus. i, p. 198 (1899).

Dendromys typicus, *A. Smith, S. Afr. Quart. Journ.* ii, p. 158 (1834);

id. Illustr. Zool. S. Afr. Mamm. pl. xxxiv, fig. 1, pl. xxi, fig. 2 [skull and teeth] (1841).

Description.—General colour chestnut-brown above, paler on the sides, white with a rufous tinge below; fur soft and thick, dark slaty for the basal three-quarters, tips chestnut-brown; head and snout acutely pointed; ears large, thinly covered with hairs, which are thicker along the margin, so as to there give it a darker appearance; fore limbs short and slender, formed for grasping, the three middle fingers elongated and clawed, the other two rudimentary; a large swollen pad occupies the base of the fingers; hind limbs elongated and slender, toes long, all clawed except the first, which has a flat nail; tail as long as or longer than the head and body, slender, with rings formed of a series of scales, which are somewhat concealed by the numerous bristles, dark above, lighter below. A

black dorsal stripe from behind the head to the root of the tail is generally present.

Dimensions.—Of a male measured in the flesh by Mr. Ayres; head and body 3·0; tail 3·25; hind foot ·75; from ear-opening to tip of nose ·90; ear ·47.

Distribution.—East and South Africa, from Gallaland through Nyasaland to Cape Colony; the type is said to have come from the Sunday river in Uitenhage; the South African Museum possesses examples from the immediate neighbourhood of Cape Town, and from Potchefstroom in the Transvaal, and there are examples from Natal in the Maritzburg Museum.

Habits.—This, like the other species of the genus, appears to be an entirely arboreal animal, living in the branches of trees, shrubs or vines, and there making a nest in which it brings up its young; it is very active in passing along from one branch to another. Sometimes it adopts for itself the nest of a bird; there are three specimens in the South African Museum, taken from the deserted nest of a weaver bird (*Hyphantornis velatus*).

121. *Dendromys pumilio*. THE SMALL TREE-MOUSE.

Dendromys pumilio, *Wagner, Munch. Gelehrt. Anzeiger*, xii, p. 437 (1841); *Matschie, Säugeth. Deutsch-Ost-Afrika*, p. 49 (1895); *W. Sclater, Ann. S. A. Mus.* i, p. 199 (1899).

Description.—Smaller than *D. mesomelas*, and without the black dorsal stripe; reddish brown above, cheeks, lower side and feet white; tail longer than the head and body (*Matschie*); is very doubtfully distinct from *D. mesomelas*.

Dimensions.—Head and body 2·38; tail 3·12 to 3·75.

Distribution.—East and South Africa; this tree mouse is recorded from various parts of German East Africa, and was originally described from Cape Colony. Unrepresented in the South African Museum.

122. *Dendromys melanotis*. THE GREY TREE-MOUSE.

Dendromys melanotis, *A. Smith, S. Afr. Quart. Journ.*, ii, p. 158 (1834); *id. Illustr. S. Afr. Zool. Mamm.* pl. xxiv, fig. 2 (1841); *Fisk, Proc. Zool. Soc.* 1887, p. 340 [habits]; *W. Sclater, Ann. S. A. Mus.* i, p. 199 (1899).

Description.—General colour above ashy grey with a slight tinge of rufous, below dull white; a well-marked black line from

between the shoulders to the root of the tail; fur soft and thick, slaty at the base as in the other species; ears broad and patulous larger than in *D. mesomelas*, the tips dark, covered with sparse silvery white hairs, a white spot on the side of the head at the base of the outer margin of the conch; fore limbs slender, only the three middle toes clawed, the fifth a clawless tubercle; hind feet long and slender, especially the toes, of which only the three middle ones bear claws, the fifth bears a flat nail, the first is repre-

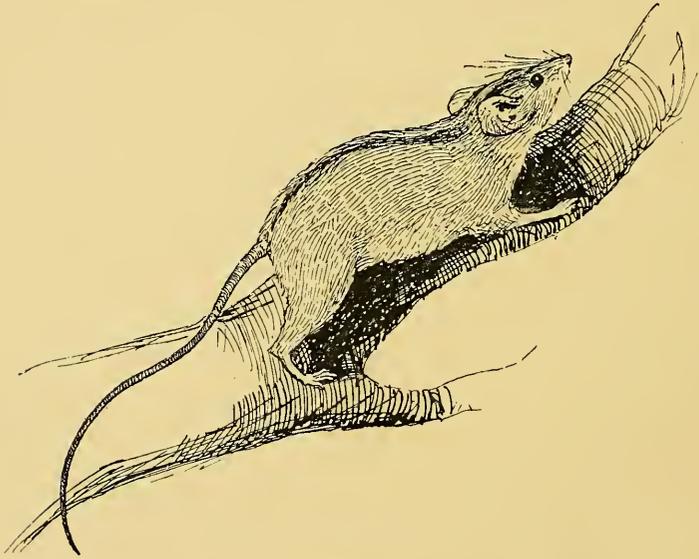


FIG. 91.—The Grey Tree-mouse (*Dendromys melanotis*).

sented only by a tubercle; the soles of the tarsus with five rounded pads set among a series of minute, closely-set hemispherical swellings; tail longer than the head and body, covered with rings from which spring short bristles, dark above, light below; eight mammae, one pair axillary, one pair pectoral, and two pairs inguinal.

Dimensions.—From a specimen measured in the flesh; head and body 2·70; tail 2·85; hind foot ·70; from ear-opening to tip of nose ·75; skull length ·80, breadth ·40; upper cheek teeth ·15.

Distribution.—Sir A. Smith's type came from Durban; the South African Museum possesses examples from the suburbs of

Cape Town and from Port Elizabeth ; no other locality seems to have been recorded, unless certain examples mentioned by M. Bocage from Angola are referable to this species.

Habits.—Like the other species of the genus this one seems to be found only on trees and shrubs, and while sometimes making a nest for itself, at other times occupies that of a small bird in which to rear its young. In addition to vegetable matter it will devour spiders and insects ; a case is recorded by Mr. Fisk in which a small animal of this species killed and devoured two young ringhals snakes (*Sepedon haemachaetes*) 9 and 10 inches in length respectively.

Genus **STEATOMYS.**

Type.

Steatomys, *Peters, Bericht Akad. Berlin*, 1846, p. 258

(1847)S. *pratensis*.

Small, short-tailed, mouse-like animals, always very plump owing to the storage of fat all over the body, with no cheek pouches, moderate ears, and short limbs.

Skull with the infraorbital opening not narrowed below.

Upper incisors grooved ; molars tuberculated, the tubercles arranged in two rows, except in the case of the anterior upper molar, the median row of which consists of three, so that this tooth has seven tubercles instead of eight, as in *Mus*.

This genus is also purely Ethiopian. Three other species have been recently described from West and East Africa.

123. **Steatomys pratensis.** THE FAT MOUSE.

Steatomys pratensis, *Peters, Bericht Akad. Berlin*, 1846, p. 258 (1847) ; *Thomas, Ann. Mag. N. H.* (6), x, p. 264 (1892) ; *de Winton, Proc. Zool. Soc.* 1896, p. 805 [Mashonaland] ; *W. Sclater, Ann. S. A. Mus.* i, p. 200 (1899).

Steatomys edulis, *Peters, Reise Mossamb. Säugeth.* p. 163. pl. xxxiv, fig. 2, pl. xxxv, fig. 11 (1852).

Steatomys krebsii, *Peters, ibid.* p. 165, pl. xxxvi, fig. 3 (1852) [Kaffraria].

VERNACULAR NAME.—Shana of Mashonas (Darling teste de Winton).

Description.—Form stout and plump ; general colour dark rufous above, lighter on the sides, white below ; fur very short and

soft; snout short and pointed; ears moderate, fairly well clothed with hairs; limbs white, fore feet with four claws and a flat nail to the first finger; hind foot with five claws, shorter than those of the forelimb; tail short, hardly half the length of the body, brown above, white below (Peters).

Dimensions.—Of the type; head and body 3·25; tail 1·75; hind foot ·60; skull length ·79, breadth ·47; upper cheek teeth ·13. From a specimen from Mashonaland, measured in the flesh by Mr. Darling; head and body 3·77; tail 1·77; hind foot ·66.

Distribution.—South-east Africa: Mozambique (whence came the type), Mashonaland, Nyasaland, and “the interior of Kaffraria” (probably meaning the Transvaal), whence came the type of *S. krebsi*. This species is not represented in the South African Museum.

Habits.—These mice live in the open country making short burrows with only a single entrance; owing to their fatness they are somewhat sluggish and not at all active; they are much relished by the natives of Mozambique as food.

Genus **MALACOTHRIX.**

Type.

Otomys, *A. Smith, S. Afr. Quart. Journ.* ii, p. 147

(1834) (*nec Cuvier*)*M. typicus*.

Malacothrix, *Wagner, Schreb. Säugeth. Suppl.* iii, p. 496

(1843).....*M. typicus*.

Small, short-tailed, mouse-like animals with stout bodies, slender limbs, and well-developed ears; the tarsus and carpus are hairy to the toe pads; the skull is slender, the antorbital foramen is hardly at all narrowed below, and the perpendicular plate is not well developed.

The upper incisors are very strongly grooved towards their outer edge, the lower ones ungrooved and rather paler; the molars resemble those of *Steatomys*, the anterior upper one with 7 cusps, 2 in the anterior and posterior row, and 3 in the median row; the middle molar has 5, the front row 3, of which the innermost is small and not well developed, the back row 2; the posterior molar has 2 small cusps only, side by side; in the lower molars the cusps are arranged in pairs.

This genus seems to come close to *Steatomys*, being distinguishable only by its very hairy tarsus.

Only the two species of this genus described below are included in it, as *Otomys albicaudatus* of Smith must apparently be assigned to the Cricetine genus *Mystromys*.



FIG. 92.—Left upper molars of *Malacothrix typicus*, to show the arrangement of the cusps.

Key of the two Species.

- A. Hind feet with four well-defined toes and claws;
ears very large exceeding $\cdot 5$ in. in length *M. typicus*, p. 35.
- B. Hind feet with five well-defined toes and claws;
ears moderate not exceeding $\cdot 5$ in. in length..... *M. pentonyx*, p. 36.

124. *Malacothrix typicus*. THE MOUSE GERBILLE.

Otomys typicus, *A. Smith, S. Afr. Quart. Journ.* ii, p. 148 (1834);
Layard, Cat. Mamm. S. Afr. Mus. p. 54 (1862).

Malacothrix typicus, *Wagner, Schreb. Säugeth. Suppl.* iii, p. 498
(1843); *de Winton, Ann. Mag. N. H.* (7), ii, p. 8 (1898); *W. Sclater,*
Ann. S. A. Mus. i, p. 201 (1899).

Description.—General colour pale brown above, the fur long, soft, and with dark slaty bases, below white also with slaty bases; head somewhat pointed; ears very large for the size of the animal, measuring about $\cdot 7$ in. by $\cdot 55$, dark coloured, sparsely covered with fine black and white hairs intermixed; limbs slender, covered with dull white hairs; on the fore foot four toes clawed, the third and fourth only slightly exceeding the second and fifth in length; hind foot with four toes only, the first or inner one being absent, all clawed, the fifth slightly shorter than the others; whole under-surface of the carpus and tarsus right up to the toe pads covered with short, white, coarse hairs; tail short, dark, and scaly, covered with short, white, bristly hairs, and so appearing of a dirty white.

Skull slender and much narrowed between the orbits, incisors orange, and the upper ones deeply grooved.

Dimensions.—From a mounted specimen; head and body 3·5; tail 1·40; hind foot ·70; from ear-opening to tip of snout 1·0; skull length ·90; breadth ·55; length of cheek teeth ·19.

Distribution.—Apparently confined to Cape Colony; the species was described by Sir A. Smith many years ago from specimens obtained near Graaff Reinet; the description is drawn up from specimens in the South African Museum from Beaufort West and Griqualand West.

125. *Malacothrix pentonyx*. THE SMALL-EARED

MOUSE GERBILLE.

Malacothrix pentonyx, *W. Sclater, Ann. S. A. Mus.* i, p. 202 (1899).

Description.—General colour above brown with a rufous tinge, below, including the upper lips and limbs pure white, the line of demarcation being very marked; fur soft and thick, above with, below without, slaty bases; head acutely pointed, ears moderate, markedly smaller than those of *M. typicus*, oval, about ·45 by ·30, covered internally with sparse whitish, externally with brown hairs.

Limbs slender, proportioned much as in *M. typicus*, the fore limbs with four clawed toes; hind limbs with five toes, all with well-developed claws, of which the inner (*i.e.*, the first) is the shortest, and the fifth slightly shorter than the other three; tarsus hairy as in the other species.

Tail short, a little darker above than below, covered with short, stiff bristles.

Skull with the interorbital region somewhat wider than in *M. typicus*; teeth as in the other species.

Dimensions.—From the type, a dismantled skin; head and body 2·75; tail 2·10; hind foot ·65; ear to nose tip 1·1; skull length ·91; breadth ·5; upper cheek teeth ·19.

Distribution.—The western part of the Colony; the types were obtained on the Cape Flats near Cape Town, by Messrs. E. L. Layard and M. Bishop.

Sub-family MURINAE.

Genus **MUS**.*Type.***Mus**, *Linnaeus, Syst. Nat.* 12th ed. i, p. 79 (1766) *M. rattus*.

Animals with bodies covered with soft, sometimes spiny, fur, with pointed muzzles and prominent eyes but no cheek pouches; the ears are nearly naked; the tail is more than half the length of the body, covered with scales arranged in rings, with usually a sparse covering of short bristles; pollex rudimentary with a flat nail, all the other digits with claws; palms with five, soles usually with six rounded or oval pads.

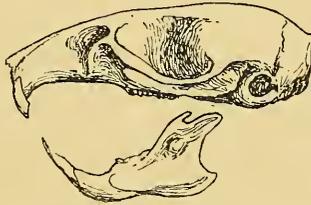


FIG. 93.—Skull of *Mus coucha* ($1\frac{1}{2}$ nat. size).

Skull with the antorbital foramen usually forming a narrow slit below, and the perpendicular plate which forms its outer wall well developed; palate compressed and the incisive foramina long.

Dentition the same as in all *Muridae*, *i.e.*, i. $\frac{1}{1}$, c. $\frac{0}{0}$, pm. $\frac{0}{0}$, m. $\frac{3}{3}$ = 16. Incisors not grooved, usually rather narrow; molars when unworn with a triple longitudinal row of tubercles; lower jaw with a double row; when worn the teeth are crossed by curved transverse bands of enamel, marking the position of the tubercles [see fig. 94].

This genus is the largest of the whole Mammalian class, containing, according to Trouessart's list, 176 species, and doubtless many still remain to be described.

They range all over the Old World, with the exception of Madagascar, but are not found in the New World except where introduced by human agency.

The study of the South African species has been much neglected since the time of Sir A. Smith, and it is very difficult to identify some of his species owing to the fact that his descriptions are often short and vague, and also that the types of those still in the British Museum are all in a very bad state of preservation.

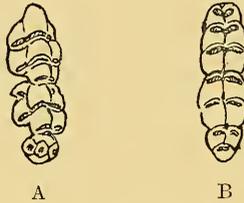


FIG. 94.—A, Upper, and B, lower molars of *Mus coucha* (enlarged), to show the arrangement of the cusps.

In the following key of South African species only those of which the identification is fairly certain, are entered.

- A. Large, body over 6 in. in length.
- a. Tail shorter than the head and body.
 - a¹. Very large, body from 7 to 12 in.; fur harsh; tail nearly naked..... *M. decumanus*, p. 39.
 - b¹. Smaller, body between 6 and 7 in. in length; tail with the distal portion with long black hairs *M. nigricauda*, p. 41.
 - b. Tail longer than the head and body.
 - c¹. Brown above only a little paler below, not white..... *M. rattus*, p. 41.
- B. Medium, body 4 to 6 in. in length.
- a. Tail longer than the head and body.
 - a². Fawn coloured rats; tail rings 27 to 30 to the inch.
 - a³. Larger, fur with slaty bases below ... *M. chysophilus*, p. 42.
 - b³. Smaller, fur with no slaty bases below; mammae 1-2 = 6..... *M. auricomis*, p. 43.
 - b². Brown or reddish brown rats.
 - a³. Fur below without slaty bases, tail bushy at tip..... *M. damarensis*, p. 44.
 - b³. Fur below with slaty bases, tail rings 45 to 50 to the inch.
 - a⁴. Mammae 1-2 = 6..... *M. dolichurus*, p. 44.
 - b⁴. Mammae 2-3 = 10 *M. verreauxi*, p. 45.

- c*². Dark brown; tail-tip with a strongly marked black brush *M. lehochla*, p. 46.
- b*. Tail shorter than the head and body.
- a*². Mammae 1-2 = 6, fur below pure white *M. paedulus*, p. 47.
- b*². Mammae 2-3 = 10, fur below with dark slaty bases, nose-tip white *M. colonus*, p. 47.
- c*². Mammae 4-4 = 16, fur below with slaty bases, no white nose-tip *M. coucha*, p. 48.
- C*. Small, body less than 4 inches.
- d*. Tail about equal to the head and body, paler below than above, but never white *M. musculus*, p. 50.
- e*. Tail considerably shorter than the head and body, underside pure white, colours distinctly marked *M. minutoides*, p. 51.

126. **Mus decumanus.** THE NORWAY OR BROWN RAT.

Mus decumanus, *Pallas, Nov. sp. Glir.* p. 91 (1779); *Smuts, Enum. Mamm. Cap.* p. 35 (1832); *Layard, Cat. Mamm. S. Afr. Mus.* p. 51 (1862); *W. Sclater, Ann. S. A. Mus.* i, p. 203 (1899).

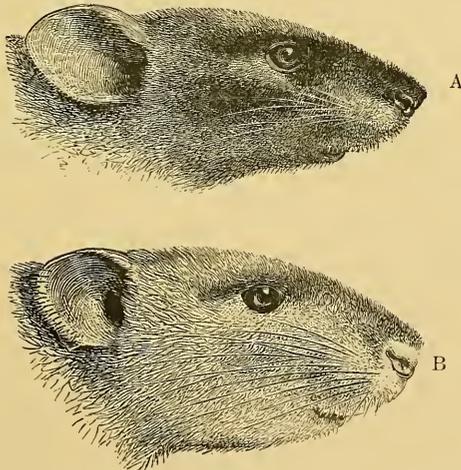


FIG. 95.—Heads of, A, *Mus rattus*; B, *Mus decumanus*.

Description.—General colour above greyish brown, sometimes

with a reddish-brown tinge; fur woolly, intermixed with longer, coarser, straight hairs, the woolly portion slaty, with pale brown tips, the coarse hairs black; below dirty white with slaty bases to the fur; ears small, when pressed forward not reaching the eyes; limbs and feet stout and strong; the tarsal pads well developed, six in number, the proximal one being an elongated oval; tail always shorter than the head and body, covered with short sparse bristles, not concealing the scaly rings, which are coarse, numbering about 25 to the inch, the bristles become a little longer towards the tail-tip, and form a slight tuft in some cases; mammae 5 to 6 pairs.

Skull large, with well-developed supraorbital ridges; the antorbital foramen is narrowed below, and the anterior edge of the plate is perpendicular.

This rat can always be distinguished by its size, the shortness of its ears and tail, and by its coarse fur.

Dimensions.—From a large mounted male; head and body 11·25; tail 7·75; hind foot 1·60; from ear-opening to nose-tip 2·20; skull length 1·50; breadth ·70; length of upper molars ·30.

Distribution.—This rat is now cosmopolitan, being found all over the world, especially in the neighbourhood of towns and seaports; its original home appears to have been in Western China, whence it spread to Europe early in the last century—it is said to have reached England about 1730. It is common in Cape Town and neighbourhood, and is probably to be found in all the large towns, and along the lines of communication.

Habits.—This rat is far the most powerful of its family, and has in most parts of the world entirely driven out and supplanted the once prevalent black rat, which is now becoming rare.

It is omnivorous, it will eat any kind of human food; it will prey on other creatures; the henroost, the dovecot, the rabbit-warren all suffer from its depredations. It is also a cannibal and will eat its cousin the black rat, or any members of its own species caught in a trap or otherwise disabled.

The brown rat is very prolific, every female produces several litters annually, each consisting of from ten to fourteen blind and naked young ones; these again will breed when only half grown and not more than six months old, but in this case the families will be smaller not more than three or four; the period of gestation is twenty days.

127. *Mus nigricauda*. THE BLACK-TAILED RAT.

Mus nigricauda, *Thomas, Proc. Zool. Soc.* 1882, p. 266, pl. xiv, fig. 1 ;
Bocage, Journ. Sci. Lisbon (2), ii, p. 10 (1892) ; *W. Sclater, Ann.*
S. A. Mus. i, p. 208 (1899).

Description.—General colour above yellow mixed with black, somewhat more yellow on the sides, fur coarse and long, below pure white without slaty bases to the hairs ; ears large, thinly covered with short greyish hairs ; extremities white, the hairs concealing the claws ; hind feet comparatively short, the six pads large and rounded, occupying a considerable portion of the sole ; tail shorter than the head and body, nearly naked at the base, but thickly covered distally above and below with long shining black hairs forming a slight pencil at the tip ; molars broad and rounded with numerous well-marked small cusps.

Dimensions.—From the type ; head and body 6·2 ; tail 5·8 ; hind foot 1·01 ; upper molars ·21.

Distribution.—The type was obtained by C. J. Andersson on the Hountop River in Damaraland ; other examples have been collected in Angola, where it appears to be fairly common. There are no specimens in the South African Museum.

128. *Mus rattus*. THE BLACK RAT.

Mus rattus, *Linnaeus, Syst. Nat.* 12th ed., i, p. 83 (1766) ; *Layard, Cat. Mamm. S. Afr. Mus.*, p. 51 (1862) ; *de Winton, Proc. Zool. Soc.* 1896, pp. 803, 807 [Rhodesia] ; *W. Sclater, Ann. S. A. Mus.* i, p. 204 (1899).

Description.—General colour above and below brown, fur coarse and harsh, ears larger than in *M. decumanus*, when pressed forward reaching as far as the eye ; feet and hands a little paler than the back but not white ; the pads on the soles well developed, the proximal one elongated and oval ; tail much longer than the head and body, of the same brown colour throughout, covered with short bristles not becoming much longer towards the tip ; tail rings somewhat finer than those of *M. decumanus*, about 30 to the inch ; extreme tail-tip in most of the South African specimens examined, white ; mammae 10 to 12 in number, 2 or 3 pairs pectoral, 3 pairs inguinal.

Skull generally resembling that of *M. decumanus*, but rather shorter in the nasal region.

Dimensions.—Measured in the flesh; head and body 7·40; tail 8·63; hind foot 1·32; skull length 1·40, breadth ·75; upper molars ·30.

Distribution.—Like the brown rat, the black rat is cosmopolitan having been carried all over the world in ships; it has, however, been driven out of many places by its brown cousin, and is now comparatively rare in England.

In Africa the black rat was formerly common in Cape Town, but now it seems to have disappeared; it is, however, the common house rat of Rhodesia, and I have examined a specimen from Pretoria preserved in the Museum there.

This rat is not indigenous in Europe; though long established there. It has been known to exist on the Continent since the thirteenth century; brown and rufous varieties differing somewhat in colour from the ordinary European form are found in North Africa, India, and Burma, and are indigenous there; it is probably from this form that the present European race originated.

Habits.—Though inferior in strength and ferocity, the black rat resembles its brown congener in its habits; it is omnivorous, very prolific and semi-parasitic, living in houses and by human aid; the Indian variety, however, alluded to above is a climbing rat ascending trees and making its nest among the branches.

129. *Mus chrysophilus*. DARLING'S RAT.

Mus chrysophilus, *de Winton, Proc. Zool. Soc.* 1896, pp. 801, 807; *W. Sclater, Ann. S. A. Mus.* i, p. 205 (1899).

VERNACULAR NAME.—Mache of the Mashonas.

Description.—General colour bright reddish fawn, sprinkled with black hairs becoming lighter on the sides; below white, clearly defined from the fawn of the sides, all the fur above and below with slaty bases; ears oval, about three-quarters of an inch in length, with a thin covering of greyish hairs; feet covered with white hairs, soles somewhat dark in colour, with the usual six pads, the proximal one rounded; tail a little longer than the head and body, the rings running about 30 to an inch, towards its base lighter below than above, distally quite brown, bristles increasing in number towards the tail-tip, but hardly forming a brush.

Skull with the outer edge of the antorbital plate sloping forwards.

Dimensions.—Of the type measured in the flesh; head and body 5·75; tail 6·50; hind foot 1·12. Of a specimen in alcohol; head and body 5·10; tail 6·0; hind foot 1·2; skull length 1·50, breadth ·75; molar teeth of upper jaw ·25.

Distribution.—The type of this species, obtained by Mr. J. ff. Darling at Mazoe, in Mashonaland, is in the British Museum; the South African Museum possesses an example from the same locality and collector; it has also been found near Bulawayo, in the Transvaal, and in Nyasaland.

130. *Mus auricomis*. THE GOLDEN RAT.

Mus auricomis, de Winton, *Proc. Zool. Soc.* 1896, pp. 802, 807; W. Selater, *Ann. S. A. Mus.* i, p. 206 (1899).

Description.—General colour above fawn-yellow, sprinkled with black hairs, lighter on the sides; below including the hands and feet pure white almost to the bases of the hairs, which are sometimes a pale grey; ears moderate, naked, save for a few yellow hairs; tail nearly naked, bi-coloured for the basal portion, brown for the terminal portion with a few short adpressed bristles, increasing in number and length towards the tip, rings of the tail about 27 to the inch. Female with three pairs of mammae (1·2 = 6).

Allied to *M. chrysophilus*, but smaller, with almost pure white belly fur and a more golden and less rufous tinge to the sides and upper parts.

Skull with the front edge of the antorbital plate somewhat concave, approaching that of *Dasymys*.

Dimensions.—Of the type measured in the flesh; head and body 4·44; tail 5·78; hind foot ·94; skull length 1·22, breadth ·59; upper molars ·20.

Distribution.—The type of this species was also obtained at Mazoe in Mashonaland, by Mr. Darling, and is now in the British Museum. Mr. de Winton records it at the same time from the neighbourhood of Bulawayo, where it was obtained by Mr. Selous. The South African Museum has examples from the Paarl, Middelburg and Griqualand West divisions of the Colony, and from Salisbury in Mashonaland.

Habits.—This rat seems to be found only among boulders and rocks; all Mr. Marshall's specimens are labelled "trapped on kopje."

131. *Mus damarensis*. THE DAMARALAND RAT.

Mus silaceus, *apud Thomas, Proc. Zool. Soc.* 1882, p. 266 [*nec Wagner*].
Mus damarensis, *de Winton, Ann. Mag. N. H.* (6), xix, p. 349 (1897);
W. Sclater, Ann. S. A. Mus. i, p. 208 (1899).

Description.—General colour reddish fawn or isabelline, sprinkled with fine darker hairs, richest along the dorsal line, becoming greyer on the sides and below pure white, including the hands and feet; ears large, covered in and outside with short reddish hairs; tail about the same length as the head and body, covered distally with somewhat long liver-coloured hairs so as to be almost bushy, rings fine, about 50 to the inch; the feet are thick, the pads are large and crowded; the claws small and curved, are almost concealed by the hairs.

Dimensions.—From the type; head and body 5·30; tail 5·30; hind foot ·95; skull length about 1·25, breadth ·62; upper molars ·24.

Distribution.—The type, obtained some years ago by Mr. C. J. Andersson in Damaraland, was formerly identified with *M. silaceus*, but has recently been shown by de Winton to be distinct.

132. *Mus dolichurus*. THE LONG-TAILED RAT.

Mus dolichurus, *Smuts, Enum. Mamm. Cap.* p. 38, pl. ii (1832); *A. Smith, S. Afr. Quart. Journ.* ii, p. 155 (1834); *Thomas, Proc. Zool. Soc.* 1891, p. 186; *id., ibid.* 1894, p. 141 [measurements]; *W. Sclater, Ann. S. A. Mus.* i, p. 207 (1899).

Mus arborarius, *Peters, Reise Mossamb. Säugeth.* p. 152, pl. xxxv, fig. 7, pl. xxxvi, fig. 2 (1852).

Mus rutilans, *Peters, M. B. Akad. Berlin*, 1876, p. 478, pl. ii, fig. 2 (1877).

Description.—General colour above rich fawn brown, becoming much more reddish on the hinder part of the back and rump; below pure white with no slaty bases to the fur; nose-tip not white; ears large, rounded and nearly naked; hands and feet covered with somewhat rusty-white hairs; tail considerably longer than the head and body, with somewhat coarse rings, about 32 to the inch, only very slightly paler below than above, ending in a brush of comparatively long brown hairs; mammae six in number, one pair pectoral, two pairs inguinal.

Dimensions.—Measured in the flesh ; head and body 4·70 ; tail 6·60 ; hind foot ·80 ; ear ·85 ; skull length 1·12, breadth ·64, upper cheek-teeth ·20. The description and dimensions are taken from an adult female specimen from the Pirie Bush near King William's Town, preserved in the British Museum.

Distribution.—The type described by Smuts was from the neighbourhood of Cape Town, and Smith records the animal from Uitenhage. There is no specimen in the South African Museum, but the British Museum has examples from the Pirie Bush in the Eastern Province of the Colony and from Natal. Outside South Africa it appears to be widely distributed from the Niger and the Cameroons in the west and the Fayoum of Egypt in the east, southwards through Central and East Africa to the Colony.

Habits.—This rat appears to be arboreal, as a rule making a nest or occupying that of a bird such as a barbet ; according to Peters, it carries its young attached to it by its mammae, like *Mus paedulcus*.

133. *Mus verreauxi*. VERREAUX'S RAT.

Mus verroxi, *A. Smith, S. Afr. Quart. Journ.* ii, p. 156 (1834).

Description.—General colour fawn brown, thickly sprinkled with black along the back and paler on the sides ; below white with well developed dark slaty bases to the fur throughout ; tip of the nose white ; a well-marked black ring round the eye, extending forwards to the bases of the whiskers ; ears somewhat oval and nearly naked, feet covered with pure white hairs ; pads small and normal, all rounded ; tail considerably longer than the head and body, distinctly bi-coloured, the rings fairly distinct, about 35 to the inch, towards the extremity the bristles become much longer and white, so that the tail-tip bears a white brush ; mammae 3-2 = 10.

This description is taken from an adult male preserved in the South African Museum, which appears to agree very well with Smith's description.

Dimensions.—Measured in the flesh ; head and body 4·5 ; tail 6·25 ; hind foot 1·06 ; skull length 1·17 ; breadth ·65 ; upper cheek teeth ·22.

Distribution.—The type was obtained near Cape Town ; there are in the South African Museum in addition to the specimen from Somerset West described above, others from Table Mountain and

French Hoek, all localities in the south-western corner of the Colony.

134. **Mus lehochla.** SMITH'S RAT.

Mus lehochla, A. Smith, *App. Report Exped. Explor. S. Africa*, p. 43 (1836); *id. Illustr. Zool. S. Afr. Mamm.* pl. xlvii, fig. 1 (1847).

Description.—General colour above dark brown, darkest in the middle of the back, becoming more rufous on the sides, hairs a little coarse with dark slaty bases; below white, with a rufous tinge, slaty bases somewhat paler and not very strongly developed; ears oval, slaty in colour, covered with a coating of fine hairs; fore and hind feet white above; skin of the under side of the tarsus ashy, the pads, six in number, of which the proximal one is oval; all the pads well developed and dark ashy, almost black; tail considerably longer than the head and body, very coarsely ringed, somewhat paler below than above, but by no means bicoloured; towards the tip the tail hairs become a good deal longer and thicker, and to a certain extent form a brush.

Skull chiefly remarkable for its very small and flattened bullae measuring $\cdot 19$ along their greatest length as compared with $\cdot 30$ in *M. paedulcus*; the antorbital plate slopes diagonally forwards and then vertically downwards, and is considerably wider than that of *M. paedulcus*, the species to which, on the whole, the present form seems most closely allied.

This description is drawn up from a rat caught at Tafelberg in the Middelburg division of the Colony, now in the South African Museum.

It has been compared with Andrew Smith's type of *M. lehochla*, by Mr. de Winton, and there can be no doubt that the two are identical; the type has obviously lost a portion of its tail.

Dimensions.—From a male specimen in alcohol; head and body $4\cdot 10$; tail $6\cdot 20$; hind foot $1\cdot 0$; ear $\cdot 6$; ear opening to nose tip $1\cdot 15$; skull length $1\cdot 13$; breadth $\cdot 6$; upper molars $\cdot 20$.

Distribution.—Smith's type was obtained at Litakun in Bechuanaland; no other locality or specimen except the above-mentioned one is known to me.

135. *Mus paeduleus*. WAHLBERG'S RAT.

Mus paeduleus, Sundevall, *K. Vet. Akad. Forh. Stockholm*, 1846 p. 120 (1847); *W. Sclater, Ann. S. A. Mus.* i, p. 206 (1899).

Description.—General colour above, greyish brown, darker in the middle of the back, greyer on the sides, below pure white with only very slight traces of slaty bases to the fur; along the back the hairs are fairly soft and thick and have a considerable admixture of black tips; ears rather large, oval with a thin covering of grey hairs; extremities greyish white, claws almost concealed by the long hairs; the proximal tarsal pad much elongated; tail slightly shorter than the head and body, dark brown above and below, rings very fine, about 50 to the inch, bristles very thick almost concealing the rings and having a slight pencil, tail-tip in the two specimens examined white; mammae 3 pairs, *i.e.*, 1-2 = 6.

Skull with the incisive foramina barely reaching the anterior level of the molars; the front edge of the perpendicular plate of the antorbital foramen with a backwardly directed slope, so that its top angle is somewhat acute.

This account is drawn up from a specimen in the South African Museum agreeing very well with the original description of Sundevall.

Dimensions.—From a skin; head and body 5·5; tail 5·0; hind foot ·90; from ear opening to nose-tip 1·10; skull too imperfect for measurement.

Distribution.—The type collected by Wahlberg, now in the Stockholm Museum, is described as coming from the interior of Kaffirland; the example in the South African Museum is from Pondoland in the extreme east of the Colony and another rat from the Lydenburg district of the Transvaal also seems referable to this species.

Habits.—According to Wahlberg the mother carries her young when running or climbing attached to her mammae.

136. *Mus colonus*. BRANTS' RAT.

Mus colonus, Brants, *Het Geslacht der Muizen*, p. 124 (1827); *Smuts, Enum. Mamm. Cap.* p. 37 (1832); *A. Smith. S. Afr. Quart. Journ.* ii, p. 154 (1834); *id.*, *Illustr. Zool. S. Afr. Mamm.* pl. xlvii, fig. 3 (1847); *Peters, Reise Mossamb. Säugeth.* p. 151 (1852); *Grill & Sundevall, K. Vet. Akad. Handl. Stockholm*, ii, 2, p. 18 (1858);

Thomas, Ann. Mag. N. H. (6), x, p. 181 (1892); *W. Selater, Ann. S. A. Mus.* i, p. 210 (1899).

Mus natalensis, *A. Smith, S. Afr. Quart. Journ.* ii, p. 156 (1834); *id.*, *Illustr. Zool. S. Afr. Mamm.* pl. xlvii, fig. 2 (1847); *Matschie, Säugeth. Deutsch-Ost-Afrika*, p. 51 (1895); *de Winton, Proc. Zool. Soc.* 1896, p. 807.

Mus mariquensis, *A. Smith, App. Report Exped. Explor. S. Africa*, p. 43 (1836); *de Winton, Proc. Zool. Soc.* 1896, p. 803.

Description.—General colour very dark brown, almost black along the middle line of the back owing to the admixture of long black hairs, rather paler and more rufous on the sides, below dirty white with dark slaty bases to the fur; ears oval, covered with a few sparse brown hairs, feet rather slender, dirty white, tail usually a little shorter than head and body, brown above, paler below owing to the colour of the short, stiff bristles with which it is thinly clothed, rings coarse and conspicuous, about 40 to the inch; mammae, according to Thomas, 10 in number—3 pairs pectoral and 2 pairs inguinal.

Dimensions.—Measured in the flesh by Mr. Marshall; head and body 3·90; tail 3·45; hind foot ·82; ear ·68; from ear to nose-tip 1·05; skull length 1·05; breadth ·60; upper cheek teeth ·20.

Distribution.—The type is said by Brants to have come from the neighbourhood of Algoa Bay; Victorin obtained his specimens at Rondebosch near Cape Town, and the South African Museum has a good series of this species from the Middelburg, Griqualand West, and Pondoland divisions of the Colony, from Rustenburg in the Transvaal, and from Salisbury in Mashonaland.

137. *Mus coucha*. THE WHITE-NOSED RAT.

Mus coucha, *A. Smith, App. Report Exped. Explor. S. Afr.* p. 43 (1836); *Thomas, Proc. Zool. Soc.* 1882, p. 266; *Jentink, Notes Leyd. Mus.* ix, p. 174 (1887); *W. Selater, Ann. S. A. Mus.* i, p. 209 (1899).

Mus silaceus, *Wagner, Archiv. f. Naturg.* viii, pt. 1, p. 11 (1842).

Mus microdon, *Peters, Reise Mossamb. Säugeth.* p. 149, pl. xxxv, figs. 5, 6, pl. xxxvi, fig. 1 (1852).

Mus sp., *Thomas, Proc. Zool. Soc.* 1888, p. 13; *Pousargues Ann. Sci. Nat.* (8), iii, p. 14 (1897).

Description.—General colour dark brown on the back, growing paler on the sides and dirty white below, all the fur above and

below with strong slaty bases ; the fur of the back long, soft with pale brown and black tips intermixed, the latter much more abundant along the middle of the back ; tip of the nose white ; ears moderate and oval ; feet pure white, tarsal pads all rounded, claws almost concealed by the long white hairs which project beyond them ; tail about the same length or shorter than the head and body, the rings numbering about 44 to the inch, covered with short bristles, dark above, white below, hardly longer towards the tip ; mammae usually 16 in number—4 pairs pectoral, 4 pairs inguinal, in the specimen examined, but often exceeding this number up to 24.

Skull with a large antorbital foramen not much narrowed below with a small, not well-developed plate.

Synonymy.—This rat is found over the greater part of Africa, and it is in consequence of this and of the fact that it varies to a great extent throughout its range both in size and colour that it has received the names recorded above in the synonymy ; it seems probable, however, that as M. Pousargues and Mr. Thomas have stated, there is only one varying species.

Dimensions.—Measured in the flesh by Mr. Marshall ; head and body 4·30 (of a dried skin 5·0) ; tail 3·75 ; hind foot ·80 ; from ear to tip of nose 1·10 ; skull length 1·1 ; breadth ·60 ; upper molars ·20 ; ear ·70.

Distribution.—The type of the species was obtained by Sir A. Smith in Bechuanaland, and it is also known from Damaraland, while the South African Museum contains a considerable series from the Cape, Namaqualand, Griqualand West, Bedford and Middelburg divisions of the Colony, from the Waterberg district of the Transvaal, and from Salisbury in Mashonaland. Outside South Africa it has been recorded from French Congoland and Abyssinia through Central and East Africa and Nyasaland to Mozambique.

Habits.—This rat appears to be sometimes found in human habitations where it often becomes troublesome ; it has also been found nesting in acacia and other trees, as well as in holes in the earth ; Mr. Marshall's examples were trapped near vleys and ant-heaps and in the house.

138. *Mus musculus*. THE HOUSE MOUSE.

- Mus musculus*, *Linnaeus, Syst. Nat.* 12th ed. i, p. 83 (1766); *A. Smith, S. Afr. Quart. Journ.* ii, p. 154 (1834); *Layard, Cat. Mamm. S. Afr. Mus.* p. 50 (1862); *W. Selater, Ann. S. A. Mus.* i, p. 211 (1899).
Mus orientalis, *Cretzschmar, Atlas zu der Reise von Rüppell, Säugethiere*, p. 76, pl. xxx (1826); *Grill et Sundevall, K. Vet. Akad. Handl. Stockholm*, ii, 2, p. 18 (1858).
Mus modestus, *Wagner, Archiv. f. Naturg.* viii, pt. 1, p. 14 (1842); *id. Schreb., Säugeth. Suppl.* iii, p. 432, pl. 181 A (1843).

Description.—General colour above brown with a yellowish tinge, darkest along the back, lighter on the sides; below greyish, the fur slaty with somewhat paler tips, never white; ears large and nearly naked, when pressed forwards reaching the eye; hands and feet grey, never white, slender with the usual number of pads which are all circular; tail usually about the same length as the head and body, dark coloured, thinly covered with the usual bristles not increasing in length towards the tip, towards the base somewhat lighter below than above, but towards the tip dark all round, rings of the tail slender, about 50 to the inch; mammae 10 in number—3 pairs pectoral, 2 pairs inguinal.

Dimensions.—From a specimen in alcohol; head and body 3·20 (skin 3·70); tail 3·45; hind foot ·62; from ear to nose-tip ·90; skull length ·80, breadth ·45; upper molars ·15.

Distribution.—Cosmopolitan, being found in the habitations of civilised man throughout the world; it probably originated in the East; it is common in Cape Town houses, also in Port Nolloth and Pretoria, and probably in all other towns of South Africa of any size.

Habits.—The house mouse is omnivorous, though chiefly subsisting on grain and vegetables; it will live in amity in the same house as the brown rat, though the latter will endeavour if possible to get rid of the black rat; it is exceedingly active, more so than any of the field mice, and can climb a nearly vertical surface with great ease. Like the brown rat, it is very prolific, and produces 3 or 5 litters in the year, each consisting of four to eight blind young ones, which in turn commence breeding in less than twelve months.

139. *Mus minutoides*. THE FIELD MOUSE.

Mus minutoides, *A. Smith, S. Afr. Quart. Journ.* ii, p. 157 (1834); *Thomas, Proc. Zool. Soc.* 1882, p. 266; *id. ibid.* 1888, p. 13, [synonymy]; *de Winton, Ann. Mag. N. H.* (6), xx, p. 320 (1897); *W. Sclater, Ann. S. A. Mus.* i, p. 212 (1899).

Mus minimus, *Peters, Bericht Akad. Berlin*, p. 274 (1852); *id. Reise Mossamb. Säugeth.*, p. 153, pl. xxxiii, fig. 2, pl. xxxv, fig. 8 (1852); *Grill et Sundevall, K. Vet. Akad. Handl. Stockholm*, ii, 2, p. 17 (1858).

Description.—Small and slender, general colour above fawn, rather darker on the middle of the back through the admixture of black hairs; fur coarse with pale slaty bases; below pure white without slaty bases; the line of demarcation of colour being strictly defined; ears moderate, rounded and almost naked, a little darker along their margins; hands and feet scantily covered with white hairs, the claws rather large and not concealed by the hairs, pads normal in number and rounded, the skin between on both palms and soles being covered with numerous little rounded swellings; tail rather shorter than the head and body, pale, and covered with a fairly thick coating of white bristles not forming a bushy tip; mammae 8 to 10—2 to 3 pairs pectoral, 2 pairs inguinal.

Skull short and rather broad, anterior upper molar large, longer than the two posterior ones taken together, the anterior portion elongated and rather pointed, often bearing an extra heel in front not found in other South African species. It is chiefly on this that the genus *Leggada* was founded, but the character is not sufficiently distinct or constant to afford grounds for generic distinction.

Dimensions.—From a specimen in alcohol; head and body 2·40 (in skin 2·90); tail 1·90; hind foot ·50; from ear-opening to nose-tip ·70; skull length ·77, breadth ·40; upper molars ·15.

Distribution.—The type of this species was obtained near Cape Town by Sir A. Smith; the South African Museum possesses examples from various parts of the Cape division, from Clanwilliam, the Paarl, Natal, and Delagoa Bay, and it has been recorded from Knysna and Damaraland; it is, therefore, probably widespread throughout South Africa; outside these limits it extends through Mozambique and Nyasaland as far north as Wadelai and Uganda.

Habits.—This little mouse is said to be sometimes obtained in houses though more frequently occurring in fields where it makes short burrows.

The following three species are not represented in the collections of the South African Museum, and cannot at present be satisfactorily identified:—

140. *Mus namaquensis*.

Gerbillus namaquensis, *A. Smith, S. Afr. Quart. Journ.* ii, p. 160 (1834).

Mus namaquensis, *de Winton, Proc. Zool. Soc.* 1896, p. 802.

Description.—General colour above fawn, pencilled with black especially posteriorly, sides lighter; below bluish white; slaty bases above and to the sides, but not to the belly hairs; ears very long and broad with short white hairs inside, extremities covered with white hairs concealing the claws; tail a little shorter than the head and body, with a short, scanty covering of bristles, black above, white below (Smith).

This species seems allied to *M. paedulcus* and *M. auricomis*.

Dimensions.—Head and body 5·50; tail 4·75.

Distribution.—Namaqualand.

141. *Mus caffer*.

Mus caffer, *A. Smith, S. Afr. Quart. Journ.* ii, p. 157 (1834).

Description.—General colour blue-grey or brown-grey, lighter on the sides, below greyish-white; all the fur very long and soft; ears long and oval, the inner surface with a sprinkling of minute white hairs, the outer with blackish hairs; feet greyish-white; tail thinly covered with very short fine greyish hairs (Smith).

Dimensions.—Head and body 3·50; tail 3·0.

Distribution.—Kaffirland.

142. *Mus muscardinus*.

Mus muscardinus, *Wagner, Schreb. Säugeth. Suppl.* iii, p. 430 (1843).

Description.—Rusty yellow above, white below; ears naked; feet white; tail shorter than the head and body, clothed with dark bristles above, and white ones below.

Dimensions.—Head and body 5·10; tail 3·20; hind foot ·75.

Distribution.—Kaffraria, collected by Krebs.

Genus **CRICETOMYS.***Type.*

Cricetomys, *Waterhouse, Proc. Zool. Soc.* 1840,
p. 2 *C. gambianus*.

Large rat-like animals, with cheek pouches in which to store up food, but otherwise externally resembling *Mus*.

Skull with the nasal portion elongated; the antorbital plate but little developed, so that the antorbital foramen is somewhat oval and not so narrowed below as in *Mus*; incisive foramina short and their distance from the front edge of the molars about equal to their length; auditory bullae somewhat small.

Dentition as in *Mus*; incisors stout, bright yellow above and below in the male, the lower ones pale in the female in the specimen examined.

Molars rooted, the anterior upper tooth with three median, three outer and two inner tubercles, and indications of a ninth at the posterior edge of the tooth; middle upper molar with the usual six tubercles, and a small seventh antero-externally; posterior upper molar also with an extra cusp in a similar position.

Only one species, spread over the greater part of Africa, is generally recognised.

143. **Cricetomys gambianus.** THE GIANT RAT.

Cricetomys gambianus, *Waterhouse, Proc. Zool. Soc.* 1840, p. 2;
Peters, Reise Mossamb. Säugeth. p. 169 (1852).

VERNACULAR NAME.—Magwinga or Inyakwingi at Inhambane (Francis).

Description.—Of large size; general colour a pale brown becoming a dirty white below, fur somewhat harsh and coarse, with very pale slaty bases and yellow and black tips forming a slight grizzling; a dark ring round the eye; ears moderate, oval and almost naked; hands and feet brown above, the palms and soles with the usual pads arranged as in *Mus*, but very much larger; tail a little longer than the head and body, covered for the proximal two-thirds with short closely adpressed brown bristles which hardly conceal the scales; on the distal third of the tail the bristles are white above and below.

Female resembling the male, with, in the specimen examined, 10 mammae, 3 pairs pectoral, 2 pairs inguinal [according to Peters

there are 8 pairs of mammae] ; iris blue black ; skull described above.

Dimensions.—Of a male measured in the flesh by Mr. Francis ; head and body 15·0 ; tail 17·75 ; hind foot 2·85 ; ear 1·75 ; ear opening to nose-tip 3·0 ; skull, length condyle to incisors 2·85 ; breadth 1·40 ; upper cheek teeth ·40.

Distribution.—This large rat was originally described from the Gambia in West Africa, it has since been found in other parts of Tropical Africa as far as Angola on the west, and Inhambane in the east ; its occurrence at this latter place brings it within our limits, and the South African Museum is indebted to Mr. H. F. Francis for a pair thence obtained, from which the measurements have been taken.

Habits.—The giant rat appears to resemble the other rats in their habits ; it often takes up its abode in houses and drains, though in a natural state it lives in long burrows excavated just under the surface in the bush ; it is fond of fruit, especially, according to Francis, of the “wild orange,” which it drags entire to its burrows. It is stated to be excellent eating.

Genus **SACCOSTOMUS.**

Type.

Saccostomus, *Peters, Bericht Akad. Berlin, 1846,*

p. 258 (1847)..... *S. campestris.*

Description.—Robust, mouse-like animals with internal cheek pouches, short tails and limbs ; skull with the infraorbital opening not much narrowed below, but more or less triangular ; incisors small, not grooved ; molars like those of *Mus*, but with the tubercles soon lost, so that in most specimens the teeth consist of transverse ridges of enamel with depressions between.

This genus is allied to *Mus*, but differs in its shorter tail and in being provided with cheek pouches, in this respect resembling *Cricetus*, which contains the hamsters of the northern part of the Old World.

The genus is practically confined to South Africa, as the only other species described, besides those mentioned below, is *S. elegans* from the Nyika plateau in North Nyasaland.

Key of the South African Species.

- A. About 5 in. in length, above with a tinge of brown, below pure white..... *S. campestris*, p. 55.
 B. About 5·25 in. in length; above iron grey, below slate grey with grey drab tips to fur *S. mashonae*, p. 56.
 C. About 5 inches in length; colour light sandy ... *S. anderssoni*, p. 57.
 D. Smaller, about 3·25 in. in length; grey below ... *S. fuscus*, p. 57.

144. *Saccostomus campestris*. THE POUCHED RAT.

Saccostomus campestris, *Peters, Bericht Akad. Berlin*, 1846, p. 258 (1847); *de Winton, Ann. Mag. N. H.* (7), ii, p. 6 (1898); *W. Sclater, Ann. S. A. Mus.* i, p. 215 (1899).

Saccostomus lapidarius, *Peters, Reise Mossamb. Säugeth.*, p. 167, pl. xxxiv, fig. 3, pl. xxxv, fig. 12 (1852); *Bocage, Journ. Sci. Lisb.* (2), ii, p. 9 (1890) [habits]; *Lorenz, Ann. kk. Hofmus. Wien*, ix, notiz. p. 65 (1894) [Zambesi].

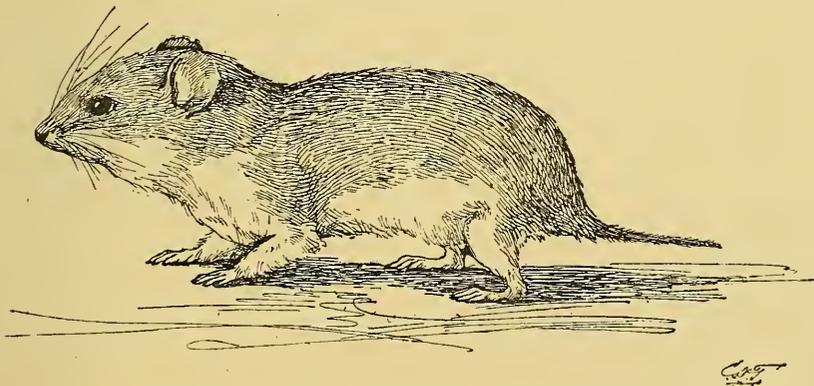


FIG. 96.—The Pouched Rat (*Saccostomus campestris*).

Description.—Form somewhat stout, the head especially being thick and broad; general colour above and on the sides dark drab brown, the basal portion of the fur slaty, the tips chiefly pale brown but with many black ones intermingled, darkest along the middle of the back; below pure white with no slaty bases to the fur, the line of demarcation between the colours very distinct; whiskers fine and mostly white; ears of moderate size, rounded, with a few

brown hairs only, about .60 inches in length; limbs rather short; hands and feet white, with pads and claws as in *Mus*, the proximal tarsal pad rounded; tail less than half the length of the head and body not scaly, with traces of the rings towards the base, covered with comparatively long rather outstanding hairs, dark above, light below; 10 mammae—3 pairs pectoral, 2 pairs inguinal; in the specimen examined there was no paler spot behind the ears as described by Peters.

The cheek pouches which open on either side of the mouth just beside the tongue, are very large, and extend along the side of the head as far back as the shoulders, a distance of about $1\frac{1}{2}$ in.; when filled with seeds as is often the case, they form two large swellings on either side of the head.

Dimensions.—From a specimen in alcohol; head and body 5.0; tail 1.70; hind foot .65; from ear-opening to nose-tip 1.30; skull length 1.30; breadth .70; upper cheek teeth .20.

Distribution.—This species was originally described from the lower Zambesi valley by Peters; it is also recorded from Nyasaland, while there are specimens in the South African Museum which seem to be referable to this species from the Port Elizabeth, Albany, Griqualand West, and the Bedford districts of the Colony, and from Zululand; it is, therefore, fairly widely distributed over the south-eastern parts of Africa.

Habits.—The pouched rat seems to resemble, in some respects, the well-known hamster of Europe in its habits. It is usually found about cultivated fields, where it forms a burrow with separate entrance and exit, and storehouses communicating with it, in which are collected grains of various descriptions; it is sometimes eaten by the natives.

145. *Saccostomus mashonae*. THE MASHONALAND POUCHED RAT.

Saccostomus mashonae, *de Winton, Proc. Zool. Soc.* 1896, pp. 804, 805; *W. Sclater, Ann. S. A. Mus.* i, p. 216 (1899).

VERNACULAR NAME.—Sugu of Mashonas (Darling).

Description.—General colour above iron-grey, sides somewhat paler, below slaty-grey with grey drab tips to the fur; tail thinly covered with hair with longer white hairs standing out somewhat like those on the tail of a shrew.

Skull with the middle upper molar with a small though well-

developed extra outer anterior cusp, barely perceptible in the other species.

This and the colour distinguish this species from *S. campestris*.

Dimensions.—Of the type; head and body 5·27; tail 1·37; hind foot ·87; skull length 1·39, breadth ·68; upper molars ·19.

Distribution.—The type of this species was obtained by Mr. J. ff. Darling at Mazoe in Mashonaland; there is no example of it in the South African Museum.

146. *Saccostomus anderssoni*. ANDERSSON'S POUCHED RAT.

Saccostomus lapidarius, *Thomas, Proc. Zool. Soc.* 1882, p. 266, pl. xiv, fig. 2 [*nec Peters*].

Saccostomus mashonae, *de Winton, Ann. Mag. N. H.* (6), xx, p. 322 (1897) [*nec de Winton, Proc. Zool. Soc.* 1896, p. 804].

Saccostomus anderssoni, *de Winton, Ann. Mag. N. H.* (7), i, p. 6 (1898); *W. Sclater, Ann. S. A. Mus.* i, p. 216 (1899).

Description.—Resembling *S. campestris* in form and dimensions but differing in colour, being of a light, somewhat sandy tint, instead of drab brown.

Distribution.—Damaraland and Angola.

147. *Saccostomus fuscus*. THE SMALL POUCHED RAT.

Saccostomus fuscus, *Peters, Reise Mossamb. Säugeth.* p. 168, pl. xxxvi, fig. 4 [animal], pl. xxxv, fig. 13 [skull] (1852); *W. Sclater, Ann. S. A. Mus.* i, p. 216 (1899).

Description.—This species resembles the previous one, but is smaller, and has a more pointed nose and more thickly haired ears; below it is grey, and its claws are black.

Dimensions.—Head and body 3·25; tail 1·10; hind foot ·70; skull length 1·0.

Distribution.—This species was also discovered by Peters further south than the former one, in the neighbourhood of Inhambane in Southern Mozambique. There is no specimen in the South African Museum.

Genus **ACOMYS.***Type.*

Acomys, *Is. Geoffroy, Ann. Sci. Nat.* (2), x, p. 126
(1838) *A. cahirinus.*

Small mouse-like animals with the hinder part of the back covered with flattened, grooved, stiff spines; 6 mammae—1 pair axillary, 2 pairs inguinal.

Skull with very small incisive foramina and with the coronoid process of the mandible but little developed; in other respects resembling *Mus*.

About thirteen species of spiny mice have been described; most of them are found in Africa and in the drier south-western parts of Asia; one species is known from Celebes.

Key of the South African Species.

- A. Tail shorter than the head and body; greyish brown above..... *A. subspinosus*, p. 58.
B. Tail longer than the head and body; rufous brown above..... *A. sclousi*, p. 59.

148. Acomys subspinosus. THE SPINY MOUSE.

Mus subspinosus, *Waterhouse, Proc. Zool. Soc.* 1837, p. 104.

Acomys subspinosus, *Thomas, Ann. Mag. N. H.* (6) xviii, p. 270 (1896); *W. Sclater, Ann. S. A. Mus.* p. 217 (1899).

Description.—Back covered with flat, bristle-like spiny hairs; body above greyish brown getting paler on the sides, below pure white; a yellowish ring round the eyes; ears moderate; tail shorter than the head and body.

Dimensions.—Of the type; head and body 3·33; tail 2·93; from ear-opening to tip of nose ·88; hind foot ·70.

Distribution.—The type is described as having come from the “Cape of Good Hope”; no more exact locality is recorded; a spiny mouse obtained on the top of Table Mountain, recently acquired by the South African Museum, seems referable to this species, though the tail is longer than the head and body.

149. *Acomys selousi*. SELOUS' SPINY MOUSE.

Acomys selousi, de Winton, *Proc. Zool. Soc.* 1896, p. 807, pl. xl, fig. 2 [animal].

Description.—Smoky rufous-brown or coffee-coloured above, more smoky on the face and darker on the back; clear chestnut-brown on the cheeks, sides, and on a patch behind the ear; below pure white, the two colours sharply distinguished; tail longer than the head and body, brown above, paler below.

Dimensions.—Head and body 3·25; tail 3·63; hind foot ·70; skull length 1·0, breadth ·50; upper molars ·20.

Distribution.—The type was obtained by Mr. Selous on his farm near Bulawayo; it has since been recorded from Nyasaland; there are no specimens in the collections of the South African Museum.

Genus **DASYMYS**.

Type.

Dasymys, Peters, *M. B. Akad. Berlin*, 1875, p. 12 (1876)...*D. incontus*.

Rat-like animals with moderate somewhat hairy ears and rather coarse fur; tail moderately scaly, and very sparsely haired; skull somewhat intermediate between that of *Gerbillus* and *Mus*; very

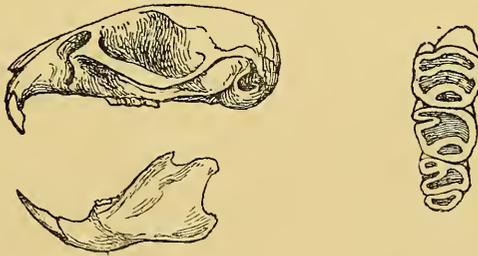


FIG. 97.—Skull (nat. size) and left upper molars (enlarged) of *Dasymys incontus*.

narrow in the interorbital region, with the front edge of the antorbital plate distinctly concave, the top angle being somewhat pointed and projecting; coronoid process long; incisors broad, plain and ungrooved; molars composed of transverse laminae showing distinct traces of a triple row of cusps, and intermediate between *Mus* and *Gerbillus*.

In addition to the species described below, two others are recognised from Angola and Central Africa respectively.

150. **Dasymys incomtus.** PETER'S WATER RAT.

Mus incomtus, *Sundevall, Oefvers. Akad. Forh. Stockholm* 1846, p. 120 (1847).

Dasymys gueinzii, *Peters, M. B. Akad. Berlin*, 1875 p. 12, pls. i, ii (1876).

Dasymys incomtus fuscus, *de Winton, Proc. Zool. Soc.* 1896, p. 804.

Dasymys incomtus, *W. Sclater, Ann. S. A. Mus.* i, p. 218 (1899).

Description.—Form stout with very thick fur, which is very dark brown above, paler on the sides and greyish below, with dark slaty bases throughout; snout moderate; ears short, broad and round, fairly well clothed with hairs; the feet are dark, but in structure like those of *Mus*; tail shorter than the head and body, of one colour throughout, ringed and scaled, covered with short bristles like those of *Mus decumanus*, the rings running about twenty-five to the inch; the upper incisors are smooth, broad and dark yellow, the lower ones much paler.

Geographical Race.—A dark variety is described by de Winton from Mashonaland resembling the type in size and general characters, but differing in colour, being a uniform sooty black with only slight yellow grizzling; the upper incisors are deep orange-red, the lower brownish honey coloured.

Dimensions.—Of the type; head and body 6·25; tail 5·83; hind foot 1·37. Of the dark variety taken from the flesh; head and body 6·25; tail 5·75; hind foot 1·25; skull length 1·45; breadth ·79; upper molars ·28.

Distribution.—The type of the species was obtained by the Swedish collector, Wahlberg, near Durban, that of the dark variety at Mazoe, in Mashonaland, by Mr. ff. Darling; it is also recorded from Nyasaland. Mr. Marshall has recently presented an example to the South African Museum from Salisbury.

Habits.—This animal is probably a water rat; Mr. Marshall's specimen was trapped on the bank of a stream.

Genus **ARVICANTHIS.***Type.*

- Arvicantis**, *Lesson, N. Tabl. R. A. Mamm.* p. 147
 (1842) *A. niloticus.*
- Isomys**, *Sundevall, K. Vet. Akad. Handl. Stockholm*
 1842, p. 219 (1843) *A. niloticus.*

Rat-like animals with hairy ears, covered with a woolly under-fur, through which project the longer, coarser hairs; the first and fifth fingers and toes are very short, much more so than in the true rats. The plan of coloration is never plain, but consists of lines or spots.

Skull and dentition as in *Mus*; mammae 8, 2 pairs pectoral, 2 pairs inguinal.

This genus is hardly separated from *Mus* by any definite characters, and its recognition is more a matter of convenience than anything else; some half-dozen species are described from various parts of Africa, while one extends into the south-western part of Asia.

Key of the South African Species.

- A. With four black stripes along the back, fifth finger normal, fairly well developed *A. pumilio*, p. 61.
- B. With only one black median dorsal stripe; fifth finger quite rudimentary with a flat nail *A. dorsalis*, p. 64.

151. **Arvicantis pumilio.** THE STRIPED MOUSE.(a) **A. pumilio typicus.**

Mus pumilio, *Sparman, K. Vet. Akad. Handl. Stockholm*, 1784, p. 339, pl. vi; *id. Voyage to Cape, English trans.*, 8vo. ed. ii, p. 375, pl. vii. (1785); *Brants, Het Geslacht der Muizen* p. 103 (1827); *Smuts, Enum. Mamm. Cap.* p. 36 (1832); *A. Smith, S. Afr. Quart. Journ.* ii, p. 153 (1834); *id. Illustr. Zool. S. Afr. Mamm.* pl. xlvi, fig. 1 (1845); *Sundevall, Oefvers. Akad. Forh. Stockholm* 1846, p. 88 (1847); *Grill, K. Vet. Akad. Handl. Stockholm* ii, 2, p. 17 (1858); *Layard, Cat. Mamm. S. Afr. Mus.* p. 50 (1862); *Thomas, Proc Zool. Soc.* 1882, p. 266.

Mus lineatus, *F. Cuvier, Hist. Nat. Mamm.* livr. 61 (1829).

Mus donavani, *Lesson, Man. Mamm.* p. 268 (1827).

Mus vittatus, *Wagner, Arch. Naturg.* viii, pt. 1, p. 11 (1842).

Mus striatus, *Sundevall, Oefvers. Akad. Forh. Stockholm* 1846, p. 88 (1847).

Arvicantis pumilio, *W. Selater, Ann. S. A. Mus.* i, p. 219 (1899).

(b) *A. pumilio dilectus*.

Arvicantis pumilio dilectus, *de Winton, Proc. Zool. Soc.* 1896, p. 803.

(c) *A. pumilio bechuanae*.

Isomys p. bechuanae, *Thomas, Proc. Zool. Soc.* 1892, p. 551.

VERNACULAR NAME.—Schancey of Mashonas (Darling).

Description.—General colour greyish brown with a slight tinge of reddish-yellow, under-fur soft, fine and dark slaty in colour,



FIG. 98.—The Striped Mouse (*Arvicantis pumilio*),

through which project considerably coarser hairs, white, black, and yellowish brown; along the back from the shoulders to the root of the tail run four black longitudinal stripes, separated by three narrower inter-spaces, of which the two outer are a little paler

than the inner, of the same colour as the back; the black stripes vary considerably in distinctness, the two median ones usually originating in a single dark median stripe on the head from between the eyes and meeting at the root of the tail; below white, but the hair not very thick, so that the slaty black of the skin is visible, giving the belly a dirty white colour (in some cases the slaty bases to the fur are strongly marked, in other cases they are quite absent); head rat-like, a pale ring round the eye; the ears rounded, anteriorly and posteriorly with a fairly thick covering of rufous hairs with a black edging along the inner margin of the conch; extremities the same colour as the back, but paler. Skin of the soles and palms dark, almost black, toes as in *Mus*, but the first and fifth proportionately shorter, pads as in *Mus*, but the second proximal one very small; claws black; tail scaled and ringed, about thirty-nine to the inch, covered with bristles increasing in length towards the tip; the bristles are chiefly black along the dorsal line, and pale yellow below, but the skin of the tail is black throughout; mammae eight, two pairs pectoral, two pairs abdominal.

Geographical Races.—The striped rat varies very considerably both in size and in colour.

In Bechuanaland there occurs a large, almost sandy race, with the dorsal stripes very faint and with pale-coloured ears, described by Thomas.

In Mashonaland, on the other hand, a darker race than the normal is found with very dark, well-defined dorsal stripes and a dusky belly washed with orange.

The collection of the South African Museum consists chiefly of spirit-preserved examples of this mouse which are not of much service for the discrimination of slight colour variations, but some skins from Pondoland in the extreme east of the Colony appear to approach Mr. de Winton's "*dilectus*," and are certainly distinctly darker and more richly coloured than what may be called the typical race from the neighbourhood of Cape Town.

Dimensions.—As has been remarked by former writers, there is much variation in the dimensions of this species. In the case of spirit preserved specimens in the South African Museum, the length of the head and body varies from 3·60 to 4·90, and the tails from 3·70 to 5·90. The following are the dimensions of an individual from the neighbourhood of Cape Town measured in the flesh; head and body 4·20; tail 4·10; hind foot 1·0; from ear to tip of nose ·90.

The dimensions of the sub-species *A. p. bechuanæ* measured in the flesh are ; head and body 5·0 ; tail 4·62 ; hind foot 1·0. Of the sub-species *A. p. dilectus* ; head and body 4·25 ; tail 3·25 ; hind foot ·75 ; the dimensions of a typical skull are ; length 1·10, breadth ·60 ; upper cheek teeth ·20.

Distribution.—The type of this species was obtained by Sparrman on the banks of the Slangen River, close to Cape St. Francis, in what is now the Humansdorp division of the Colony. The species is very common everywhere all over South Africa, and extends northwards to Great Namaqualand on the west, and through Nyasaland as far as Mianzini near Lake Naivasha in British East Africa, whence Thomas has described a third sub-species, *A. p. dimidiatus* rather smaller and more brightly coloured than the typical one. As already stated, the two other sub-species, *A. p. bechuanæ* and *A. p. dilectus*, come from Bechuanaland and Mazoe in Mashonaland respectively.

In the collections of the South African Museum there are specimens from the Cape, Clanwilliam, Namaqualand, Stellenbosch, Paarl, Caledon, Bedford, Albany and Pondoland divisions of the Colony from the Transvaal, Mashonaland and Delagoa Bay.

Habits.—This rat is found always in bushy places among under-wood, where it forms a nest among the dried leaves and branches for the bringing up of its young. Its voice is a rather harsh metallic chirp.

152. *Arvicanthis dorsalis*. THE SINGLE-STRIPED MOUSE.

Mus dorsalis, *A. Smith, Illustr. Zool. S. Afr. Mamm.* pl. xlvi. fig. 2 (1845) ; *Bocage, Journ. Sci. Lisbon* (2), ii, p. 16 (1890).

Arvicanthis dorsalis, *de Winton, Proc. Zool. Soc.* 1896 p. 803 ; *W. Sclater, Ann. S. A. Mus.* i, p. 221 (1889).

VERNACULAR NAME.—Chewangaranga of Mashonas (Darling).

Description.—General colour above reddish brown, the fur coarse like that of the other species ; a single median black stripe running from the neck to the root of the tail ; below white with slaty bases to the fur ; the skin white, not slaty as in the other species ; ears rather broad, covered with coarse hairs, mingled reddish and black, the former prevailing ; extremities of the same colour as the sides but white inside ; the first and fifth digit of the fore limb very small and rudimentary, the latter provided with a

small flat nail, so that the hand bears only three clawed digits; sole of the hind foot with three well-developed pads only, those at the base of the first and fifth toes and the one next to these proximally being very small or absent.

Tail longer than the head and body, but in other respects resembling that of *A. pumilio*, the dorsal stripe being continued along its whole length. Mammae 8, 2 pairs pectoral, 2 pairs inguinal. Incisors broad and stout but smooth, not furrowed.

Dimensions.—From a specimen preserved in spirit; head and body 4·70; tail 5·60; from ear-opening to tip of nose 1·40; hind foot 1·10. Of a specimen measured in the flesh by Mr. Marshall; head and body 4·70; tail 4·90; hind foot 1·12; ear ·62; skull length 1·20; breadth ·67; upper molars ·25.

Distribution.—Sir A. Smith, the describer of this species, states that it is common to the north of the Orange River, but rare to the south; it has also been obtained within our limits by Mr. Darling at Mazoe, and by Mr. Marshall at Umfuli, in Mashonaland, and beyond in Angola, Mozambique, and Nyasaland.

Genus **GOLUNDA.**

Type.

Golunda, *Gray, Charlesw. Mag. N. H.* i, p. 586 (1837) ... *G. ellioti*.
Pelomys, *Peters, Reise Mossamb. Säugeth.* p. 157 (1852)... *G. fallax*.

Rat-like animals with short rounded heads and somewhat coarse bristly fur; the fifth finger of the fore limb is very short and rudimentary; the tail is long, scaly, and rat-like; skull with compressed palate; upper incisors grooved, molars low and broad with tubercles arranged as in *Mus*, when worn exhibiting a peculiar series of semicircular flattened lobes arranged in a triple row in the upper, in a double row in the lower jaw.

The grooving of the incisors and the shortness of the fifth finger at once separate this genus from *Mus*, which it otherwise closely resembles.

Four species are recognised. One of these is found in India, two in West Africa, and the remaining one, described below, in South Africa.

153. *Golunda fallax*. THE SWAMP RAT.

Pelomys fallax, *Peters, Reise Mossamb. Säugeth.* p. 157, pl. xxxiii, fig. 3, pl. xxxv, fig. 9 (1852); *Bocage, Journ. Sci. Lisbon.* (2), ii, p. 17 (1890) [habits in Angola].

Golunda fallax, *de Winton, Proc. Zool. Soc.* 1896, p. 804; *W. Sclater, Ann. S. A. Mus.* p. 222 (1899).

Description.—General colour above speckled dark brown and yellowish, slightly paler on the sides and grey below, fur harsh and bristly, a somewhat indistinct dark dorsal stripe along the back; tip of the nose rufous-brown, ears moderate, round, fairly covered with rufous hairs; fifth finger very short, with a nail-like claw; tarsus with only five pads, the proximal one being absent, and the three next to it being very small; tail shorter than the body, dark above, paler below, covered with sparse bristles, the rings about 25 to an inch; mammae 8, 2 pairs pectoral, 2 pairs inguinal.

Skull with the nasal region exceedingly short and broad; incisors with a strong longitudinal furrow rather towards the outer side of the tooth, molars much as in *Mus* but rather broader.

Dimensions.—Head and body 6·75; tail 5·25; hind foot 1·37; skull length 1·12. (Peters.)

Distribution.—This species was described by Peters from the Zambesi Valley in Mozambique. It has since been recorded from Nyasaland and Angola; within our limits it was obtained by Mr. Darling at Mazoe, in Mashonaland. It is represented in the collections of the South African Museum by two skins from Nyasaland.

Habits.—This rat is always found in marshy places or near rivers where it forms deep burrows; it is not regarded as destructive and is eaten by the natives of Angola, according to Anchieta.

Subfamily CRICETINAE.

Genus MYSTROMYS.

Type.

Mystromys, *Wagner, Arch. Naturges.* vii, pt. 1, p. 132

(1841) *M. albipes*.

Rat-like animals with soft, rather woolly fur, and large broad ears, with short tails and a somewhat hairy tarsus; skull with the antorbital foramen forming a long oval, hardly at all narrowed

below, and the perpendicular plate but little developed, not extending forwards beyond the upper root of the zygoma; incisors ungrooved, molars rooted, those of the upper jaw with the tubercles arranged in a double instead of a treble row as in the *Murinae*, those of the lower jaw as in the *Murinae* in a double row.

This genus appears to be confined to Central and South Africa, one species having been described by Noack from the former region.

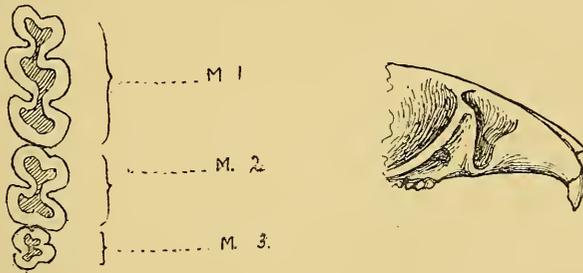


FIG. 99.—Left upper molars (enlarged) and the anterior half of the skull ($\times 2$) of *Mystromys albicaudatus*.

To the same subfamily belong the hamsters of the Palaearctic region and a number of curious rat-like genera from Madagascar and from the New World, in neither of which two latter places are any true *Murinae* indigenous.

Key of the South African Species.

- A. Larger about 7·0 inches, below bluish white *M. albipes*, p. 68.
 B. Smaller about 4·0 inches, below only slightly paler than above *M. albicaudatus*, p. 67.

154. *Mystromys albicaudatus*.—THE WHITE-TAILED RAT.

Otomys albicaudatus, *A. Smith, S. Afr. Quart. Journ.* ii, p. 148 (1834);
id. Illustr. Zool. S. Afr. Mamm. pl. xxxiii. (1841).

Malacothrix albicaudatus, *Wagner, Schreb. Säugeth. Suppl.* iii, p. 498 (1843).

Mystromys albicaudatus, *de Winton, Ann. Mag. N. H.* (7), ii, p. 7 (1898);
W. Sclater, Ann. S. Afr. Mus. i, p. 223 (1899).

Description.—General colour dark brown above, somewhat paler below, the fur being long, soft, and somewhat woolly, dark slate for

the greater part of its length with brown tips; space round the nose and chin pure white; ears very large, broad, and patulous about $\cdot 7$ by $\cdot 6$ in., the inner half of the conch nearly white, the outer half black, covered anteriorly and posteriorly with a few silvery and black hairs. Limbs slender, hands and feet covered with white hairs, lengthened so as to almost conceal the claws; pads normal in number, but the two proximal ones of the sole very small and rounded, the naked portion of the sole very narrow, much encroached on by the long white hairs on either side, so that the whole tarsus has a very hairy appearance; tail short, less than half the length of the head and body, almost white, obscurely ringed, but these are almost hidden by the dense covering of short hairs above, with a few black hairs intermixed, below pure white.

Incisors smooth and very pale yellow.

The description is drawn up from a specimen in the South African Museum which has been compared with the type in the British Museum. It may be noticed that in Smith's original description the incisors are described as smooth, in the subsequently published "Illustrations" as grooved.

Dimensions.—From the example in alcohol in the South African Museum; head and body $3\cdot 85$; tail $1\cdot 68$; hind foot $\cdot 95$; from ear-opening to nose-tip $1\cdot 20$; skull length $1\cdot 22$, breadth $\cdot 65$; upper cheek teeth $\cdot 25$.

Distribution.—Sir A. Smith met with this species in the neighbourhood of Grahamstown and to the north of the Orange River; the single example in the Museum is also from the neighbourhood of Grahamstown. There is an example in the British Museum from the Transvaal.

Habits.—This species, according to Smith, is found on grassy flats where it forms its burrows; it is nocturnal, but is active and bold, especially during rainy weather.

155. *Mystromys albipes*. THE WHITE-FOOTED RAT.

Mystromys albipes, *Wagner, Arch. Naturg.* vii, pt. 1, p. 133 (1841); *id.*

Schreb. Säugeth. Suppl. iii, p. 500, pl. clxxvi a (1843).

Euryotis lanuginosa, *Lichtenstein, Verzeich. Säugeth. u. Vögel n Kaffernlande, Berlin*, p. 10 (1842).

Mystromys lanuginosus, *W. Sclater, Ann. S. Afr. Mus.* i, p. 224 (1899).

Description.—General colour above light brown, below white, the hair thick, soft and rather woolly, dark slate for the greater

part of its length, the tips mingled brown and white, the former predominating along the middle of the back, the latter on the sides; tip of the snout somewhat pale, not white, ears very large, about $\cdot 9$ by $\cdot 75$, darker towards the margin, covered with thin greyish hairs; limbs short and slender, hands and feet white above, the claws almost concealed by the long white hairs, pads as in the other species; tarsus with a very narrow naked line almost concealed by the long white hairs; tail short, obscurely ringed, covered with a thick coating of hairs, white above and below.

Dimensions.—From an old mounted specimen; head and body 7.0; tail (broken) about 2.0; hind foot 1.0; from ear-opening to nose-tip 1.40; skull length about 1.45, breadth $\cdot 72$; upper cheek teeth $\cdot 25$.

Distribution.—The single specimen from which the description is taken, and which appears to be identical with that described by Wagner, was obtained some years ago on the Cape Flats, near Cape Town, and is now in the South African Museum.

Family BATHYERGIDAE.

Rodents adapted to underground life; of somewhat cylindrical form, with short limbs and tail, and with very small or rudimentary eyes and no ear conch. Skull with a very narrow palate, not wider than the molar teeth; antorbital foramen usually rather small and rounded; no perpendicular plate; mandible like that of the hystricine rodents with the angular portion springing from the outside of the bony covering of the lower incisors; incisors very large, grinding teeth rooted. The family is a purely Ethiopian one, containing in addition to the South African genera two others, *Myoscalops* closely resembling *Georychus* in external appearance, and the very curious sand-rats of the genus *Heterocephalus*, with their naked bodies and peculiar physiognomy, hitherto found only in Somaliland.

Key of the South African Genera.

- A. Upper incisors grooved; claws, especially of the forefeet, long and strong..... *Bathyergus*, p. 71.
 B. Upper incisors smooth; claws of both feet rather small and ill-developed *Georychus*, p. 73.

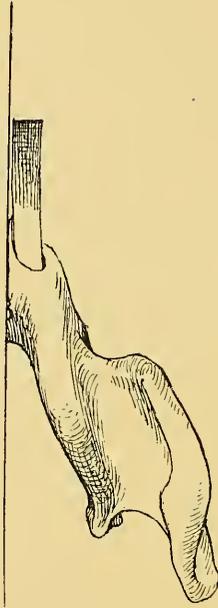


FIG. 100.—Lower jaw of *Bathyergus maritimus*, from below, to show how the angle of the mandible springs from outside the bony casing of the lower incisor.

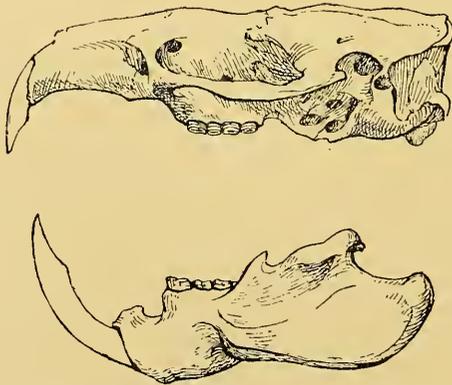


FIG. 101.—Side view of the skull of *Bathyergus maritimus* ($\frac{1}{3}$ nat. size).

Genus **BATHYERGUS.***Type.*

- Bathyergus**, *Illiger, Prodr. Syst. Mamm.* p. 86
(1811) *B. maritimus.*
- Orycterus**, *Waterhouse, Ann. Mag. N. H.* (1), viii,
p. 82 (1842)..... *B. maritimus.*

Burrowing rodents with small eyes, no ear conch, and the toes of the fore feet with specially long claws, of which that of the second digit is considerably the longest; hind foot with the third toe the longest.

Skull massive with an almost straight upper profile and a small sub-circular antorbital foramen.

Dentition.—i. $\frac{1}{1}$, c. $\frac{0}{0}$, p.m. $\frac{1}{1}$, m. $\frac{3}{3}$ = 20; upper incisors large, broad, and grooved, lower incisors also large but smooth; molars simple with re-entering folds in youth only.

Only the single species below described is known.

156. **Bathyergus maritimus.** THE SAND-MOLE.

Mus maritimus, *Gmelin, Linn. Syst. Nat.* p. 140 (1788).

Mus suillus, *Schreber, Säugeth.* iv, p. 715, pl. cciv B (1792).

Georychus maritimus, *A. Smith, Descr. Cat. S. Afr. Mus.* p. 28 (1826).

Bathyergus maritimus, *Smuts, Enum. Mamm. Cap.* p. 48 (1832); *A. Smith, S. Afr. Quart. Journ.* ii, p. 170 (1834); *Layard, Cat. Mamm. S. Afr. Mus.* p. 55 (1862); *W. Sclater, Ann. S. A. Mus.* i, p. 225 (1899).

Orycterus maritimus, *Waterhouse, Ann. Mag. N. H.* (1), viii, p. 81, pl. ii, fig. 1 [skull] (1842).

LITERATURE.—Masson (1776), p. 304, early mention of the species; Buffon, *Suppl.* vi (1782), p. 255, earliest description; Sparrman (1785) ii, p. 212, note on its occurrence, and identification with the African rat of Pennant; Thunberg (1795) i, pp. 262, 285, described as the "witte mol" from near Cape Town with account of habits; Moseley (1892), p. 125, habits near Simonstown.

VERNACULAR NAMES.—Zand Mol or Duin Mol of the Colonists; Kauhowba (*i.e.*, Hippopotamus mole) of the Hottentots (Allamand in Buffon).

Description.—General colour slaty grey with a distinct brown tinge on the back, fur soft, thick and rather woolly, slaty for the greater part of its length, the tips on the back being pale brown; head somewhat acutely pointed, a considerable flesh-coloured patch surrounding the nostrils and reaching the edge of the upper lip;

the incisors so long that they are always visible, the lips not being large enough to cover them; eyes about as large as the head of a large pin, the eyeballs being about .10 in. in diameter. External ears absent, a small round hole surrounded by a fleshy-coloured bare margin marking the external opening of the meatus; limbs very short, the fore feet with five toes all with large strong claws much better developed than those of the hind feet, the second the longest, then the third, fourth, fifth, and first in order; hind foot with a broad naked sole, along the sides of which run fringes of

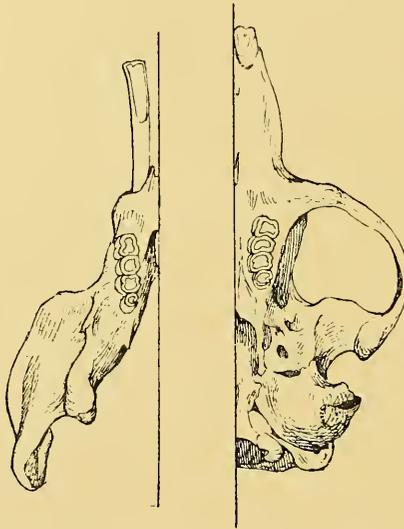


FIG. 102.—Left half of palate and lower jaw from above ($\frac{1}{5}$ nat. size) of *Bathyergus maritimus*, to show the modifications of the skull in this family.

white stiff bristle-like hairs; the five toes of the hind foot are all clawed, the middle one being the longest, the claws somewhat flattened and nail-like; tail very short, covered on the sides and below with stiff white bristles.

Incisors white, those of the upper jaw strongly grooved down the middle of the tooth; those of the lower very long, sometimes over three inches, of which half protrudes beyond the socket; these teeth are separated by a slight interval; the molars somewhat oval in section, decreasing in size from in front backwards, surrounded by a ring of enamel with infoldings gradually disappearing with age.

White and piebald varieties of this animal are not uncommon.

Dimensions.—From a skin; head and body 16·50; tail 1·25; hind foot 1·87; from ear-opening to nose-tip 1·50; skull length 2·70; breadth 1·90; upper molars ·50.

Distribution.—This animal appears to be found only along the coast and never inland; it is abundant near Cape Town, and seems to extend northwards to Namaqualand, and eastwards as far as Knysna certainly, perhaps as far as Bathurst. All the specimens in the South African Museum are from the neighbourhood of Cape Town.

Habits.—The sand-mole was known to Masson and la Caille and other early travellers, but the first satisfactory description of it was transmitted to Allamand in Holland by Colonel Gordon (who commanded the Dutch forces before the first taking of the Colony by the English in 1795), and was reprinted by Buffon. The animal is found only in sandy places on dunes and flats where it forms long burrows, throwing up the excavated sand in large heaps over a foot high, the freshness of which will give an indication of the near neighbourhood of the animal. In some parts of the Cape Flats the ground is completely riddled by these burrows, so that riding becomes very dangerous. Moseley states that the most successful manner of securing the mole is to remove the sand quickly from a freshly made heap and then retire a little and in a short time the mole comes up to fill up the hole and can then be easily shot.

The food of the sand mole consists of bulbs and roots; when captured it gives vent to a series of grunts and is very savage, biting with great ferocity with its powerful incisors and always ready for opposition; on the surface of the ground its powers of locomotion are somewhat limited; it can make use of its eyes to a certain extent. By those who have tasted it, its flesh is considered to be very palatable.

Genus **GEORYCHUS.**

Type.

Georychus, Illiger, *Prodr. Syst. Mamm.*, p. 87
(1811) *G. capensis.*

Mole-like Rodents closely resembling *Bathyergus* externally, but with quite small claws to both feet, the second and third toes of both fore and hind feet are about equal, and the longest.

Skull with a somewhat rounded upper profile; teeth as in *Bathyergus*, but with the upper incisors quite smooth.

This is a purely African genus; in addition to those described below, there are some three or four species known from Angola, Central and East Africa.

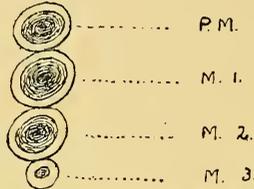


FIG. 103.—Left upper molars of *Georychus hottentotus* (enlarged).

*Key of the South African Species.**

- A. With a white spot on the occiput.
- a. Larger about 8·0 in. in length.
- a'. With white spots on the snout, eyes and ears; skull with the premaxillae not extending back behind the nasals; upper molars increasing in size from in front backwards *G. capensis*, p. 74.
- b'. With white patches below the ears meeting on the throat *G. damarensis*, p. 76.
- b. Smaller, about 5·0 in. in length; premaxillae forming a suture behind the nasals..... *G. darlingi*, p. 77.
- B. With no white occipital spot; small, about 5·0 in.
- c. Premaxillae extending back behind the nasals but not forming a suture; upper molars decreasing in size from in front backwards *G. hottentotus*, p. 77.
- d. Premaxillae not extending backwards beyond the nasals..... *G. nimrodi*, p. 78.

157. *Georychus capensis*. THE BLES MOL.

Mus capensis, Pallas, *Glives*, pp. 76, 172, pl. vii (1779).

Bathyergus capensis, Smit's, *Enum. Mamm. Cap.* p. 49 (1832); A. Smith, *S. Afr. Quart. Journ.* ii, p. 170 (1834); Waterhouse, *Ann. Mag. N. H.* (1), viii, p. 81, pl. ii, fig. 2 (1842).

Georychus capensis, A. Smith, *Descr. Cat. S. Afr. Mus.* p. 29 (1826);

* *Georychus lugardi*, de Winton, *Ann. Mag. N. H.* (7) i. p. 253 (1898), has been accidentally overlooked; it is a small species with a small white spot on the crown, but with the premaxillae not extending back behind the nasals. The type specimen was obtained in the Kalahari between Palapye and Lake Ngami.

Grill, *K. Vet. Akad. Handl. Stockholm*, ii, 2, p. 19 (1858) [Cape Town and Knysna]; *Layard*, *Cat. Mamm. S. Afr. Mus.* p. 55 (1862); *Gray*, *Proc. Zool. Soc.* 1864, p. 123; *P. L. Sclater*, *Proc. Zool. Soc.* 1889, pp. 246, 449 [white var.]; *Thomas*, *Ann. Mag. N. H.* (6), xvi, p. 238 (1895); *W. Sclater*, *Ann. S. A. Mus.* i, p. 227 (1899).

LITERATURE.—*Masson* (1776), p. 305, allusion to the species as the blesmol; *Buffon* (1776), *Suppl.* iii, p. 193, and (1782), *Suppl.* vi, p. 251, earliest description of this animal; *Sparman* (1785), ii, p. 211, note on habits and occurrence; *Thunberg* (1795), i, p. 262, described as *Marmota capensis*; *Moseley* (1892), p. 125, occurrence and habits near Simonstown.

VERNACULAR NAME.—Blesmol of Dutch Colonists.

Description.—General colour above a rusty brown becoming paler on the sides, and slaty grey below; the fur soft and thick, and with slaty bases throughout, except on the spots; head becoming

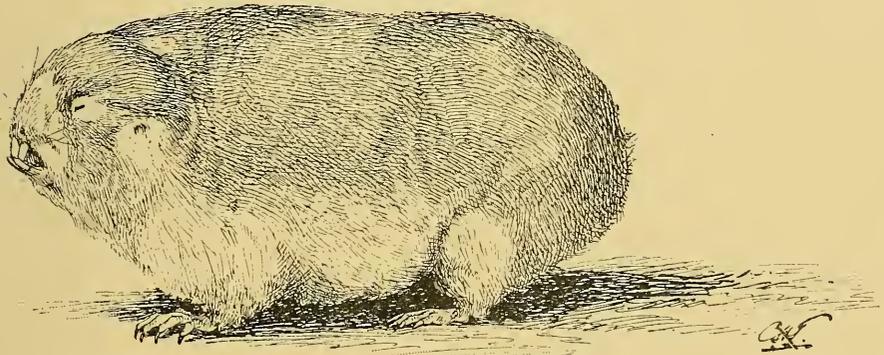


FIG. 104.—The Blesmol (*Georchus capensis*).

darker, almost black; round the nostrils and mouth, round the eyes, round the ear-openings, and on the top of the head, a set of pure white patches; head much truncated in front; eyes very small, the eye-ball about $\cdot 15$ in diameter; external ears absent; limbs short, fore feet with five small claws, hind feet also with five claws, short and broad, the sole being covered with wrinkles and creases, but with no definite pads; tail very short, thick, and rounded, covered with white stiff bristles; mammae 8 in number, 2 pairs pectoral, 2 pairs inguinal.

Young of about five inches are a pure slaty grey above, not rusty brown. Skull with the nasals and premaxillae, extending back about the same distance; antorbital foramen small and round with a thick outer wall. Incisors white, quite smooth; upper molars

increasing in size from before backwards, the premolars being the smallest.

Dimensions.—From a mounted specimen; head and body 8·5; tail ·80; hind foot 1·20; from ear-opening to nose-tip 1·5; skull length 2·10, breadth 1·60; upper molars ·33.

Distribution.—The western half of the Colony extending to Namaqualand and Kimberley in the north, and to Knysna in the east. A blesmol obtained at Nottingham Road, in the upper part of Natal, now in the Maritzburg Museum, seems to be identical with this species, if so, its range in an easterly direction will be much increased.

Habits.—The blesmol is found both in the uncultivated, sandy districts and also in cultivated grounds and gardens, where it burrows much the same fashion as the sand-mole, throwing up heaps of earth at intervals which mark the line of the excavation; the burrows do not descend very deep below the surface, they branch from time to time, the branches thus formed being blind; the main burrow eventually ends in a somewhat rounded chamber with smooth walls. Here the animal forms its store of food consisting of tubers and bulbs. On the Lion's Rump Hill, just overlooking Cape Town, the most abundant bulb is that of *Sparaxis grandiflora* (of the natural order *Iridaceae*); here in such a chamber the floor will be found covered with a coating of the dried outside shucks of the bulbs, and on the top of these a quantity of the bulbs themselves, all with the little bud at the top carefully bitten off so that it cannot sprout; in lower lying land these animals often collect the tubers of the "pig-lily" (*Richardia*), and when in the neighbourhood of a garden, potato-tubers of which they seem inordinately fond, and which they also prevent from sprouting by removing the "eyes" or buds.

The animal when caught is fierce and bites severely with its large incisors.

158. *Georychus damarensis*. THE DAMARALAND BLES MOL.

Bathyergus damarensis, *Ogilby*, *Proc. Zool. Soc.* 1838, p. 5.

Georychus damarensis, *Gray*, *Proc. Zool. Soc.* 1864, p. 125; *Thomas*, *Ann. Mag. N. H.* (6), xvi, p. 239 (1895); *W. Sclater*, *Ann. S. Afr. Mus.* i, p. 228 (1899).

Description.—Size about the same as that of the common blesmol. General colour uniform reddish brown above and below

with a large, irregularly square white mark on the occiput and others on each side of the neck below the ears, meeting underneath the throat, which is therefore a dirty white; feet reddish brown; tail short, covered with stiff reddish brown bristles (Ogilby).

Dimensions.—Head and body 8·25; tail ·25.

Distribution.—The type of this species, now in the British Museum, was obtained many years ago by Captain Alexander in Damaraland; it also occurs in Angola. It is not represented in the collections of the South African Museum.

159. *Georychus darlingi*. DARLING'S BLES MOL.

Georychus darlingi, *Thomas, Ann. Mag. N. H.* (6), xvi, p. 239 (1895); *de Winton, Proc. Zool. Soc.* 1896, p. 805, pl. xl, fig. 1; *W. Sclater, Ann. S. Afr. Mus.* i, p. 228 (1899).

VERNACULAR NAME.—Nota of the Mashonas (Darling).

Description.—Size small; fur close, soft and velvety, general colour uniform drab, the bases of the fur slaty-grey, below slightly paler; a large prominent triangularly shaped spot on the crown of the head; feet and tail as in *G. hottentotus*.

Skull broad and heavy, nasals short and evenly expanded, premaxillae surpassing them posteriorly and forming a suture behind them; antorbital foramen higher than broad, with a thick outer wall.

Dimensions.—From a male measured in the flesh; head and body 5·0; tail ·47; hind foot ·86; skull length 1·12; breadth ·88; upper molars ·22.

Distribution.—The type (now in the British Museum) was obtained by Mr. G. A. K. Marshall, near Salisbury, and other specimens collected by Mr. Darling were received from Mazoe, also in Mashonaland, at the same time. This species is not represented in the South African Museum, but I have examined blesmols apparently identical from the Albany division of the Colony and from Natal.

160. *Georychus hottentotus*. THE MOLE RAT.

Bathyergus hottentotus, *Lesson, Voy. Coq. Zool.* i, p. 166, pl. ii, fig. 2 (1826).

Bathyergus caecutiens, *Brants, Muizen* p. 37 (1827); *Smuts, Enum. Mamm. Cap.* p. 49 (1832); *A. Smith, S. Afr. Quart. Journ.* ii, p. 171 (1834).

- Bathyergus ludwigii*, *A. Smith, Zool. Journ.* iv, p. 439 (1829).
Georychus holosericeus, *Wagner, Schreber Säugeth. Suppl.* iii, p. 373 (1843).
Georychus caecutiens, *Gray, Proc. Zool. Soc.* 1864, p. 125; *Thomas, Ann. Mag. N. H.* (6), xvi, p. 238 (1895).
Georychus hottentotus, *Grill, K. Vet. Akad. Handl. Stockholm* ii, 2, p. 19 (1858) [Knysna]; *Noack, Zool. Jahrb.* iv, p. 144, pl. iii, figs. 21-25 (1895) [Kalahari]; *W. Selater, Ann. S. A. Mus.* i, p. 228 (1899).

Description.—Much smaller than *G. capensis*; general colour dark slaty with a tinge of dark brown above owing to the brown tipping of the slaty fur, below the tipping is dirty white, giving a paler general aspect to the fur; no sign of white anywhere on the head, which is the same colour as the body; not entirely blind as described by Brants, but with very small eyeballs about .08 in. in diameter and a distinct slit measuring about the same length; limbs and tail as in the other species, but with the sole of the foot narrower and more slender.

Skull with the premaxillae extending further back than the nasals but not forming a suture in the middle line behind; the lachrymal bone forms on either side a slight overhanging projection, rendering the skull at this point much wider than it is just behind; antorbital opening elongated and upright. The upper molars are more rounded than in *G. capensis*, and decrease in size from in front backwards, the premolar being the largest.

Dimensions.—Of a male in the flesh; head and body 5.62; tail .50; hind foot .92; skull length 1.35, breadth .97; upper molars .25.

Distribution.—This is the common mole rat of the eastern province of the Colony and Natal, though extending as far as Stellenbosch in the west, whence the South African Museum possesses examples; other localities are Uitenhage (Smith), Knysna (Victorin), Kalahari (Noack), Johannesburg, Grahamstown, Howick, and Durban in Natal (South African Museum). The type is said to have been obtained at the Paarl.

161. *Georychus nimrodi*. SELOUS' MOLE RAT.

Georychus nimrodi, *de Winton, Proc. Zool. Soc.* 1896, p. 808; *W Selater, Ann. S. A. Mus.* i, p. 229 (1899).

Description.—About the same size as *G. hottentotus*; general colour dark drab with no white spot on the head; skull with the

premaxillae not extending posteriorly beyond the nasals, so that the suture between these and the frontals is a simple bowed line; ant-orbital foramina small, with the outer wall thickened.

Dimensions.—Of the type, a male in the flesh; head and body 5·75; hind foot ·96; skull length 1·22, breadth 1·06.

Distribution.—The type together with several other examples, were all obtained by Mr. Selous, at Essex Vale, a farm near Bula-wayo, and are now in the British Museum.

Division HYSTRICOMORPHA.

Skull with a stout zygomatic arch, the jugal bone not supported below by the backward prolongation of the maxillary process, antorbital foramen large and open; in the mandible the angular portion arises from the outside of the bony casing of the lower incisor [see fig. 100, p. 70]; clavicles perfect or imperfect, fibula distinct; one premolar in each jaw.

Family PEDETIDAE.

Genus PEDETES.

Type.

Pedetes, *Illiger, Prodr. Syst. Mamm.* p. 81 (1811).....P. caffer.

Helamys, *F. Cuvier, Dict. Sci. Nat.* xx, p. 341 (1821)P. caffer.

Form kangaroo-like; fore limbs short, with strong-clawed toes, hind limbs well developed, with four toes armed with hoof-like nails; the metatarsus is especially elongated and the metatarsal bones are separate from one another.

Skull short and broad with very wide and expanded nasals, ant orbital opening very large and oval; malar bone ascending from the zygomatic arch in a horizontal plate to meet the lachrymal bone; cervical vertebrae free.

Dentition.—i. $\frac{1}{1}$, c. $\frac{0}{0}$, pm. $\frac{1}{1}$, m. $\frac{3}{3}$ = 20; molars rootless, with a single deep enamel fold externally in the upper jaw, internally in the lower jaw.

This genus, the only one of the family, and containing the single species below described, is a rather anomalous one, and has no near

allies, so that its position among the other Rodent families has varied considerably. Mr. Alston, in his classical paper on the arrangement of Rodents (Proc. Zool. Soc. 1876, p. 61), placed it in a special subfamily of *Dipodidae*, or Jerboa rats, among the *Myomorpha*; several authors have recognised the fact that the resemblances between the Jerboas and *Pedetes* are artificial and

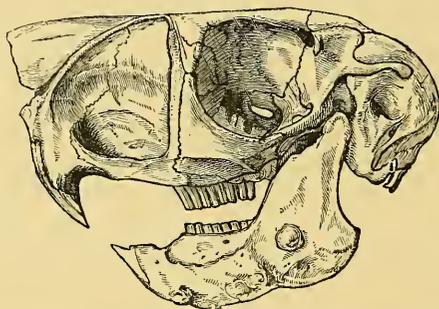


FIG. 105.—Skull of *Pedetes caffer*. (From Flower and Lydekker.)

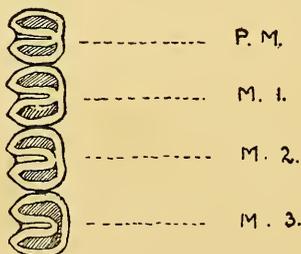


FIG. 106.—Left upper molars of *Pedetes caffer*, to show the external enamel folds.

adaptive rather than natural, and Dr. Winge, of Copenhagen, in a general revision of the Rodents,¹ has placed the *Pedetidae* between the *Sciuridae* and the *Anomaluridae*; Mr. O. Thomas, however, in his recently published list has transferred the family to the *Hystrico-*

¹ Jordfundne og nulevende Gnavere fra Lagoa Santa, E. Museo Lundii, vol. i., art. 3 (1888).

Proc. Zool. Soc. 1896, p. 1012.

morpha, and placed it at the commencement of the series. On the whole, most of the characters of the skull and teeth bear out the contention of Mr. Thomas.

162. **Pedetes caffer.** THE SPRING-HAAS.

Mus caffer, Pallas, *Glires*, p. 87 (1778).

Yerbua capensis, Forster, *K. Vet. Akad. Handl. Stockholm* (1778), p. 108, pl. iii

Helamys capensis, F. Cuvier, *Hist. Nat. Mamm.* livr. 59 (1829); Layard, *Cat. Mamm. S. Afr. Mus.* p. 54 (1862).

Pedetes caffer, A. Smith, *Deser. Cat. S. Afr. Mus.* p. 26 (1826); Smuts, *Enum. Mamm. Cap.* p. 47 (1832); Carruccio, *Bol. Soc. Rom. Zool.* iv, p. 265 (1895); Parsons, *Proc. Zool. Soc.* 1898, p. 858 [anatomy]; W. Sclater, *Ann. S. A. Mus.* i, p. 231 (1899); P. L. Sclater, *Proc. Zool. Soc.* 1899, p. 428 [fig. of animal].

Pedetes typicus, A. Smith, *S. Afr. Quart. Journ.* ii, p. 169 (1834).

LITERATURE.—Buffon (1782) Suppl. vi, p. 261, describes this animal as the “grande gerboise du Cap” and figures it from Foster’s notes and sketches; Sparman (1785) ii, p. 210, notes the existence of the animal and refers to the description in the Transaction of the Swedish Academy; Thunberg (1795) ii, p. 182, noticed as *Jerboa capensis* near Tulbagh; le Vaillant (1796) ii, p. 334, note on habits with description; Burchell (1822) i, p. 487, ii, p. 3, carefully described with notes on habits in Griqualand West.

VERNACULAR NAMES.—Springhaas of the Colonists; Inziponde of Amaxosa (Cloete).

Description.—General colour tawny brown, becoming paler on the sides and almost pure white below, including a vertical stripe in front of the thighs; fur long, straight, dark brown, with a slaty tinge basally, sandy brown terminally; rhinarium not connected with the upper lip by a naked line; snout very obtuse, eye large, ears long and pointed, measuring $2\frac{1}{4}$ to 3 in., thickly clothed with hairs basally, nearly naked terminally, bearing at the base of the inner margin a little fleshy projecting lobe resembling a bat’s tragus; fore limbs short, with five toes, all provided with long, curved, and pointed claws, palm of the hand with a large, rounded, naked pad at the root of the thumb, and another smaller oval one with a fringe of hairs around it at the root of the fifth digit; hind limbs much elongated, the tarsus being as long as the foot from the knee to the ankle; only four toes, the third the largest, the fifth the smallest, and the first absent, all armed with solid hoof-like nails; sole of the foot hairy to the claws; tail about as

long as the head and body, covered with long hairs, sandy brown above, pale below, the terminal third black; mammae four in number, pectoral in position.

Dimensions.—From a mounted specimen; head and body 23·50; tail without terminal hairs 20·50; with 21·50; hind foot 6·50; from ear-opening to tip of nose 4·0; skull length from condyle to premaxillae 2·95, between perpendiculars 3·8, breadth 2·35; upper molars ·78.



FIG. 107.—The Spring-haas (*Pedetes caffer*).

Distribution.—Found throughout the drier and higher parts of South Africa extending northwards to Angola and Unyamwezi in German East Africa, but not apparently occurring in Nyasaland, or Mozambique; the South African Museum possesses examples from the Port Elizabeth, Albany, Graaff Reinet, and Middelburg divisions of the Colony; it is also found throughout the Orange

Free State, the upper part of Natal, Griqualand West, Bechuanaland, the Transvaal, Rhodesia, and German South-West Africa.

Habits.—The springhaas is found both in the plains and in mountainous country, where it forms complex and deep burrows in which several families live together.

It is seldom seen, as it is crepuscular or nocturnal in its habits; it progresses, when pressed, by great bounds in similar fashion to a kangaroo and can move more quickly up a slope than down; it is never very rapid in its movements and can be easily overtaken.

Its food consists of roots and green stuff, and it is exceedingly destructive to crops both green and ripe; according to le Vaillant its flesh is very good eating, and it is considerably sought after for this purpose. A favourite method of capture, though one would think a not very feasible one in the dry country inhabited by it, is to pour water down the burrows which causes the animals instantly to emerge.

The young are said to be born in summer and to be 3 or 4 in number.

Family OCTODONTIDAE.

Rodents with fore and hind limbs generally provided with five toes; with a large palatine foramen and with a distinct inferior angle to the malar bone; the molars are provided with both external and internal enamel folds and the clavicles are imperfect.

Thomas, in his recent list of rodents, recognises 22 genera belonging to this family; of these 17 are confined to the New World and chiefly to the southern portion of it; the remaining 5 are all purely African, and two of these, described below, are South African.

Key of the South African Genera.

- A. Tail but little shorter than the body, well covered with fairly long hairs; incisors smooth, small and compressed *Petromys*, p. 84.
- B. Tail barely half the length of the body, covered with very short sparse stiff bristles; incisors very broad and strong, those of the upper jaw with three deep groves *Thryonomys*, p. 86.

Genus **PETROMYS.***Type.*

Petromys, *A. Smith, S. Afr. Quart. Journ.* i, no. 5,
p. 11 (1831) *P. typicus.*

Compact, rounded animals with moderate rounded ears; tail only a little shorter than the body, covered with stiff hairs, which become longer towards the tip; five toes to both fore and hind limbs, the pollex, though clawed, being short and rudimentary.

Skull very broad posteriorly, with very large, round antorbital openings, at the base of which is a groove for the passage of the nerve.

Dentition.—i. $\frac{1}{1}$, c. $\frac{0}{0}$, p.m. $\frac{1}{1}$, m. $\frac{3}{3}$ = 20; upper incisors smooth, small, and compressed; molars rooted, somewhat quadrate with a single internal fold in the upper jaw, and external one in the lower, and with indications [especially in young skulls] of smaller opposite folds external in the upper, internal in the lower jaw.

Only one species of this genus, that below described, is known.

163. **Petromys typicus.** THE ROCK RAT OR NOKI.

Petromys typicus, *A. Smith, S. Afr. Quart. Journ.* i, no. 5, p. 11 (1831); *id. ibid.* ii, p. 146 (1834); *id. Illustr. Zool. S. Afr. Mamm.* plates xx, xxi (skull and anat.), (1840); *Waterhouse, Nat. Hist. Mamm.* ii, p. 308, pl. xvi, fig. 8, pl. xvii, fig. 1 (1848); *W. Sclater, Ann. S. A. Mus.* i, p. 232 (1899).

VERNACULAR NAME.—Noki in Namaqualand (Howard).

Description.—General shape rat-like; colour dull brownish grey, pencilled tawny and black, hinder part of the back and posterior extremities dull chestnut, all the hairs bluish grey at the base; below dull white tinged with tawny; apex of the muzzle and orbit bright chestnut, whiskers long, rigid, and black, snout projecting and truncated; ears rather small, wider than high, blackish, only moderately clothed with hair; fore limbs with four clawed toes, the first being represented by a mere tubercle, palms with five rather swollen pads; claws black; hind limbs somewhat thickened, hairy above, naked below, with six pads, the three at the base of the toes large and oval, the two next small and rounded, the

proximal one much elongated but not well developed, all the toes clawed, the first short and not reaching the base of the second.

Tail a little shorter than the head and body, cylindrical, covered with scales, which, however, are concealed by the long black hairs, these are about $\cdot 25$ long towards the base, but gradually increase to about $\cdot 75$ at the tip; the extreme base of the tail is the same colour as the body, the rest of it is black.

Incisors yellowish.

Dimensions.—From a specimen in alcohol; head and body $5\cdot 75$; tail $5\cdot 30$; hind foot $1\cdot 25$; from ear-opening to tip of nose $1\cdot 50$; length of a skin according to Smith $7\cdot 25$; skull length $1\cdot 63$, breadth $\cdot 98$; upper molars $\cdot 38$.

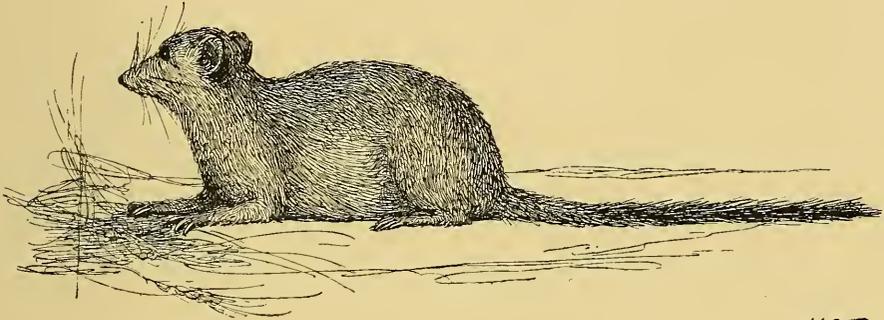


FIG. 108.—The Rock Rat (*Petromys typicus*).

Distribution.—The rock rat has been found only in Namaqualand; Sir A. Smith obtained his specimens in the mountains towards the mouth of the Orange River. The South African Museum is indebted to Dr. Howard for examples of this species, obtained at Klipfontein about fifty miles inland from Port Nolloth.

Habits.—This animal inhabits the dry rocky mountain ranges of Namaqualand, making its home in crevices of the rocks or under stones; it runs about over the boulders during the day, feeding in the early morning and evening chiefly on the flowers of some of the *Compositae* found so abundantly in those parts; it exhibits little fear of man.

Genus **THRYONOMYS.***Type.*

- Aulacodus**, *Temminck, Monogr. Mamm. i,*
 p. 245 (1827) [*nec Eschricht*] *T. swinderenianus.*
- Thryonomys**, *Fitzinger, S. B. Akad. Wien lvi,*
 pt. 1, p. 141 (1867)..... *T. semipalmatus.*

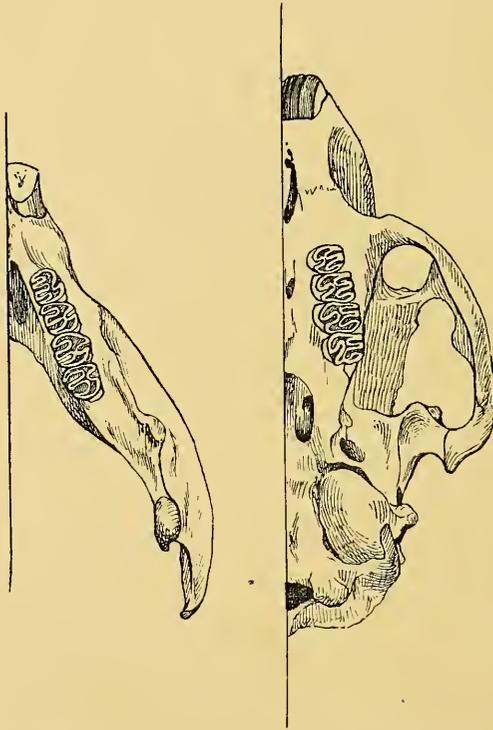


FIG. 109.—Left half of palate and right half of lower jaw of *Thryonomys swinderenianus*.

Stout, rat-like animals, with blunt muzzles, harsh fur, and short tails sparsely covered with stiff bristles; the fore feet with a rudimentary pollex and a small fifth toe, the hind foot with only four digits, the outer (fifth) being very short.

Skull with the facial portion inflated, the cranial portion small; the occipital and lamboidal crests are very well developed; the

antorbital opening is large and has a special basal groove for the reception of the nerve.

Dentition.—i. $\frac{1}{1}$, c. $\frac{0}{0}$, pm. $\frac{1}{1}$, m. $\frac{3}{3}$ = 20; incisors very broad the upper ones with three strong longitudinal grooves; the lower ones smooth; molars rooted, with, in the upper jaw two external and one internal enamel folds; in the lower jaw one external and two internal folds.

The use of the old and more familiar name for this genus, *Aulacodus*, has recently been shown by Thomas to be inadmissible, as it was previously used by Eschricht for a genus of *Coleoptera*.

Four species from other parts of Africa are recognised in addition to the one below described.

164. *Thryonomys swinderenianus*. THE CANE RAT.

Aulacodus swinderianus, *Temminck, Monogr. Mamm.* i, pp. 245, 248, pl. xxv. [juv.] (1827); *Waterhouse, Nat. Hist. Mamm.* ii, p. 356, pl. xvi. fig. 2 (1848); *Layard, Cat. Mamm. S. Afr. Mus.* p. 50 (1862). *Aulacodus swinderenianus*, *Thomas, Ann. Mag. N. H.* (6) xiii, p. 202 (1894).

Thryonomys swinderenianus, *W. Sclater, Ann. S. A. Mus.* i, p. 234 (1899).

LITERATURE.—Drummond (1875), p. 402, account of habits and hunting in Zululand; Kirby (1896), p. 550, native names and occurrence in the Eastern Transvaal.

VERNACULAR NAMES.—Ground Rat, Ground Pig, or Cane Rat of the English; Reit Muis of the Dutch Colonists; Ivondwe of Swazis and Zulus (Kirby); Ikvilira of Basuto (Kirby).

Description.—General colour speckled yellow and brown, below paler, body covered everywhere with coarse bristles, no under-fur; the bristles are pale brown for the greater part of their length, with subterminal black and terminal yellow portions; they are flattened and grooved on the upper surface; chin and upper lip dirty white; ears short, broad and rounded, almost concealed among the bristles, covered with a few dark hairs; limbs rather short, with four clawed toes to each, those of the fore limb being the shorter, pollex very small with a flat nail, hallux absent; tail less than half the length of the head and body, somewhat rat-like, covered with short stiff hairs, dark above, light below, the scaly skin being hardly hidden; mammae six in number, pectoral in position.

Dimensions.—From a mounted specimen; head and body 19·0, tail 7·0, hind foot 2·80; from ear-opening to nose-tip 3·55; skull length 3·75, breadth 2·62; upper molars ·75; weight of a male from 9 to 10 lbs.

Distribution.—The cane rat was originally described by Temminck from a young specimen of which the history was unknown; subsequently it was obtained from Sierra Leone and Natal, and it is now known also from French Congo, Angola, German East Africa, Nyasaland, and Mozambique. Within our limits it is found only in the eastern Transvaal, Zululand, Natal and the eastern portion of the Colony as far as Grahamstown. The South African Museum possesses examples from the Peddie and Transkei divisions of the Colony, from near Durban in Natal, and from the Rustenburg district of the Transvaal.

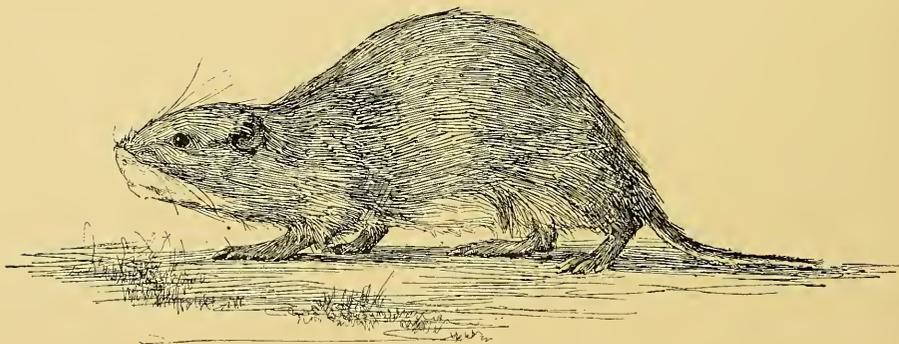


FIG. 110.—The Cane Rat (*Thryonomys swinderenianus*).

Habits.—This animal is not, as originally stated, a burrower, but according to Peters and Drummond lives in very thick jungle grass and reed beds, where it forms a kind of nest on the surface of the ground; it is nocturnal, emerging only at night from its lair to ravage the plantations; it devours large quantities of roots and tender shoots of various plants, and is specially destructive of sugarcane plantations whence it derives its vernacular name; it is hunted on moonlight nights with dogs, and is regarded as very good eating.

So strong are its incisor teeth that ivory which has been stored for some time has occasionally been found gnawed by these rats; the three characteristic grooves of the upper incisors being reproduced on the tusks thus mutilated.

Family HYSTRICIDAE.

This family contains the porcupines, which are animals of stout habit with subequal limbs, covered with hair which is more or less completely modified into spines; other characters are noticed below.

The Porcupines are spread all over the New World, but in the Old World are confined to the southern portions of Europe and Asia and to Africa.

Genus **HYSTRIX**.*Type.*

Hystrix, *Linnaeus, Syst. Nat.*, 12th ed. i, p. 76
(1766)..... *H. cristata*.

Porcupines with short tails, smooth soles, and furrowed upper lips; the skull is ovate and greatly inflated with air spaces, the nasal cavity being specially large; the clavicles are imperfect.

Dentition.—i. $\frac{1}{1}$, c. $\frac{0}{0}$, pm. $\frac{1}{1}$, m. $\frac{3}{3}$ =20; molars semi-rooted, those of the upper jaw with one internal and three or four external enamel folds, this arrangement being reversed in the lower jaw; the folds soon become with wear simple circles of enamel surrounding the margin of the tooth.

Only one member of this genus occurs within our limits, the other species are spread over Southern Europe, Asia, and Northern Africa.

165. **Hystrix africae-australis**. THE SOUTH AFRICAN PORCUPINE.

Hystrix cristata, *Smuts, Enum. Mamm. Cap.* p. 50 (1832); *A. Smith, S. Afr. Quart. Journ.* ii, p. 171 (1834); *Layard, Cat. Mamm. S. Afr. Mus.* p. 55 (1862) [*nec Linnaeus*].

Hystrix africae-australis, *Peters, Reise Mossamb. Säuegeth.* p. 170, pl. xxxii, figs. 6, 7 [skull] (1852); *W. Sclater, Ann. S. A. Mus.* i, p. 235 (1899).

Hystrix capensis, *Grill, K. Vet. Akad. Handl. Stockholm* ii, 2, p. 19 (1858).

LITERATURE.—Kolben (1732), ii, p. 119, described at considerable length with various fables often told of this animal; Sparrman (1785), i, p. 160, description of habits and hunting under the name of the Yster-varik; Moodie (1835), p. 259, on its habits and hunting in the Colony; Livingstone

(1857), p. 56, asserts that it can subsist without water; Grout (1863), p. 298, on its habits and vernacular name in Zululand; Millais (1895), p. 115, figured in a sketch; Kirby (1896), p. 550, note on its habits and native names in the Eastern Transvaal.

VERNACULAR NAMES.—Ijzer-vark (Iron-hog) of the Dutch; Qanda of Amaxosa (Cloete); Injelwane, Inungu of Zulus (Kirby); Ingugumbane of Zulus (Drummond); Nunku of Basuto (Kirby).

Description.—General colour dark brown, almost black, the fore part of the body and limbs covered with long coarse bristles,



FIG. 111.—The South African Porcupine (*Hystrix africae-australis*).

which are not stiff and sharp; along the nape of the neck and the middle of the front part of the back the bristles are very long, up to 16 inches, and can be erected at the will of the animal so as to form a crest; towards the hinder part of the back and the haunches the bristles become stronger, stouter, and sharp-pointed, forming the true quills, these are banded brown and white, the brown bands being the broader and the tips white; all the quills are longitudinally striated.

Head much rounded, the rhinarium somewhat hairy and connected with the upper lip by a bare line, eyes small and black, ears short, broad, and rounded, thick with a few fine hairs; sometimes a white transverse mark on the chest; feet covered with bristles nearly concealing the toes and claws, which are four in number on the fore feet (the pollex being rudimentary) and five on the hind; tail short, entirely surrounded and concealed by the spines, the point with a tuft of hollow membranous cylinders, which in the young are pointed and spiny, but broken off in the older animals.

The differences between this species and that of Southern Europe and Northern Africa (*H. cristata*) are chiefly cranial, and were first noticed by Peters.

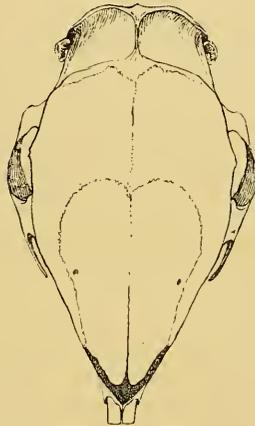


FIG. 112.—Skull from above of *Hystrix africae-australis* ($\frac{2}{3}$ nat. size).

In the South African species the nasal bones reach backwards as far as the anterior border of the orbit, while in *H. cristata* they extend much further, as far as the posterior root of the zygoma. In consequence of this the frontal bones in *H. africae-australis* are much longer, being more than half the length of the nasals and twice as long as their distance from the occipital crest; in *H. cristata*, on the other hand, they are less than half the length of the nasals and just about as long as their distance from the occipital crest.

Dimensions.—From a mounted specimen; head and body 26.0;

tail about 5.0; hind foot 4.50; from ear-opening to nose-tip 6.50; skull length 6.0, breadth 3.40; upper molars 1.5

Distribution.—This porcupine is found all over South Africa, extending northwards as far as French Congo on the west and German East Africa on the east; within our limits it appears to be very widely spread, being recorded from nearly all the districts of the Colony, from German South-west Africa, Rhodesia, the Transvaal, Orange Free State, and Natal. It is not uncommon on the slopes of Table Mountain.

Habits.—The porcupine is a purely nocturnal animal, spending the day in caves and under rocks and coming out at night in search of food, which consists entirely of roots and other vegetable matter. Porcupines are a great annoyance to farmers and gardeners, as they are very fond of pumpkins, melons, potatoes, maize and other garden stuff.

They are hunted on moonlight nights with dogs and spears and often give a good run, though the dogs frequently suffer severely from the quills.

They are reported to be excellent eating.

Suborder **DUPLICIDENTATA.**

Two pair of incisors in the upper jaw; the second pair very much smaller, placed behind the anterior pair and provided with enamel coating all round; incisive foramina very large and usually confluent so that the bony palate is very incomplete; the fibula is firmly ossified to the tibia and articulates with the calcaneum.

Family **LEPORIDAE.**

Genus **LEPUS.**

Type.

Lepus, *Linnaeus, Syst. Nat.* 12th ed. i, p. 77 (1766)..... *L. timidus*.

This, the only South African genus of the family is characterised as follows:—

Rodents with long ears and hind legs and short, bushy, recurved tails; limbs with five toes to the fore and four to the hind feet, soles very thickly haired.

Skull with the bony palate reduced to a mere bridge between the molars, with no true alisphenoid canal, and with a very peculiarly shaped postorbital process; this where it springs from the frontals is quite narrow, but afterwards expands to form a flattened bar margining the upper rim of the orbit.

Dentition.—i. $\frac{2}{1}$ (at birth $\frac{3}{1}$), c. $\frac{0}{0}$, p.m. $\frac{3}{2}$, m. $\frac{3}{3}$ = 28; the outer upper incisors are soon lost, the next pair are very small and placed directly behind the large middle pair which are longitudinally grooved; grinding teeth rootless with transverse enamel folds dividing them into lobes.

The genus contains the hares and rabbits, of which there are a large number of species distributed all over the world, with the exception of the Australian region and Madagascar.

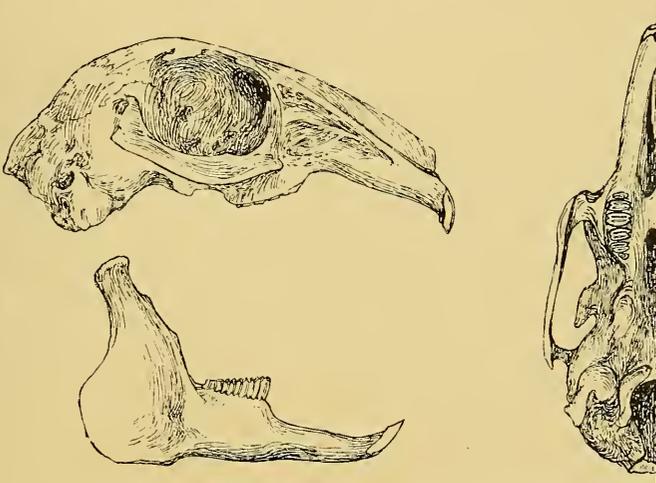


FIG. 113.—Skull of *Lepus crassicaudatus* ($\frac{1}{3}$ nat. size).

*Key of the South African Species.**

- A. With tail white below and black above.
- a. Smaller, ears about $4\frac{1}{2}$ in., no red nape patch..... *L. capensis*, p. 94.
- b. Larger, ears more than 5 in., a red nape patch..... *L. saxatilis*, p. 95.
- B. Tail brown above and below, ears moderate, a red nape patch..... *L. crassicaudatus*, p. 96.

* The European Rabbit (*Lepus cuniculus*) was introduced by the early voyagers on to Robben Island in Table Bay, where it is now quite acclimatized and very abundant; it has, however, never obtained a footing on the mainland.

166. **Lepus capensis.** THE CAPE HARE.

Lepus capensis, *Linnaeus, Syst. Nat.* 12th ed. i, p. 78 (1766); *Smuts, Enum. Mamm. Cap.* p. 51 (1832); *A. Smith, S. Afr. Quart. Journ.* ii, p. 172 (1834); *Waterhouse, Nat. Hist. Mamm.* ii, p. 95 (1848); *Grill, K. Vet. Akad. Handl. Stockholm* ii, 2, p. 19 (1858); *Layard, Cat. Mamm. S. Afr. Mus.* p. 56 (1862); *Noack, Zool. Jahrb.* iv, p. 159 (1889) [Kalahari]; *W. Sclater, Ann. S. Afr. Mus.* i, p. 236 (1899).

Lepus arenarius, *Is. Geoffroy, Dict. Class. d'Hist. Nat.* ix, p. 383 (1826); *id. Mag. Zool.* pl. x. (1832).

Lepus ochropus, *Wagner, Schreb. Säugeth. Suppl.* iv, p. 96 (1844).

LITERATURE.—Sparman (1785), i, p. 256, mentions two species, probably this and *L. saxatilis*, from the Houtniquas (*i.e.*, Knysna); Nicolls and Eglington (1892), p. 78, description and note on habits and occurrence; Kirby (1896), p. 551, native names and occurrence in the Eastern Transvaal.

VERNACULAR NAMES.—Vlackte-haas (*i.e.*, plains hare) of the Dutch; Umvundhla of the Amaxosa (Stanford); Mukla of the Basutos (Kirby).

Description.—General colour speckled black and yellowish brown, the hair somewhat coarser than that of the other species, woolly and pale slate-colour at the base, the tips yellowish brown with a subterminal band of black; sides paler somewhat rufous, below white tinged with rufous; chin pale yellowish, chest pale brownish, outside of the limbs with a rufous tinge, round the eye a pale almost white ring; ears moderate, about $4\frac{1}{2}$ in. in length from the point of coalescence of the margins to the tip, almost naked anteriorly, posteriorly with the inner half thickly clothed with short almost black hairs, the tips and upper margins quite black; nape and occiput grey not rufous; feet clothed with comparatively short hairs so that the claws are hardly hidden; tail rather long, jet-black above, pure white below.

Dimensions.—From a mounted specimen; head and body 23·0; tail 4·0; hind foot 4·50; from ear to tip of nose 4·5; skull length 3·42, breadth 1·55; upper molars ·54.

Distribution.—The Cape hare is found almost everywhere throughout the Colony, and extends northwards through Angola to French Congo on the West Coast, and through Natal, Mozambique, and German East Africa to Kilima-njaro on the East Coast; it has been noticed by Kirby in the eastern Transvaal, but hitherto its occurrence in Rhodesia and Nyasaland has not been authenticated. It is common in the immediate neighbourhood of Cape Town, whence come the examples in the South African Museum.

Habits.—This hare frequents uncultivated lands and flats covered with scattered bush; it may often be seen at early dawn and in the evening feeding on the grassy spots along the roads; when pursued it will take refuge in the ground if it is able to do so though it does not form a burrow of its own. It has the reputation of being a very unclean feeder, eating both human and other excrement along the roads and also in the cattle kraals, in consequence of this it is not much sought after for food though as a matter of fact it is gastronomically speaking just as good as the European species.

167. *Lepus saxatilis*. THE ROCK HARE.

Lepus saxatilis, *F. Cuvier, Dict. Sci. Nat.* xxvi, p. 309 (1823); *Smuts, Enum. Mamm. Cap.* p. 52 (1832); *A. Smith, S. Afr. Quart. Journ.* ii, p. 173 (1834); *Waterhouse, Nat. Hist. Mamm.* ii, p. 92, pl. i, fig. 1 (1848); *Layard, Cat. Mamm. S. Afr. Mus.* p. 56 (1862); *W. Selater, Ann. S. A. Mus.* i, p. 237 (1899).

Lepus rufinucha, *A. Smith, Zool. Journ.* iv, p. 440 (1829).

Lepus fumigatus, *Wagner, Schreb. Säugeth. Suppl.* iv, p. 98, pl. 233G (1844).

LITERATURE.—Sparman (1785) i, p. 256, notice of a hare probably this species from Houtniquas (*i.e.*, Knysna); Nicolls and Eglington (1892), p. 79, short description of this species; Kirby (1896), p. 551, occurrence in eastern Transvaal with vernacular names.

VERNACULAR NAMES.—Rhebok or Kol Haas of Dutch Colonists; Intenetya of Amaxosa (Stanford); Nogweja, Intenetsha of Swazis and Zulus; Ikloli of Basutos (Kirby).

Description.—Considerably larger than the other two species; general colour speckled black and yellowish brown, but with no trace of the rufous; below, including the chin, white with a pale yellowish tinge, chest like the back, no black mark on the cheek, a white spot often present on the forehead; ears very long, from the confluence of the margins about $5\frac{1}{4}$ in., from the extreme base about $6\frac{1}{2}$ in., nearly naked anteriorly; the inner half of the posterior surface thickly covered with short hair and along the margin of the tip a fringe of black; a rufous patch on the nape and occiput as in *L. crassicaudatus*; limbs much longer than those of the other species; claws concealed by the long hairs; tail long like that of *L. capensis*, white with a black streak above.

Dimensions.—From a mounted specimen; head and body 260;

tail about 4.0; hind foot 5.75; from ear to tip of nose 6.0; skull length 4.18, breadth 1.82; upper molars .66.

Distribution.—This hare appears to be confined to the higher hills throughout South Africa as far north as Ovampoland and Rhodesia; it does not seem to be recorded from the countries beyond our limits, though it is noted by Peters from the neighbourhood of Tette on the Zambesi. The South African Museum contains examples from the Ceres, Caledon and Middelburg divisions of the Colony.



FIG. 114.—The Red Hare (*Lepus crassicaudatus*).

168. **Lepus crassicaudatus.** THE RED HARE.

Lepus crassicaudatus, *Is. Geoffroy, Mag. Zool.* pl. ix (1832); *Waterhouse, Nat. Hist. Mamm.* ii, p. 99 (1848); *Layard, Cat. Mamm. S. Afr. Mus.* p. 57 (1862); *W. Sclater, Ann. S. A. Mus.* i, p. 238 (1899).

Lepus rupestris, *A. Smith, S. Afr. Quart. Journ.* ii, p. 174 (1834).

Lepus melanurus, *Rüppell, Mus. Senckenbergianum* iii, p. 137 (1842).

LITERATURE.—le Vaillant (1796) ii, p. 166, description of this species as the "Roodegat Haas" in Namaqualand; Nicolls and Eglington (1892), p. 79, short description and account of distribution.

VERNACULAR NAMES.—Roode-haas, Klip-haas and sometimes Rooi-sterk of the Colonists.

Description.—General colour speckled black and yellowish brown much as in *L. capensis*, but perhaps a little lighter, becoming rufous-white below; fur softer than in *L. capensis*; chin white, separated on either side from the grey of the cheeks by a black line running back from the angle of the mouth to below the ear; a whitish ring round the eye; ears moderate rounded at the extremities, about $4\frac{1}{2}$ in. in length, nearly naked anteriorly, posteriorly a band along the inner margin covered with very short speckly black and yellow hairs; a pure rufous patch on the occiput and nape of the neck, the rufous extending up the base of the ears; legs and feet short and rufous brown; tail thick and bushy, reddish brown above and below, with no white or black as in the other species.

Dimensions.—Head and body 20.0; tail 3.50; hind foot 5.0; from ear-opening to tip of nose 4.5.

Distribution.—This hare is also found only in the hills at considerable elevations; it appears to be fairly well distributed all over the Colony, Natal, the Orange Free State and the southern Transvaal; it has recently been obtained on the Nyika plateau at an elevation of 7,000 ft. in Nyasaland. There are examples in the South African Museum from the Beaufort West and Middelburg divisions of the Colony.

Habits.—The habits of this hare seem to be somewhat rabbit-like; they live in colonies in rocky places at great elevations, and are said to form a pen or lair under overhanging cliffs.

Order CHIROPTERA.

This order contains the bats, mammals with the fore limbs modified for flight; the bones of the arms and of the fingers are enormously elongated and support a flying membrane, the pteridium; the ulna is rudimentary, the radius is long and curved, the wrist consists of the six carpal bones supporting a short thumb (pollex) which is always unconnected with the wing membrane and always bears a claw; the other four fingers are greatly elongated, and it is between these and the sides of the body and the hind legs that the wing membrane is extended; the knee is directed outwards and somewhat backwards, owing to the rotation of the hind limb outwards towards the wing membrane; from the inner side of the ankle joint arises a peculiar, elongated cartilaginous process (the calcar) directed inwards along the posterior margin of the accessory membrane of flight extending between the legs and usually embracing the tail (the interfemoral membrane) a small lobe of this membrane on the outer side of the calcar often present is termed the post-calcarial lobe; another small portion of the wing membrane lying in front between the humerus and the radius is called the antebrachial membrane.

The ears, which are often very large, frequently have within the conch a peculiar upstanding process (the tragus) [see fig. 123, p. 125] whilst the portion of the outer margin opposite the tragus is called the antitragus.

Other important characteristics are as follows:—testes abdominal or inguinal, penis pendant; mammary glands thoracic and generally post-axillary; uterus simple or with more or less long cornua; placenta discoidal and deciduate; the smooth cerebral hemispheres not extending backwards over the cerebellum.

The dental series includes incisors, canines, premolars and molars and never exceeds i. $\frac{2}{3}$, c. $\frac{1}{1}$, pm. $\frac{3}{3}$, m. $\frac{3}{3}$ =38.

Bats are provided with a very well-developed tactile sense, in

fact it is something more than a tactile sense, as it enables them to appreciate the presence of obstacles without actual contact; this sense appears to reside in the wing membranes, and perhaps in the large ears and the nose leaf, a curious complicated organ highly developed in some families. The existence of this sense was proved many years ago by the perhaps rather cruel experiments of Spallanzani, who after depriving bats of their sight, let them fly

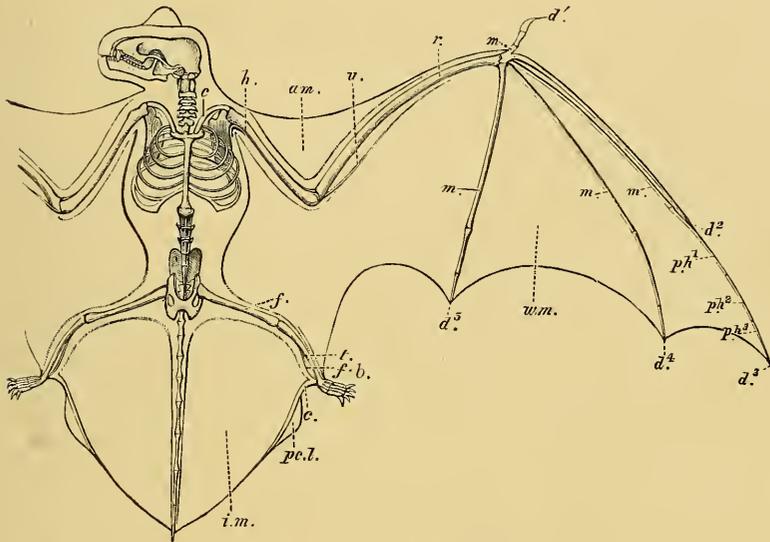


FIG. 115.—Skeleton and flying membranes of a Bat:—*c*, clavicle; *h*, humerus; *r*, radius; *u*, ulna (rudimentary); *d*¹, pollex; *d*², *d*³, *d*⁴, *d*⁵, digits, 2 to 5 supporting *w.m.*, the wing-membrane; *m*, *m*, metacarpal bones; *ph*¹, *ph*², *ph*³, first, second, and third phalanges; *am*, antibrachial membrane; *f*, femur; *t*, tibia; *f.b.*, fibula (rudimentary); *c*, calcar, supporting *im*, the interfemoral membrane; *pc.l.*, postcalcaneal lobe. [From Flower and Lydekker.]

in a room across which a large number of silken threads had been tied; the bats very successfully managed to avoid all contact with the threads, although only just sufficient space was allowed for them to pass through with outstretched wings.

Bats vary nearly as much in their power of flight as birds; those with longer and narrower wings being much swifter than the short-winged forms. The species of stronger flight appear as a rule earlier in the evening, in some cases even before sunset, and

may often be seen hawking insects in company with swallows and swifts.

From the weakness and reversed position of the hind limbs, bats are unable to walk like other mammals, and when placed on the ground are entirely helpless, crawling along in a laborious manner, chiefly by the aid of their clawed thumbs; when at rest they usually suspend themselves by their hind toes to trees or crevices of rocks or to rafters and beams in out-houses, and remain with their heads hanging downwards.

As a rule only one young one is produced at birth, and it remains clinging to its mother until nearly of her own size.

In temperate countries bats hibernate in the winter, a number often being found huddled together; whether this takes place in South Africa or not does not seem to be recorded; in fact observations on the habits of bats in South Africa are very much needed; no one seems to have paid much attention to them.

The present account of the South African bats is founded on the Catalogue of the Chiroptera in the British Museum, written by Dr. Dobson, and published in 1876, since which time no general account of the order has appeared.

By Dr. Dobson and others the order has been divided into two divisions termed suborders, though the characters distinguishing the two groups are hardly of such importance as in the case of the suborders of other mammalian orders; the first of these containing only one family, the fruit-eating bats (*Pteropodidae*) is termed the *Megachiroptera*; the other containing five families of insect-eating bats is called the *Microchiroptera*.

Of these six families representatives of five are found in South Africa. The sixth *Phyllostomatidae*, among which are the true vampires or blood-sucking bats, is confined to the New World, and chiefly to the southern part of it.

Key of the South African Families.

- A. Crowns of the molar teeth smooth; both thumb and second digit terminating in a claw *Pteropodidae*, p. 101.
- B. Crowns of the molar teeth tubercular; only the thumb with a claw.
 - a. Nostrils surrounded by a well-developed nose-leaf; ears large, no tragus *Rhinolophidae*, p. 110.

- b. Nostrils at the anterior end of a longitudinal groove on the face; no nose-leaf; ears large, united and provided with tragi *Nycteridae*, p. 119.
- c. Nostrils at the end of the muzzle, opening simply, no nose-leaf; ears separate, with tragi; tail contained in and produced to the end of the interfemoral membrane ... *Vespertilionidae*, p. 121.
- d. Nostrils simple, no nose-leaf; ears large, often united, tragi short and broad; first phalanx of the middle finger folded in repose on the upper surface of the metacarpal bone; tail more or less free from the interfemoral membrane *Emballonuridae*, p. 137.

Suborder MEGACHIROPTERA.

Family PTEROPODIDAE.

This family contains the largest representatives of the order; its members are entirely frugivorous; the crowns of the molars are smooth with a longitudinal furrow; the bony palate is continued some distance behind the last molar; the second finger usually (always in South African species) terminates in a claw; the outer and inner margins of the ear conch meet below to form a complete ring.

The members of this family are confined to the warmer regions of the Old World and consequently are not very numerous in South Africa. The largest genus *Pteropus*, containing upwards of forty species, many of which are of very large size, does not reach Africa proper, though curiously enough in Madagascar, and even in the Comoro Islands lying between Madagascar and the mainland, and only distant some 200 miles from the latter, several species occur.

Key of the South African Genera.

- A. Tail very short, free from and in front of the interfemoral membrane; a tuft of white hairs at the base of the ears; molars $\frac{1}{2}$ *Epomophorus*, p. 102.
- B. Tail short, contained in the interfemoral membrane; no tuft of white hairs; molars $\frac{2}{3}$ *Rousettus*, p. 105.

Genus **EPOMOPHORUS.***Type.*

Epomophorus, *Bennett, Trans. Zool. Soc.* ii, p. 38 (1836) *E. macrocephalus*.

Head long; muzzle conical, or thickened and obtuse in front; lips very expansible, largely developed and pendulous in the males, ears simple, separate, and with a tuft of white hairs near the base of their anterior margins; second finger with a well-developed claw; tail very short and wholly free from and inferior to the inter-femoral membrane or altogether absent.

Dentition.—i. $\frac{2}{2}$, c. $\frac{1}{1}$, pm. $\frac{2}{2}$, m. $\frac{1}{2}$ = 28.

Incisors very small and weak, first upper premolar separated by a considerable space from the canine. Skull with a somewhat flattened crown; postorbital processes very short; palate concave and vaulted.

These bats can be easily distinguished by their large size, their long heads, their very expansible lips, and by the white tuft of hairs which adorns the margins of the ears of both sexes.

The genus, of which some half dozen species are described, is entirely confined to Africa, and is most developed in the West Coast region; two species, however, mentioned below, are found in the eastern part of South Africa.

Key of the South African Species.

- A. Larger; fore arm 3·5 in.; fifth palatal ridge simple and divided *E. gambianus*, p. 102.
 B. Smaller; fore arm 3·0 in.; fifth palatal ridge rhomboidal and hollowed out in the centre..... *E. crypturus*, p. 105.

169. **Epomophorus gambianus.** THE EPAULETTED FRUIT BAT.

Pteropus gambianus, *Ogilby, Proc. Zool. Soc.* 1835, p. 100.

Pteropus walbergii, *Sundevall, Oefvers. Akad. Forhandl. Stockholm*, 1846, p. 118 (1847).

Epomophorus gambianus, *Dobson, Cat. Chirop. B. M.* p. 10, pl. ii, fig. 3 [head] (1878); *id. Proc. Zool. Soc.* 1881, p. 685 [habits and anatomy]; *Howard, Scientific African*, i, p. 77 (1896) [Bulawayo].

Description.—Head large and muzzle long; lips, especially in the male pendulous, thickened and glandular, obviously adapted to a sucking habit; ears not very large, about as long as the distance

from the ear to the nose, nearly naked and oval; nostrils simple, opening somewhat laterally and separated by a wide shallow groove reaching the upper lip.

On the shoulders (see Fig. 116) are two large eversible glandular sacs marked by a patch of long white hairs, these are absent or rudimentary in the females.

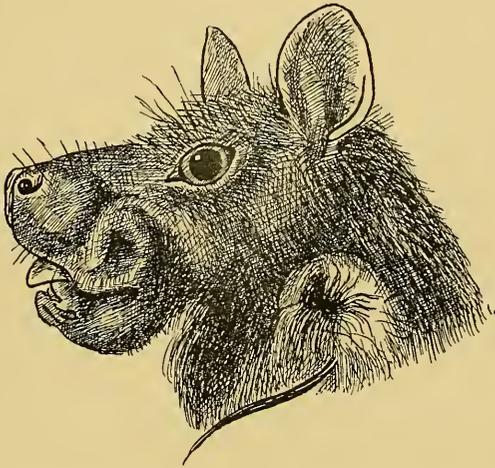


FIG. 116.—Head of the Epauletted Fruit Bat (*Epomophorus gambianus*).



FIG. 117.—Palate of *Epomophorus gambianus*, to show the ridges.

Fur of the back mouse-coloured and soft, extending along the fore and hind limbs and scantily developed on the neighbouring parts of the wing membrane; below somewhat paler; the white tufts of hairs at the base of the inner margin of the ear conch and on the shoulder glands being very conspicuous.

Tail very small about .15 in., concealed in the thick fur between the genital organs and the interfemoral membrane and quite free from the latter.

The first and second fingers bear claws and the wing membrane is attached to the basal joint of the second toe.

Roof of the mouth with six palate ridges; the first placed just behind the canines with a slight triangular projection in the centre of the posterior margin; second, third and fourth simple and undivided transversely, the fourth being opposite the first molar; the fifth and sixth being divided by a narrow transverse incision into two half ridges.

Dimensions.—Of a male and female preserved in alcohol; head and body ♂ 6.5, ♀ 5.5; snout from nostril to base of ear conch ♂ 2.75, ♀ 2.0; fore arm ♂ 3.5, ♀ 3.25; hind foot with claw ♂ 1.0, ♀ 1.0; expanse of wings ♂ 21.0.

Distribution.—This fruit bat appears to be found throughout the greater part of tropical Africa from Gambia on the West Coast to Kilima-njaro on the east and southwards thence to the Colony; in South Africa it is confined to the eastern half, being recorded from Mashonaland, Matabeleland (Howard), Natal and the eastern provinces of the Colony.

The South African Museum possesses examples from Durban and from the neighbourhood of Grahamstown.

Habits.—The species was first described by Mr. Ogilby from specimens brought home from Gambia in West Africa by Mr. Rendall; little seems to have been noticed about the habits of this bat but it is said by Dr. Kirk (now Sir John Kirk) to feed chiefly on figs. Dr. Dobson has shown that the whole structure of the lips, wind-pipe and gullet of this animal is admirably arranged to form a suction engine which is probably applied to the upper end of the fig so that the soft internal parts can be sucked out through the upper aperture. Mr. Howard states that these bats are fond of fruit and spend the night stripping peach trees, the fruit of which they take with them to the darker shade afforded by orange trees in order to devour.

Dr. Schönland, from whom the Grahamstown specimens in the South African Museum were received, states that they are not uncommon in that neighbourhood especially in winter time.

170. **Epomophorus crypturus.** THE SMALLER EPAULETTED
FRUIT BAT.

Epomophorus crypturus, *Peters, Reise Mossamb. Säugeth.* p. 26, pl. v. and pl. xiii, figs. 1-6 (1852); *Kirk, Proc. Zool. Soc.* 1864, p. 650; *Bocage, Journ. Sci. Lisb.* (2), i, p. 3 (1889); *Thomas, Proc. Zool. Soc.* 1894, p. 137 [Zomba and Natal].

This species differs from *E. gambianus*, with which it was identified by Dobson, in size, the fore arm measuring 3·0 in. as against 3·5 in., and also in the arrangement of the palate ridges, in which it resembles a West African species, *E. macrocephalus*.

The second and third ridges in this species are arched forwards and separated by a considerable space from the fourth ridge, the fifth ridge, however, is the most peculiar and characteristic, it is rhomboidal and hollowed out in the centre and divided into two triangular halves by a narrow groove; the sixth ridge resembles that of *E. gambianus*.

Dimensions.—From Peters' description of a male; head and body 6·25; forearm 3·0; expanse of wings 19·75.

Distribution.—This bat was originally described by Peters from Tette on the Zambesi; it has subsequently been obtained from Mozambique, and there are examples in the British Museum from Zomba, in British Central Africa, and from Natal. This species is not represented in the collections of the South African Museum.

Habits.—According to Kirk these bats appear about sunset, they are abundant at the time when the great fig-trees are covered with fruit, this they carry off to the neighbouring *Bombax* trees and devour at leisure.

Genus **ROUSETTUS.**

Type.

Rousettus , <i>Gray, London Medical Repository</i> , xv., p. 299 (1821).....	<i>R. aegyptiacus.</i>
Xantharpyia , <i>Gray, List Spec. B. M.</i> p. 37 (1843).....	<i>R. amplexicaudatus.</i>
Cynonycteris , <i>Peters, Reise Mossamb. Säugeth.</i> p. 25 (1852)	<i>R. collaris</i>

Muzzle long and conical, upper lip grooved; index finger clawed, shorter than the metacarpal of the middle finger; tail short but distinct, and attached at its base to the interfemoral membrane.

Dentition.—i. $\frac{2}{2}$, c. $\frac{1}{1}$, pm. $\frac{3}{3}$, m. $\frac{2}{3}$ = 36. First upper pre-molar very small, close to the canine, separated by an interval from the second.

Skull very much vaulted above, post-orbital processes longer than in *Epomophorus*. Palate somewhat flat.

Nine species of this genus are described by Mr. Dobson in his catalogue, and several others have since been discovered; two only have been recorded from South Africa.

The range of this genus extends over Africa and Madagascar, and through Southern Asia from Palestine and India to the Malayan and Papuan islands as far as New Ireland.

Key of the South African Species.

- A. Smaller, fore arm about 3·12, fur greyish..... *R. collaris*, p. 106.
 B. Larger, fore arm about 4·5, fur yellowish, especially about the neck..... *R. stramineus*, p. 109.

171. **Rousettus collaris.** THE COMMON FRUIT BAT.

Pteropus collaris, Illiger, *Abhandl. Akad. Berl.* 1815, p. 84

Pteropus hottentotus, Temminck, *Monogr. Mamm.* ii, p. 87 (1835-41);
Smuts, Enum. Mamm. Cap. p. 3 (1832); *Grill, K. Vet. Akad. Handl. Stockholm*, ii, 2, p. 13 (1858) [Knysna].

Pteropus leachii, Smith, *Zool. Journ.* iv, p. 433 (1829); *id. Illustr. Zool. S. Afr. Mamm.* pl. xlviii (1847); *Layard, Cat. Mamm. S. Afr. Mus.* p. 19 (1862).

Cynonycteris collaris, Peters, *Reise Mossamb. Säugeth.* p. 25 (1852);
P. L. Sclater, Proc. Zool. Soc. 1870, p. 127 [fig. and account of breeding]; *Dobson, Cat. Chiropt. B. M.* p. 75 (1878).

Description.—Head moderate, lips not swollen or expanded, ears short, about as long as the distance from the nostril to the eye, oval, with a slight projection at the base of the outer margin; nostrils separated by a wide groove with sloping margins; wing membrane from the sides of the back, hairy only in the neighbourhood of their attachment and along the fore limbs, and there only slightly clothed.

Body covered with brown hair, darker above, lighter almost grey below, hair on the neck above the chest longer and coarser forming a kind of collar, and in the adult male a deep yellow colour; no traces of white hairs at the base of the ear or on the

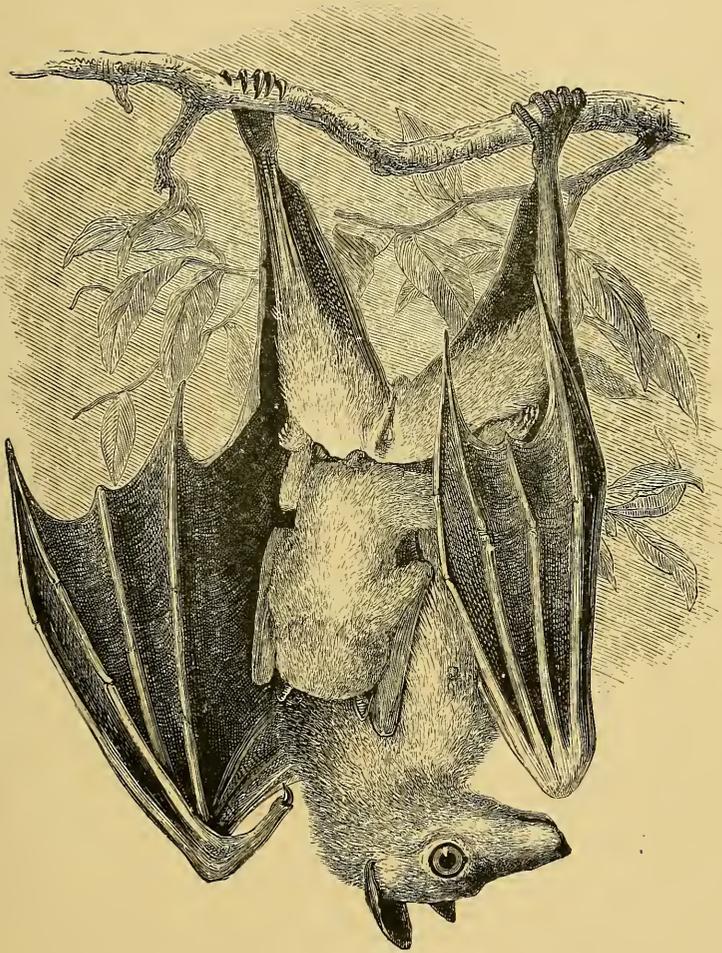


FIG. 118.—The Common Fruit Bat (*Rousettus collaris*), with young one clinging to its mother. (*Proc. Zool. Soc.*).

shoulder; the interfemoral membrane is hairy above to a point in the centre behind, below naked; tail about $\cdot 5$ in., attached at its base to the interfemoral membrane.

Incisors small, with a space in the upper ones between them and the canines; first upper premolar very small, second large and canine-like, third like the molars.

Dimensions.—From a specimen preserved in alcohol; head and body $5\cdot 5$; snout from the nostril to the base of the ear conch $1\cdot 32$; fore arm $3\cdot 12$; hind foot with claw $\cdot 9$; expanse about $25\cdot 0$; skull length $1\cdot 62$; zygomatic breadth $1\cdot 0$; upper cheek teeth $\cdot 55$.

Distribution.—The common fruit bat seems to be widely spread over Africa; in addition to South Africa it is recorded from Gaboon and Cyprus, and the Zoological Society of London has received an example caught in the Red Sea.

It is common in Cape Town and the neighbourhood at certain seasons of the year, and also in the Eastern Province and Natal; the specimens in the South African Museum are all from the immediate neighbourhood of Cape Town.

Habits.—These bats are not uncommon in South Africa, and appear as soon as their favourite food, which consists of fruit, and specially of loquats, is ripe; Mr. Layard asserts that in default of fruit they devour insects, and that they snap them off the flowers and leaves without alighting, and Dr. Dobson was informed that near Moulmein in Burma, a closely allied species was found to feed on shell-fish left exposed by the tide.

It is, however, as a devourer of fruit that it is best known, and its method of doing so is described by Mr. Layard as follows: When eating it throws itself on to a neighbouring branch or suspends itself with quivering wings, and seizing the fruit in its mouth, either bites a portion of it away at once or pulls it away from its hold; in this way it destroys far more fruit than it devours.

From two or three imported specimens there has been bred in the Zoological Society's Gardens in London a very large number of young ones; the young one is described as being born covered with short smooth hairs of a uniform pale cinereous, darker at the tips. They hang by their hind claws to the lower part of the body of the mother with their mouth usually attached to one of the two mammae, which are placed on the pectoral muscle beneath the wing.

172. *Rousettus stramineus*. THE YELLOW FRUIT BAT.

Pteropus stramineus, *Geoffroy, Ann. du Muséum* xv, p. 95 (1810).

Xantharpyia straminea, *Gray, List Mamm. B.M.* p. 38 (1843).

Pteropus? *Layard, Cat. Mamm. S. Afr. Mus.* p. 20 (1862).

Cynonycteris straminea, *Dobson, Cat. Chirop. B.M.* p. 77 (1878).

Description.—Face in front of the eyes nearly naked; back of the head covered with short and adpressed yellowish brown hair; fur on the back yellowish, brighter coloured along the margins, and occupying only a narrow space, about 1·5 in. wide across the loins; humerus and legs covered with long hair; below, the hair of the neck and throat is long and bright yellow, that of the rest of the under surface yellow; the fur extending on to the wing membrane from the knee to a point half way down the fore arm. Wing membrane arising from close to the spine. Skull and teeth similar to those of *R. collaris*, but proportionately larger.

The species can be distinguished from *R. collaris* by its greater size and its peculiar bright yellow colour.

Dimensions.—From a mounted specimen; head and body 8·0; from the base of the ear to the nostril 1·92; fore arm 4·5; hind foot with claws 1·0.

Distribution.—This fruit bat is found throughout the Ethiopian region, from Gambia, Abyssinia and Aden southwards. In South Africa it appears to be rare; there are two examples in the South African Museum. One of these was captured at sea off Hondeklip Bay in Namaqualand, the other, recently obtained, is from Mashonaland.

Habits.—It is probable that this bat resembles the other more common species in its habits; nothing special has been recorded about it.

Suborder **MICROCHIROPTERA.**

This suborder comprises the greater number of known bats, all of comparatively small size and of insectivorous, or occasionally, of frugivorous or sanguivorous habits; the crowns of the molars are acutely cusped, the bony palate is narrowed abruptly and not continued back behind the last molar; the index or second finger is never terminated by a claw, and the inner and outer margins of the ear conch arise separately from the head; the tail when present

is either contained in the interfemoral membrane, or if free appears on the upper or dorsal surface, never on the ventral.

This suborder is distributed all over the world, except in the extreme arctic regions.

Family RHINOLOPHIDAE.

Small insect-eating bats with a well developed nose-leaf, situated in a depression on the muzzle; ears large, generally separate; tragus completely absent.

The upper incisors are quite rudimentary; the first upper molar is minute, and the milk teeth are absorbed before birth.

Key of the South African Genera.

- A. First toe with two, others with three joints each; posterior nose-leaf triangular and erect; a large antitragus *Rhinolophus*, p. 110.
- B. All the toes with two joints only; posterior nose-leaf concave, with rounded upper margin; no antitragus *Hipposiderus*, p. 116.

Genus **RHINOLOPHUS.**

Type.

Rhinolophus, *Geoffroy, Nouv. Dict. d'Hist. Nat.*

xix, p. 383(1803) *R. ferrum-equinum*:

First toe with two, others with three joints as in most mammals.

Nose-leaf very complicated, consisting of three distinct portions— anterior, central and posterior; the anterior portion horse-shoe shaped, containing within its margin the nasal orifices and the erect central process; posterior process triangular with cells on its anterior surface; central process or sella arising between and behind the nasal orifices, flattened anteriorly and sending a backwardly directed, laterally compressed, connecting process, which is either free or connected with the posterior nose-leaf [see Figs. 119, 120 on pp. 112, 114]. Base of the outer margin of the ear expanded forming an antitragus; no tragus. Wings large.

Dentition.—i. $\frac{1}{2}$, c. $\frac{1}{1}$, pm. $\frac{2}{3}$, m. $\frac{3}{3}$ = 32.

First upper premolar minute and either in the tooth-row or

in the outer angle between the large canine and second upper premolar; second lower premolar minute, sometimes not to be detected, lying outside the tooth-row.

Of these bats, which can be very easily recognized by the peculiar shape of the nose-leaf, at least twenty-four species are known from various parts of the Eastern hemisphere, including Australia.

The five South African species can be distinguished as follows:—

- A. First upper premolar in the tooth row between the canine and the second upper premolar; fore arm 1·7..... *R. landeri*, p. 111.
- B. Second upper premolar close to the canine forcing the first upper premolar out externally to the tooth row.
- a. Ears quite attenuated at the tips, fore arm 2·12 *R. ferrum-equinum*, p. 112.
- b. Ears subacutely pointed, not attenuated.
- a¹. Ears as long as the head; horse-shoe shaped nose-leaf not concealing the sides of the muzzle; fore arm 1·8... *R. capensis*, p. 114.
- b¹. Ears shorter than the head; horse-shoe shaped nose-leaf, broad, concealing the sides of the muzzle; fore arm 2·2..... *R. aethiops*, p. 115.
- c¹. Ears shorter than the head; nose-leaf thickly coated with hair, hardly concealing the sides of the muzzle; fore arm 2·3..... *R. hildebrandti*, p. 115.

173. *Rhinolophus landeri*. LANDER'S HORSESHOE BAT.

Rhinolophus landeri, *Martin, Proc. Zool. Soc.* 1837, p. 101; *Dobson, Cat. Chirop. B. M.* p. 118, pl. vii, fig. 9 (1878); *Thomas, Proc. Zool. Soc.* 1894, p. 138.

Rhinolophus lobatus, *Peters, Reise Mossamb. Säugeth.* p. 41, pl. ix, xiii, fig. 16, 17 (1852); *Dobson, Report Brit. Assoc.* p. 178 (1880).

Description.—Ears shorter than the head and not attenuated at the extremities; the inner margin of the ear conch convex to the tip; antitragus short, evenly convex, separated posteriorly by a shallow notch; horizontal nose-leaf broad, almost concealing the muzzle; vertical process of the sella narrowed in the centre exceeded in height by the posterior connecting process which forms

a more or less acute angular elevation; posterior nose-leaf short and acutely pointed.

Colour from ferruginous brown to sulphur above and below.

First upper pre-molar in the tooth-row closely pressed between the canine and second premolar.

Dimensions.—See *R. ferrum-equinum* below.

Distribution.—Africa generally; the type in the British Museum is from Fernando Po, it is also recorded from Gaboon, Mombasa and Nyasaland. In South Africa it is found in Damara-land and Mashonaland; examples from Mazoe in the latter district are preserved in the South African Museum.

174. **Rhinolophus ferum-equinum.** THE EUROPEAN
HORSESHOE BAT.

Vespertilio ferrum-equinum, Schreber, *Säugeth.* i, p. 174 pl. lxii (1775);

Rhinolophus ferrum-equinum, Leach, *Zool. Miscell.* iii, p. 2 (1817);

Dobson, *Cat. Chiropt. B. M.* p. 119, pl. vii, fig. 10 [head] (1878); id.

Report Brit. Assoc. p. 177 (1880).

Rhinolophus geoffroyi, A. Smith, *Zool. Journ.* iv, p. 433 (1829).

Description.—Ears slightly shorter than the head, very acutely pointed and attenuated at the tip; the outer margin of the ear conch deeply concave in its upper third, inner margin slightly concave in its upper fourth; antitragus not much developed,

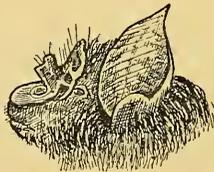


FIG. 119.—Head of the European Horseshoe Bat (*Rhinolophus ferrum-equinum*).

separated posteriorly by a shallow notch. Nose-leaf small, the horseshoe-shaped portion not concealing the sides of the muzzle, vertical process narrow, sides slightly concave, exceeded in height by the posterior connecting process; terminal portion of the nose-leaf triangular, with emarginate sides.

Wing membrane from the ankles; extreme tip of the tail free; fur above reddish brown, below yellowish grey.

Second upper premolar close to the canine; first premolar minute and quite external to the tooth-row.

Dimensions.—Measurements of males of *R. ferrum-equinum*, *R. capensis*, and *R. landeri* from specimens preserved in alcohol:—

	<i>R. ferrum-equinum.</i>	<i>R. capensis.</i>	<i>R. landeri.</i>
Head and body	3·12	2·62	2·25
Tail	1·18	·87	1·0
From extremity of muzzle to base of inner margin of the ear	·63	·60	·62
Length of ear	·76	·86	·74
Fore arm	2·12	1·87	1·80

Distribution.—This species is very widely diffused; it is found all over Europe as far north as the southern part of England and the Hartz Mountains, in Asia in the Himalayas and Japan, and apparently all over Africa. The South African Museum possesses examples from Cape Town and its neighbourhood where it appears to be not uncommon, and from Ookiep in Namaqualand; it is also found in the Eastern Provinces and Natal; specimens from King Williams Town and Durban being recorded in the British Museum Catalogue. It likewise occurs in the Transvaal, whence I have examined examples preserved in the Pretoria Museum.

Habits.—Very little has been recorded about the habits of these horseshoe bats in South Africa; probably they do not differ much from their congeners in Europe. The most remarkable feature about them is doubtless the very complicated nose-leaf, which seems to form a special organ of touch. They are said to come out at a later hour in the evening than the other bats without nose-leaves, and possibly these sensitive organs together with their large and delicate ears, may enable them to hunt for their insect prey at a later hour. In the north of France, and probably in other temperate countries, these bats hibernate in caves in large colonies, and it has been observed that the colonies consist exclusively of either males or females.

Their food consists of insects, especially of beetles the hard wing-cases of which their very sharp pointed teeth enable them easily to crush.

175. **Rhinolophus capensis.** THE CAPE HORSESHOE BAT.

Rhinolophus capensis, *Lichenstein, Verz. Doubl. Zool. Mus. Berl.* p. 4 (1823); *Dobson, Cat. Chiropt. B. M.* p. 121, pl. vii, fig. 11 (1878).

Rhinolophus clivusos, *apud Smith, S. Afr. Quart. Journ.* ii, p. 55 (1834); *Smuts, Enum. Mamm. Cap.* p. 5, (1832); *Layard, Cat. Mamm. S. Afr. Mus.* p. 20 (1862) [*nec Rüppell*].

? *Rhinolophus auritus*, *Sundevall, K. Vetens. Akad. Handl. Stockholm*, ii, 2, p. 13 (1858) [*Knysna*].

Description.—Resembles *R. ferrum-equinum* closely, but the ears are longer than the head, and are broad and sub-acutely pointed

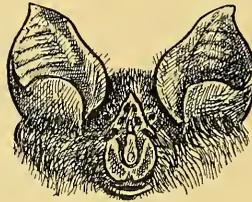


FIG. 120.—Head of the Cape Horseshoe Bat (*Rhinolophus capensis*).

and not attenuated near the tips; inner margin convex throughout, outer margin very slightly concave in its upper third, nose-leaf and other parts as in *R. ferrum-equinum*, the horseshoe shaped portion of the nose-leaf not concealing the margins of the muzzle.

The fur usually as in *R. ferrum-equinum*, but a specimen in the South African Museum from the Clanwilliam division of the colony is of a light reddish colour above and below. *R. auritus*, described as rather smaller and differing slightly in colour is probably referable to this species.

Dimensions.—See above, under *R. ferrum-equinum*.

Distribution.—This species is found apparently throughout the greater part of South Africa, extending as far north as Nyasaland and Zanzibar. Within the limits of our fauna the South African Museum possesses examples from Cape Town, the Clanwilliam and Albany divisions, and the British Museum has specimens from the de Kaap Gold Fields in the Transvaal, and from Mashonaland.

Habits.—Not uncommon in the neighbourhood of Cape Town, frequenting stables and outhouses, from the roofs of which it hangs suspended during the hours of daylight.

176. *Rhinolophus aethiops*. THE DAMARALAND HORSESHOE BAT.

Rhinolophus aethiops, *Peters, M. B. Akad. Berlin*, 1868, p. 637 (1869); *Dobson, Cat. Chirop. B. M.*, p. 122, pl. vii, fig. 12 [head] (1878); *id. Report Brit. Assoc.* p. 178 (1880).

Description.—Resembling *R. ferrum-equinum* closely in size and in the general form of the ears; the ear couch, however, is less attenuated above and quite obtusely pointed, and the nasal cutaneous appendages are much larger; horseshoe shaped portion of the nose-leaf broad, when viewed from above and concealing the muzzle; central erect part of the sella as in *R. ferrum-equinum*, but the posterior connecting band is more broadly rounded off, and scarcely rises above the level of the extremity of the sella; sides of terminal lancet-shaped leaf straight, not emarginate; wings from the ankles or tarsi; last caudal vertebra projecting; colour, distribution of fur and dentition as in *R. ferrum-equinum*.

Dimensions.—Head and body 2·4; tail 1·2; ear ·9; fore arm 2·2 (Dobson).

Distribution.—This little bat, of which there are no examples in the South African Museum, was originally obtained at Otjimbinque in Ovampoland. It has also been recorded from southern Angola.

177. *Rhinolophus hildebrandti*. HILDEBRANDT'S HORSESHOE BAT.

Rhinolophus hildebrandti, *Peters, M. B. Akad. Berlin*, 1878, p. 195, pl. i, fig. 1; *Dobson, Report Brit. Assoc.* (1880), p. 178; *Thomas, Proc. Zool. Soc.*, 1894, p. 138.

Description.—Ears a little shorter than the head, rounded at the tip and hardly attenuated, the inner margin being convex throughout, the outer slightly concave in the upper half, antitragus rounded, separated posteriorly by a shallow notch; nose-leaf well developed, but hardly covering the sides of the muzzle, sella narrowest in the middle where it is concave, rounded above, the posterior connecting process not surpassing it in height, and evenly rounded posteriorly, not conical or pointed as in *R. ferrum-equinum*; terminal portion slightly emarginate laterally, rounded at the tip, the whole of the organ thickly clothed with hair; wings from the ankles; tail tip slightly projecting, calcanea well developed.

Fur soft and abundant, grey brown above, below grey, becoming almost white posteriorly.

Anterior upper premolar in a triangular space external to the tooth-row, the median premolar and the canine being just in contact; median lower premolar not discernible in the single specimen available for examination.

Dimensions.—Measured in the flesh by Mr. Marshall; head and body 2.70; tail 1.70; ear 1.20; length of fore arm 2.30.

Distribution.—The type of this species was obtained at Taita in East Africa; it has also been recorded from Nyasaland. The South African Museum has recently received the skin of a bat from Mr. G. A. K. Marshall captured in a small cave, ten miles east of Salisbury, which agrees in every respect with those from Nyasaland in the British Museum and from it the description has been drawn up.

Genus **HIPPOSIDERUS.**

Type.

Hipposiderus, Gray, *Zool. Miscell.* p. 37 (1831) *H. speoris*.
Phyllorhina, Bonaparte, *Icon. Faun. Ital.* (1836)..... *H. diadema*.

All the toes equal, with two joints each, unlike most mammals; nose-leaf complicated, consisting of three portions; an anterior horseshoe shaped part, a posterior portion erect, concave, with rounded hind margins often divided by vertical ridges into shallow cells and an intermediate portion corresponding to the sella of *Rhinolophus* which is usually broadly cordiform from the base upwards and has no trace of the hinder connecting process.

Most of the species are provided with a frontal sac behind the posterior nose-leaf which the animal can evert at pleasure.

Dentition.—i. $\frac{1}{2}$, c. $\frac{1}{1}$, pm. $\frac{2}{2}$, m. $\frac{3}{3}$ = 30. First upper premolar minute, in the outer angle between the canine and the second upper premolar.

Twenty-two species of this genus are described in Dr. Dobson's catalogue, of which only two are found in South Africa; the others are distributed over the other parts of Africa and the tropical and sub-tropical regions of Southern Asia and Australia.

Key of the South African Species.

- A. Larger, fore arm 3.5; frontal glandular sac
 with a longitudinal opening *H. commersoni*, p. 117.
 B. Smaller, fore arm 1.85; frontal glandular sac
 small with transverse opening *H. caffer*, p. 118.

178. **Hipposiderus commersoni.** COMMERSON'S LEAF-NOSED BAT.

Rhinolophus commersoni, *Geoffroy, Ann. de Museum*, xx, p. 263, pl. v (1813).

Phyllorhina vittata, *Peters, Reise Mossamb. Säugeth.* p. 32, pl. vi, xiii, fig. 7-13 (1852).

Phyllorhina commersonii, *Peters, M. B. Akad. Berlin*, 1871, p. 318 (1872); *Dobson, Cat. Chirop. B. M.* p. 133, pl. ix, fig. 2 [head] (1878).

Description.—Ears long, narrow and attenuated at their extremities; head long and wide in front, the anterior nose-leaf not concealing its sides; posterior leaf as wide as the anterior with nearly straight hind margin, the leaf itself concave and divided

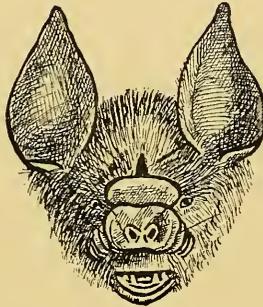


FIG. 121.—Head of Commerson's Leaf-nosed Bat (*Hipposiderus commersoni*).

down the middle by a vertical ridge with ill-defined parallel ridges on either side; four accessory leaflets underlying the sides of the anterior horseshoe. Behind the posterior leaflet is the longitudinally placed opening of the large glandular frontal sac through which projects a bundle of long hairs.

Wing membrane attached to the ankles; last joint of the middle finger folded back in repose on the penultimate joint; tail long, ultimate and the greater part of the penultimate vertebrae projecting beyond the interfemoral membrane.

Fur light brown on the head and back, greyish on the sides, white beneath, except a patch of brown on the shoulder; in some specimens reddish throughout.

First upper premolar minute and external to the tooth-row; canines very long and strong.

Dimensions.—Head and body 4·40; tail 1·37; from nostril to base of inner margin of ear 1·06; length of ear 1·0; fore arm 3·5.

Distribution.—This bat, the largest of the genus, appears to be found over the greater part of tropical Africa and Madagascar; an example in the South African Museum obtained in Ovampoland brings it within the limits of this work.

179. *Hipposiderus caffer*. THE AFRICAN LEAF-NOSED BAT.

Rhinolophus caffer, *Sundevall, Oefvers. Akad. Forh. Stockholm*, 1846, p. 118 (1847).

Phyllorhina caffra, *Peters, Reise Mossamb. Säugeth.* p. 39, pl. viii (1852); *Dobson, Cat. Chirop. B. M.* p. 140 (1875).

Phyllorhina gracilis, *Peters, Reise Mossamb. Säugeth.* p. 36, pls. vii, xiii, figs. 14-15 (1852).

Description.—Ears shorter than the head with the basal half of the inner margin very convex, point of the ear slightly obtuse; on the outer margin, the antitragus is marked by a distinct projection; horseshoe-shaped nose-leaf narrow with two secondary leaflets on either side; posterior leaflet with convex and free hind margin not divided by vertical ridges; the small transversely directed opening of the frontal glandular sac can be observed behind the posterior nose-leaf.

Wings from the ankles; tip of the tail projecting beyond the interfemoral membrane; last joint of the middle finger folded back in repose on the penultimate joint.

Fur grey above, paler below, inner side of ear clothed with fine hair.

Dimensions.—Head and body 2·35; tail ·9; from the nostril to the base of the inner margin of the ear ·54; length of the ear ·50; fore arm 1·85.

Distribution.—Generally distributed over tropical Africa south of the Sahara, from Abyssinia and the Cameroons southwards. Within our limits it appears to be confined to the extreme northern and eastern districts; it is recorded from Damaraland, Mashonaland, the de Kaap Gold Fields in the Transvaal, Delagoa Bay and Natal. It is well represented in the South African Museum by specimens from Natal Delagoa Bay and Mazoe in Mashonaland.

Family NYCTERIDIDAE.

Insectivorous bats with the nostrils sometimes margined by a nose-leaf, sometimes with the nostrils at the end of a deep longitudinal depression; ears large and united, tragi well developed, mammae pectoral; tibiae long, fibulae rudimentary.

Premaxillary bones cartilaginous or small, upper incisors absent or very small in the centre of the space between the canines.

Genus NYCTERIS.

Type.

Nycteris, *Geoffroy, Nouv. Dict. d'Hist. Nat.* xv, p. 501

(1803)..... *N. hispida*.

Bats with nostrils at the anterior end of a longitudinal facial groove; ears usually long, united by a low band, tragi small but well developed; tail long, produced to the hinder edge of the inter-femoral membrane, with terminal T-shaped vertebrae; index finger consisting of the metacarpal bone alone; mammae pectoral not axillary.

Dentition.—i. $\frac{2}{3}$, c. $\frac{1}{1}$, pm. $\frac{1}{2}$, m, $\frac{2}{3}$ = 32.

Upper incisors small, chisel-shaped bifid or trifid equal in vertical extent, close together, second lower premolar small, often minute or internal.

Some seven or eight species of this genus are described from the Ethiopian region and from the Malay Peninsula and Java.

Key of the South African Species.

- A. Ears short; tragus with concave inner margin, incisors trifid *N. hispida*, p. 119.
- B. Ears long; tragus with convex margins, incisors bifid *N. capensis* p. 120.

180. Nycteris hispida. THE HAIRY SLIT-FACED BAT.

Vespertilio hispidus, *Schreber, Säugeth.* i, p. 169, pl. lvi (1775).

Nycteris daubentonii, *Geoffroy, Desc. de l'Egypte*, p. 113 (1812).

Nycteris villosa, *Peters, Reise Mossamb. Säugeth.* p. 48, pl. xi (1852).

Nycteris hispida, *Peters, M. B. Akad. Berlin*, 1870, p. 901, pl. fig. 1 and 2 (1871); *Dobson, Cat. Chirop. B. M.* p. 162, pl. xi, fig. 1 [incisors] (1878).

Description.—Ears only slightly longer than the head; tragus small, curved inwards and forwards, narrowed above inner margin, concave; fur of the back extending upon the humerus and the fleshy part of the forearm and the wing membranes between the elbow and knee; fur dark brown or black, the extremities of the hairs paler.

Upper incisors short, broad, and trifid; the second lower premolar minute, in the tooth-row, varying in size.

Dimensions.—Head and body 1·8; tail 1·85; ear ·85; fore arm 1·6.

Distribution.—This species is found over the greater part of the tropical Africa; from South Africa the British Museum possesses a specimen obtained at the Cape of Good Hope, and Dr. Peters has recorded a species (*N. villosa*) which seems to be identical or very closely allied, from Inhambane in Portuguese South-east Africa. Not represented in the South African Museum.

181. *Nycteris capensis*. CAPE SLIT-FACED BAT.

Nycteris capensis, *A. Smith, Zool. Journ.* iv, p. 434 (1829); *Smuts, Enum. Mamm. Cap.* p. 7 (1832); *Dobson, Cat. Chirop. B. M.* p. 166 (1878); *id Report Brit. Assoc.* (1880), p. 183.

Nycteris affinis, *A. Smith, Zool. Journ.* iv, p. 434 (1829).

Nycteris discolor, *Wagner, Schreber Säugeth.* i, p. 440 (1840); *Grill, K. Vetens. Akad. Handl. Stockholm* ii, 2, p. 13 (1858) [Knysna].

Nycteris fuliginosa, *Peters, Reise Mossamb. Säugeth.* p. 46, pl. x. (1852).

Nycteris damarensis, *Peters, M. B. Akad. Berlin*, 1870, p. 905 (1871).

Description.—Ears much longer than the head with almost rounded tips; tragus with the outer margin convex in its upper half, and its inner margin convex throughout, not very long, hardly projecting above the fur at the base of the ear. Nostrils at the anterior end of a deep longitudinal slit, extending back nearly as far as the band connecting the ears, the sides of the slit margined by small cutaneous appendages.

Wings from the ankles; tail long, the terminal caudal vertebrae forming a T-shaped piece margining the interfemoral membrane which is large and well developed.

Fur greyish brown above, sometimes with a reddish tinge at the base of the ears, below much lighter and sometimes nearly white.

Upper incisors bifid; the second lower premolar very minute, difficult to detect even with a lens, in the tooth-row.

Dimensions.—From a specimen preserved in alcohol; head and body 2.60; tail 2.0; from tip of nostril to base of inner margin of the ear .62; ear 1.25; forearm 1.77.

Distribution.—South Africa, extending northwards to Damaraland and Zanzibar; a common bat in South Africa. The South African Museum possesses examples from the Namaqualand, Worcester, Fort Beaufort, Griqualand West, and Clanwilliam divisions of the Colony, from Rustenberg in the Transvaal and from Mazoe in Mashonaland; it has also been recorded from Damaraland and Natal.

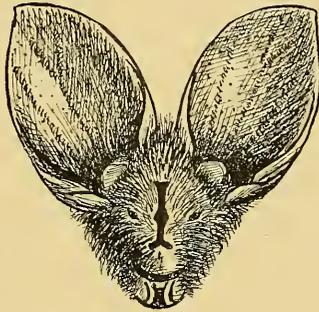


FIG. 122.—Head of the Cape Slit-faced Bat (*Nycteris capensis*).

The differences separating this species from *N. thebaica* of North-east Africa are very slight, and probably on comparison of a larger number of specimens will be found non-existent; should this turn out to be the case the distributional area of the species will be extended to Egypt.

Habits.—Nothing much has been recorded about the habits of this species; like other insectivorous bats they come out at dusk, spending the day in numbers together, frequently in lofts clinging to the beams.

Family VESPERTILIONIDAE.

Insectivorous bats with nostrils at the extremity of the muzzle opening by a simple circular or crescentic apertures, with moderate ears, usually separate and well developed tragi; legs short; tail long contained in and produced to the hinder margin of the inter-femoral membrane with only the tip occasionally projecting.

Incisors $\frac{1-2}{3}$ on either side, upper ones small separated by a wide space in the middle line, usually close to the canines; upper premolars from one to three in number when the latter the anterior tooth is usually small and often outside or inside the regular tooth-row.

This family is found nearly all over the world and contains by far the greatest number of species and individuals in the order.

Key of the South African Genera.

- A. Crown of the head flattened to the level of the face line, upper incisors close to the canines.
- a. Outer margin of the ear conch ending near the angle of the mouth; ears short and triangular; tragus curved inwards or straight; premolars two or less.
- a¹. Two pairs of upper incisors, inner ones bifid.
- a². No lobular projection at the angle of the mouth; tibiae short *Vespertilio*, p. 122.
- b². A lobular projection near the mouth; tibiae long *Chalinobus*, p. 128.
- b¹. One pair of upper incisors, unicuspidate, close to the canines; wing membrane thick and leathery *Scotophilus*, p. 129.
- b. Outer margin of the ear conch ending opposite the inner margin of the tragus; ears generally long and narrow, the tragus long and narrow straight or outwardly curved; three upper premolars...
- a¹. Nasal opening crescentic; first and second upper premolars smaller than the third *Myotis*, p. 130.
- b¹. Nasal opening circular; first and second upper premolars nearly equal to the third *Kerivoula*, p. 132.
- B. Crown elevated above the face line; incisors separated by a space from the canines; terminal joint of the middle finger bent in repose on the under surface of the metacarpal bone *Miniopterus*, p. 134.

Genus **VESPRTLIO.**

Type.

Vespertilio, *Linnaeus, Syst. Nat.* 12th ed., i. p. 46

(1766) *V. murinus*.*

Eptesicus, *Rafinesque, Annals of Nature*, p. 2 (1820)

V. fuscus.

* *V. discolor* Natt. et auct. plur.

- Pipistrellus**, *Kaup, Entw.-Gesch. u. natürl. Syst. der europ. Thierw.*, pt. 1, p. 98 (1829)..... V. pipistrellus.
Yesperus, *Keys. & Blasius, Wieg. Archiv*, v. pt. 1, p. 313 (1839).
Yesperugo, *Keys. & Blasius, Wieg. Archiv*, v, pt. 1, p. 312 (1839).

Muzzle very thick and broad with glandular prominences between the eyes; crown of the head nearly flat; nostrils opening on either side by simple crescentic apertures; ears separate, shorter than the head, triangular, the outer margin extending beyond the base of the tragus to near the angle of the mouth.

Dentition.—(In African species) i. $\frac{2}{3}$, c. $\frac{1}{1}$, pm. $\frac{1-2}{2}$, m. $\frac{3}{3}$ = 32 or 34.

Upper incisors in pairs separated by an interval, outer incisors close to the others, often very minute, first upper premolar minute or absent.

Owing to certain investigations by Mr. G. S. Miller, Jr. (*Ann. Mag. N. H.* (6), xx, p. 380, 1897), this genus hitherto known as *Yesperugo* must now be called *Vespertilio*—a considerable inconvenience liable to cause a good deal of confusion but necessary if the rules of nomenclature are to be adhered to.

This genus probably contains the greatest number of individuals and of species among all the *Chiroptera*. Fifty are recognised in Mr. Dobson's catalogue and some twenty additional ones have since been described; they are distributed over the whole of the world but are more abundant in the temperate and subtropical regions of the Eastern hemisphere.

Only four species have been hitherto definitely recorded from South Africa, but probably a good many more remain to be discovered and recognised.

Key of the South African Species.

- A. With one upper premolar. (Subgenus *Eptesicus*).
 a. Inner upper incisors with a small external cusp.
 a¹. Smaller; fore arm 1.25 V. *minutus*, p. 124.
 b¹. Larger; fore arm 1.44 V. *capensis*, p. 125.
 b. Inner upper incisors unicuspidate; forearm 2.0 V. *megalurus*, p. 126.
 B. With two upper premolars, first minute and internal to the tooth-row (Subgenus *Pipistrellus*)

- c. Outer upper incisors nearly as large as the inner ones; base of thumbs and soles of feet swollen, forming adhesive discs; fore arm 1·2 *V. nanus*, p. 126.

182. **Vespertilio (Eptesicus*) minutus.** THE SMALL SEROTINE BAT.

Vespertilio minuta, *Temminck, Monogr. Mammal.* ii, p. 209 (1841); *Grill, K. Vctens. Akad. Handl. Stockholm* ii, 2, p. 13 (1858) [Knysna].

? *Vespertilio subtilis*, *Sundevall, Oefvers. Akad. Forhandl. Stockholm*, 1846, p. 119 (1847).

Scotophilus minutus, *Tomes, Proc. Zool. Soc.* 1861, p. 33 [Lake Ngami].

Vesperugo minutus, *Dobson, Cat. Chirop. B. M.* p. 197 (1878).

Description.—Ears moderately long but shorter than the head, inner margin nearly straight, tips rounded, upper portion of the outer margin concave, lower portion convex terminating close to the angle of the mouth with a lobe; tragus with straight inner and convex outer margin, somewhat attenuated towards the tip. Wing membrane to the base of the toes; post-calcaneal lobe narrow or absent; extreme tip of the tail projecting beyond the interfemoral margin. Fur brown with lighter tips, paler below. Only one upper premolar.

This bat resembles *V. capensis* very closely except that it is a good deal smaller.

Dimensions.—From an adult male in alcohol; head and body 2·10; tail 1·25; snout from inner margin of ear to nostrils ·44; ear ·45; fore arm 1·25, of a male measured in the flesh by Mr. Marshall, head and body 1·9, tail 1·25, ear ·43.

Distribution.—This species is found all over Africa, south of Somaliland and the Sahara, also in Madagascar.

From South Africa the South African Museum possesses examples from the Cape, Namaqualand, Albany and Port Elizabeth divisions of the Colony, and from Salisbury in Mashonaland. It is also recorded from Knysna and Lake Ngami.

* This name is substituted for *Vesperus* which is not tenable owing to pre-occupation [c f. Thomas, *Proc. Zool. Soc.*, 1896, p. 791].

183. **Vespertilio (Eptesicus) capensis.** THE CAPE SEROTINE BAT.

Vespertilio capensis, *A. Smith, Zool. Journal* iv. p. 435 (1829); *Smuts, Enum. Mamm. Cap.* p. 7 (1832); *A. Smith, S. Afr. Quart. Journ.* ii, p. 58 (1834).

Vespertilio minutus, *apud A. Smith, Illustr. Zool. S. Afr. Mamm.* pl. li. (1848).

Scotophilus capensis, *Tomes, Proc. Zool. Soc.* 1861, p. 36.

Vesperugo capensis, *Dobson, Cat. Chiropt. B. M.* p. 198 (1878); *Fisk, Proc. Zool. Soc.* 1890, p. 97 [albino var].

Description.—Ears shorter than the head, somewhat triangular with rounded tips, inner margin of the conch nearly straight, outer with the upper half slightly concave, the lower portion with a distinct lobule which terminates close to the mouth; tragus with straight inner, and convex outer margin; its greatest width being at about the level of the commencement of the inner margin of the conch.

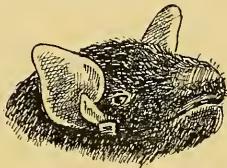


FIG. 123.—Head of the Cape Serotine Bat (*Vespertilio capensis*).

Wings from the base of the thumb; post-calcaneal lobe very small; extremity of the tail projecting. Fur above light brown, below paler, all the bases of the fur slaty; no hair on the wing membranes except very close to the body.

Inner upper incisor well developed with traces of a small second cusp at the extremity, outer very small, in close contact with the base of the inner: only one upper premolar.

Dimensions.—From an adult male in alcohol; head and body 2.28; tail 1.30; snout from base of inner margin of ear to front of head .38; ear .48; fore arm 1.44.

Distribution.—South Africa generally, extending as far north as Kilima-njaro in East Africa. The South African Museum has received specimens from Cape Town and the neighbourhood, and from the divisions of Knysna, Clanwilliam and Griqualand West, also from Potchefstroom and Waterberg in the Transvaal; it also

extends into the eastern districts, as the British Museum has examples from King Williamstown and Durban.

Habits.—This species, apparently one of the commonest in South Africa, is said by Sir A. Smith to be an inhabitant of wooded districts, where it commences to seek its food at dusk, and continues on the wing through the night, resting during the day in caves or hollow trees. Several specimens, however, which have reached the Museum are described as having been caught in sheds or lofts, and it seems probable that these are their most usual resting places.

A curious albino variety obtained by Mr. Fisk was exhibited before the Zoological Society in 1890; it was shot at Somerset West, near Cape Town.

184. **Vespertilio (Eptesicus) megalurus.** THE EASTERN PROVINCE
SEROTINE BAT.

Vespertilio megalurus, *Temminck, Monogr. Mamm.* ii, p. 206 (1841).

Vesperugo megalurus, *Dobson, Cat. Chirop. B. M.* p. 199 (1878).

Description.—Ears shorter than the head; tragus twice as long as broad, tip obtusely pointed; muzzle nearly naked; tail long, with last caudal vertebra free, no trace of a post-calcaneal lobe; wings from the base of the toes, fur long and woolly.

Inner upper incisor long, acutely pointed and unicuspidate, outer incisor very small; a single upper premolar close to the canine (Dobson).

Dimensions.—From the type specimen; head and body 2·6; tail 2·0; ear ·6; fore arm 2·0 (Dobson).

Distribution.—The type of this species was obtained in Kaffraria, *i.e.*, in the eastern part of Cape Colony, and is now preserved in the Leyden Museum. Examples have been since obtained in the Drakensberg of Natal and in Nyasaland; it is as yet unrepresented in the South African Museum.

185. **Vespertilio (Pipistrellus) nanus.** THE CLINGING SEROTINE
BAT.

Vespertilio nanus, *Peters, Reise Mossamb. Säugeth.* p. 63, pl. xvi, fig. 2 (1852).

Vesperugo nanus, *Dobson, Proc. Zool. Soc.* 1875, p. 472; *id. ibid.*, 1876, p. 532, pl. iv, fig. 1, 1a, 4a, [on the adhesive discs]; *id. Cat. Chirop. B. M.* p. 237, pl. xii, fig. 9 [head] (1878).

Description.—Ears narrow, shorter than the head, inner margin gently convex, upper half of the outer margin concave, lower portion emarginate opposite the base of the tragus with a projecting square lobule above; tragus with convex outer and concave inner margins, the terminal projection being somewhat rounded and curved inwards. Base of the thumb swollen, with the surface traversed by wrinkles; sole of the foot similarly swollen and wrinkled but somewhat flatter; post-calcaneal lobe small, distinct and rounded; tail with the extreme point alone projecting.

Fur above and below dark brown or black with shining tips not encroaching on the wing membranes, which are attached to the base of the toes.

Upper incisors nearly equal in length, the inner bicuspidate, the outer unicuspidate, second upper premolar separated from the canine by a slight interval through which can be seen the small first premolar wholly inside the tooth row.

Dimensions.—From an adult male in alcohol; head and body 1·87; tail 1·38; snout from base of ear conch to tip of nose ·38; ear ·37; fore arm 1·20; measurements in the flesh by Mr. Marshall, head and body 1·75; tail 1·25; ear ·30.

Distribution.—Africa generally, south of the Sahara together with Madagascar. The type was obtained at Inhambane by Dr. Peters, and in South Africa this bat seems to be found only in the eastern or low lying districts; the South African Museum has specimens from Natal and the British Museum from East London. It does not seem to occur in the western half of the Colony.

Habits.—The most remarkable peculiarity of this bat is the possession of the swellings above described at the base of the thumb and on the soles of the feet, due doubtless to the great development of the integument and of the areolar or connective tissue below. The object of these swellings is doubtless adhesive, to enable the animals to walk on smooth hard surfaces where their claws would afford them but slight assistance; this same structure is found in two other species of the genus, *V. pachypus* from India, and *V. tylopus* from North Borneo, while in another genus from South America (*Thyroptera*) belonging to the same family there are regular round sucking discs attached to the thumb and sole of the foot.

The following species may shortly be mentioned:—

Vespertilio (Pipistrellus) noctula (Schreber), the Noctule bat of England, is found over the greater part of the Palaearctic,

Oriental and Ethiopian regions and probably reaches South Africa, although no record of its occurrence seems to exist. It may be recognised by having two upper premolars, by the absence of adhesive cushions to the thumbs and soles, and by the fact that the inner margin of the tragus is very concave; the length of the fore arm is from 2.0 to 2.8.

Vespertilio (Eptesicus) damarensis Noack, *Zool. Jahrb.* iv, p. 213, pl. v, fig 59 [incisor teeth] (1889), recently described seems to be closely allied to *V. capensis*, but has no very definite characters by which it can be discriminated; as its name implies, it was obtained in Damaraland.

Genus **CHALINOLOBUS.**

Type.

Chalinolobus, *Peters, M. B. Akad. Berlin*, 1866,

p. 680 (1867) *C. tuberculatus*.

Closely resembling *Vespertilio* in general characters but the lower lip with a fleshy lobule on either side near the angle of the mouth, the molars unicuspidate and the tibiae long and slender.

Two subgenera are distinguished, one *Chalinolobus* proper with two upper premolars found only in the Australian region, the other, *Glauconycteris*, with one upper premolar confined to the Ethiopian region with one species extending into South Africa.

186. **Chalinolobus variegatus.** THE BUTTERFLY BAT.

Scotophilus variegatus, *Tomes, Proc. Zool. Soc.* 1861, p. 36.

Chalinolobus variegatus, *Dobson, Proc. Zool. Soc.* 1875, p. 388;

Dobson, Cat. Chirop. B. M. p. 254 (1878).

Description.—Muzzle short and obtuse, ears short and sloped somewhat backwards, inner margins commencing in a short lobule then convex throughout, the tip being much rounded, the outer margin ending in a horizontal lappet of thickened skin forming a fleshy lobule running along the lower lip; tragus semilunate, its inner margin slightly concave, outer convex. First phalanx of the longest digit short, second phalanx long, flexed in repose along the first; wings to the base of the toes; tibiae long; tail entirely contained within the interfemoral membrane; no post-calcaneal lobe.

Fur covering the membranes as far as a line drawn from the middle of the humerus to the distal end of the tibia.

Fur above with the basal third slate-coloured, the middle third pearly white, the tips brownish white, below pearly white throughout; wings and interfemoral membrane very remarkable, being pearly white, traversed by dark brown reticulations and parallel lines.

Upper incisors long, slender and directed inwards, the outer ones filling up the space between the inner ones and the canines but with very short cusps; lower incisors placed at right angles to the direction of the jaw.

Dimensions.—From a male in alcohol; head and body 1·9; tail 1·8; ear ·06; fore arm 1·55; tibia ·7 (Dobson).

Distribution.—The first examples of this species were obtained by Mr. C. J. Andersson, at Otjoro, in Damaraland; two of these specimens including the type are now in the Berlin Museum and two in the South African Museum; it has recently been recorded by Mr. de Winton from Uganda, having been obtained there by Mr. Jackson.

Genus **SCOTOPHILUS.**

Type.

Scotophilus, *Leach, Trans. Linn. Soc.* xiii, p. 71

(1822) S. temmincki.

Muzzle short, conical, rounded off and naked; ears shorter than the head, the outer margin terminating behind the angle of the mouth in a distinct convex lobe; tail, except for the terminal vertebra, contained in the interfemoral membrane; fur almost confined to the body; wing membranes thick and leathery.

Dentition.—i. $\frac{1}{3}$, c. $\frac{1}{4}$, pm. $\frac{1}{2}$, m. $\frac{3}{8}$ = 30; upper incisors long and unicuspidate, their bases close to the canines, upper premolar large; first lower premolar small, crushed in between the canine and the second premolar.

Eight species of this genus are recognised in Dobson's catalogue as found throughout the tropical and subtropical regions of the Eastern hemisphere, of these one only reaches Southern Africa.

187. **Scotophilus borbonicus.** THE BOURBON BAT.

Vespertilio borbonicus, *Geoffroy, Ann. du Museum* i, p. 201, pl. xlvi (1800).

Nycticejus leucogaster, *Cretzschmar, Ruppell's Atlas zu der Reise, Zool.* p. 71, pl. xxviii, fig. a (1826).

Vespertilio dinganii, *A. Smith, S. Afr. Quart. Journ.* ii, p. 59 (1834).

Scotophilus dinganii, *A. Smith, Illustr. Zool. S. Afr. Mamm.* pl. liii (1849).

Nycticejus planirostris, *Peters, Reise Mossamb. Säugeth.* p. 65, pl. xvii, fig. 1 (1852); *Tomes, Proc. Zool. Soc.* 1861, p. 33 [Damaraland].

Nycticejus viridis, *Peters, ibid.* p. 67, pl. xvii., fig. 2 (1852).

Scotophilus borbonicus, *Dobson, Cat. Chirop. B.M.* p. 260 (1878).

Description.—Muzzle thick, obtusely conical, front part covered with glandular prominences; ears short and rounded, inner margin commencing with an angular backwardly projecting lobe behind the tragus, outer margin ending below in a horizontally projecting rounded lobe not very far from the angle of the mouth; tragus narrow, attenuated at the tip and much curved inwards; wing membrane attached to the side of the foot near the base of the toes; post-calcaneal lobe very narrow; extremity of tail projecting; thumbs short, about $\cdot 3$ in. Fur long, hardly extending on to the wing membrane; colour olive-brown above, pale yellowish below.

Cingulum of the upper incisor much developed, forming a projecting broad shoulder.

Dimensions.—Of a male preserved in alcohol; head and body 3.12; tail 2.0; snout from base of inner margin of ears to nostrils $\cdot 75$; ear $\cdot 60$; fore arm 2.10.

Distribution.—This bat is found all over the Ethiopian Region from Senegambia and Nubia to Cape Colony, and also in the islands of Madagascar and Réunion or Bourbon. In South Africa it is recorded from Damaraland, Natal and King Williamstown, and there are examples in the South African Museum from Hex River in the Worcester division and from the neighbourhood of Grahamstown.

Genus **MYOTIS.**

Type.

Myotis, *Kaup, Europ. Thierw.* i, p. 106 (1829) *M. myotis*.*

Glandular prominences on the face not very large; crown of the head slightly elevated above the face line; ears oval broad with angular internal basal lobe, and external margin terminating quite close to the base of the tragus, which is long, acute, attenuated and usually bent outwards; nostrils opening sublaterally by simple crescentic apertures.

* *Vespertilio murinus*, Schreber et auctt. plur.

Dentition.—i. $\frac{2}{3}$, c. $\frac{1}{1}$, pm. $\frac{3}{3}$, m. $\frac{3}{3}$ = 38.

Upper incisors nearly equal, divergent small, close together and to the canines; the first and second upper premolars small, the second smaller than the first, both often internal to the tooth-row.

This genus is nearly as large as *Vespertilio*; forty-three species are recorded by Dr. Dobson, distributed all over the world; they can be recognised by the large number of their teeth, by their tragus and their long and slender extremities. Out of about half-a-dozen species found in Africa only one reaches its southern extremity.

The genus has hitherto been known as *Vespertilio*, but the researches of Mr. Gerrit Miller (*Ann. Mag. N. H.* (6) xx, p. 382, 1897) have shown that this name is properly applicable to the one hitherto known as *Vesperugo*, and that *Myotis* must be substituted.

188. *Myotis tricolor*. THE TRICOLORED BAT.

Vespertilio tricolor, *Smuts, Enum. Mamm. Cap.* p. 106 (1832); *Smith, S. Afr. Quart. Journ.* ii, p. 60 (1834); *Temminck, Monogr. Mamm.* ii, p. 207 (1841); *Dobson, Cat. Chirop. B. M.* p. 305 (1878).

Description.—Crown of the head slightly raised above the face; ears broad with tips shortly rounded off, the horizontal and ascending portions of the inner margin forming a right angle with one another; the outer margin ends abruptly near the base of the tragus, with a small convex lobe just before its termination; tragus long, very narrow above and acutely pointed, curved outwards so as to nearly reach the margin of the ear. Wings to the base of the toes, tail entirely within the interfemoral membrane; fur just covering the margin of the wing membrane, but on the interfemoral itself reaching as far as a line drawn from one tibia to the other; posterior edge of the interfemoral membrane with a well-marked fringe of hair; ear conch also covered externally with fine hairs.

Fur above smoky white with darker brown tips, below similar but lighter. Inner incisor larger than the outer, first upper premolar somewhat larger than the second, both somewhat internal to the tooth-row.

Dimensions.—Of a female in alcohol; head and body 2·0; tail

1.65; snout from base of inner margin of ear to tip of nostril .56; ear .43; fore arm 1.40; all the dimensions somewhat less than those of the type specimen as described in Dobson's Catalogue.

Distribution.—The type which is in the Leyden Museum is said to have come from the Cape of Good Hope; the South African Museum has specimens from Montagu in the Robertson division and from Natal, and the British Museum from King Williamstown. The species is probably widely distributed in South Africa but appears to be rather rare.

Genus **KERIVOULA.**

Type.

Kerivoula, *Gray, Ann. Mag. N. H.* x, p. 258 (1842)...*K. hardwickii*.

Crown of the head somewhat vaulted; aperture of the nostril completely circular, opening sublaterally close to the margin of the upper lip; ears funnel-shaped owing to the great convexity of the outer margins; tragus long, narrow, and very acutely pointed, straight or slightly curved outwards; tail wholly in the inter-femoral membrane.

Dentition.—i. $\frac{2}{3}$, c. $\frac{1}{1}$, pm. $\frac{2}{3}$, m. $\frac{2}{3}$ = 38.

Upper incisors parallel, the outer shorter sometimes minute, the second upper premolar slightly smaller than the third, never minute.

Some ten species of this genus, which is rather closely allied to *Myotis*, are now known from various portions of the Old World. Two of these are found in South Africa.

Key of the South African Species.

- A. Outer upper incisors minute; fur with bronze yellow extremities, fore arm 1.45 *K. aeresa*, p. 133.
 B. Outer upper incisors nearly as long as the inner ones; fur with reddish brown extremities, fore arm 1.4..... *K. lanosa*, p. 133.

189. *Kerivoula aerosa*. THE BRONZE BAT.

Kerivoula aerosa, *Tomes, Proc. Zool. Soc.* 1858, p. 333, pl. lxvi, fig. 1 [animal, head and skull]; *Dobson, Cat. Chirop. B. M.* p. 339 (1878).

Description.—Ears rounded above, shorter than the head, with a shallow emargination occupying the upper third of the outer margin of the ear conch; tragus long, tapering, and acutely pointed; fur of the back not extending on to the membranes, the margin of the interfemoral membrane between the extremities of the calcanea and the tail being sparingly furnished with short bristly hairs.

Fur above long, thick and curly, dark grey-brown at its base and for three-fourths of its length, passing through yellowish-brown and umber-brown to the tips, which are bronze-yellow; beneath sepia brown tipped with brownish-bronze.

Upper inner incisors long and pointed, outer incisors very small, hardly visible without a lens; first upper premolar long, acutely pointed (Dobson).

Dimensions.—Head and body 2.0; tail 1.7; ear .6; fore arm 1.45 (Dobson).

Distribution.—This bat appears to be known only from a single specimen, the type described by Mr. Tomes which came from the "Eastern Coast of South Africa." As the species is unrepresented in the collections of the South African Museum, the description has been copied from Dobson's Catalogue.

190. *Kerivoula lanosa*. THE WOOLLY BAT.

Vespertilio lanosus, *Smith, Illustr. Zool. S. Afr. Mamm.* pl. 1 (1847); *Grill et Sundevall, K. Vetens. Akad. Handl. Stockholm* ii, 2, p. 14 (1858) [Knysna].

Kerivoula lanosa, *Tomes, Proc. Zool. Soc.* 1858, p. 331, pl. lxvi, fig. 2 [head and skull]; *Dobson, Cat. Chirop. B. M.* p. 340, pl. xvii, figs. 5, 5a [head] (1878); *id. Report Brit. Assoc.* 1880, p. 190.

Kerivoula argentata, *Tomes, Proc. Zool. Soc.* 1861, p. 32 [Ovampoland].
Nycticejus nidicola, *Kirk, Proc. Zool. Soc.* 1864, p. 651.

Description.—Ears moderate, the outer margin with a small concavity below the tip, and a small but distinct notch about the middle, and at the base a small tooth-like upwardly directed pro-

jection, which conceals the base of the tragus; tragus tapering and very acutely pointed.

Fur on the upper surface thinly covering the wing membrane as far as a line drawn from the middle of the humerus to the knee, the fore arm and thumb, the second finger and the outer margin of the wing to the extremity of the last phalanx of the third finger, as well as the tail being covered with short shiny yellow hairs; half the interfemoral membrane clothed with long hairs; along the posterior edge of the calcaneum a comb-like fringe of closely-set short parallel hairs. Fur above dark brown at the base, then passing through yellowish-brown to reddish-brown tips; beneath very pale yellowish-brown to dirty white.

Outer incisor nearly as long as the inner, with a posterior basal cusp often worn down so that the tooth appears to be unicuspidate; first and second upper premolars small (Dobson).

Dimensions.—Of adult male; head and body 1·7; tail 2·0; ear ·50; fore arm 1·4 (Dobson).

Distribution.—Sir A. Smith obtained his specimens about 200 miles east of Cape Town along the south coast, *i.e.*, in the George or Knysna divisions, whence it was also obtained by Victorin; it is further recorded by Tomes from Damaraland, by Bocage from the interior of Angola, and by Kirk from Shupanga, just south of the Zambesi in Portuguese East Africa; there are no specimens in the South African Museum.

Habits.—Sir Andrew Smith says that this bat inhabits the forest lands near the sea shore, and appears as night sets in; Dr. Kirk obtained his specimens from the hanging nests of weaver birds (*Euplectes*) near the Zambesi.

Genus **MINIOPTERUS.**

Type.

Miniopterus, *Bonaparte, Fauna Italica, fasc. xxi*

(1837) M. schreibersi.

Crown of the head abruptly and considerably raised above the face line; tragus like that of *Vespertilio*; nostrils simple, openings lunate; first phalanx of the third and fourth finger very short, about one-third the length of the terminal phalanges which are flexed forward in repose on the under surface of the metacarpal bone; tail wholly in the interfemoral membrane.

Dentition.—i. $\frac{2}{3}$, c. $\frac{1}{1}$, pm. $\frac{2}{3}$, m. $\frac{3}{3}$ = 36.

Upper incisors short in pairs, on either side separated from the canines by a space.

Four species of this genus are recognised in Mr. Dobson's Catalogue from the tropical and semi-tropical regions of the Eastern Hemisphere. Two closely allied species extend to South Africa.

Key of the South African Species.

- A. Interfemoral membrane nearly naked; size larger; fore arm 1·8 *M. schreibersi*, p. 135.
 B. Interfemoral membrane half clothed; size smaller; fore arm 1·5 *M. scotinus*, p. 136.

191. **Miniopterus schreibersi.** THE LONG-WINGED BAT.

Vespertilio schreibersii, *Natterer, Kuhl Deutsch. Flederm. Wetteran, Ann.* iv, p. 41 (1819).

Vespertilio natalensis, *Smith, S. Afr. Quart. Journ.* ii, p. 59 (1834).

Vespertilio fuliginosa, *Hodgson, Journ. Asiat. Soc.* iv, p. 700 (1835).

Vespertilio orsinii, blepotis et dasythrix, *Temminck, Monogr. Mamm.* pp. 179, 212, 268, pls. xlix, figs. 1-2, liii, figs. 1-2 (1841).

Miniopterus schreibersii, *Keyserling and Blasius Wiegmann Arch.*, v, p. 323 (1839); *Tomes, Proc. Zool. Soc.* 1858, p. 117, pl. lxxv, figs. 1-2 [skull]: *id. ibid.* 1861, p. 39 [Lake Ngami]; *Dobson, Cat. Chirop. B. M.* p. 348 (1878).

Miniopterus dasythrix, *A. Smith, Illustr. Zool. S. Afr. Mamm.* pl. lii (1848).

Description. — Muzzle rather short, covered with glandular prominences; crown of the head greatly elevated above the face line; a horizontal groove along the face between the eye and upper lip; ears short and broad, the outer margin terminating near the angle of the mouth with a lobe; tragus as in *Vespertilio* obtusely rounded above and slightly curved inwards; terminal phalanx of third and fourth fingers much longer than the first, and flexed forwards in repose along the under side of the metacarpal bones.

Wings to the ankles; no postcalcaneal lobe; tail wholly contained in the interfemoral membrane; wing membranes nearly naked, though there is a small development of hairs along the margin of the body; interfemoral membrane, except for a few long hairs at the root of the tail, naked.

Colour variable, in South African examples dark brown above,

the tips of the fur being a little greyish, below also brown but somewhat lighter.

Incisors separated from the canines by a space, inner incisor bicuspidate, outer unicuspidate, both sloping inwards parallel to one another; first upper premolar with a single cusp somewhat inside the general tooth line, and not so large as the second; in the lower jaw the outer incisors have rounded summits with a small posterior cusp, the inner two pairs are nearly equal in size and tri-lobed.

Dimensions.—Of a male preserved in alcohol; head and body 2·37; tail 2·12; muzzle from base of inner margin of ear to tip of snout ·40; ear ·37; fore-arm 1·80. Of a male measured in the flesh by Mr. Marshall; head and body 2·12; tail 2·0; ear ·30; expanse of wing 12·5.

Distribution.—This is a very widely spread species; it is found throughout the southern portions of Europe and Asia, from Spain to the Philippine Islands, and through the Malayan Archipelago to Australia, also throughout Africa and Madagascar. In South Africa it does not appear to be uncommon though not, so far as I know, recorded from the neighbourhood of Cape Town. The South African Museum has examples from Montagu in the Robertson division, from Caledon, Bedford, Middelburg and Griqualand West, from Rustenburg in the Transvaal, from Delagoa Bay and from Mashonaland; by Mr. Tomes it is recorded from Lake Ngami.

Habits.—Nothing has been recorded about the habits of this bat in South Africa, but in Europe, according to Blasius, it is one of the swiftest flyers of the order, almost resembling a swallow in its powerful flight and graceful movements on the wing; it appears early in the evening; during the day it hides in caves, crevices in rocks and old buildings.

192. *Miniopterus scotinus*. THE HAIRY LONG-WINGED BAT.

Miniopterus scotinus, *Sundevall, Oefvers. Akad. Forh. Stockholm* iii, p. 119 (1847); *Tomes, Proc. Zool. Soc.* 1858, p. 127; *Dobson, Cat. Chirop. B.M.* p. 351 (1878).

Miniopterus minor, *Peters, M.B. Akad. Berlin*, 1866, p. 885.

Description.—Smaller than *M. schreibersi*; on the upper surface a distinct band of hair extends from the elbow to the ankle; half the interfemoral space is clothed with thinly spread fur, which also

extends in a band on each side internal to the legs to the base of the calcaneum.

Above bright reddish or dark brown, almost black, below paler (Dobson).

Dimensions.—Head and body 1·75; tail 1·75; ear 0·40; fore arm 1·5 (Dobson).

Distribution.—South-east Africa and Madagascar; the type was obtained from Durban, and the British Museum possesses a specimen from Mashonaland; it is not represented in the collections of the South African Museum.

Family EMBALLONURIDAE.

Insectivorous bats with simple nostrils at the end of the muzzle; ears large, often united; tragus small, often broad; first phalanx of middle finger folded in repose on the dorsal or upper surface of the metacarpal bone; tail free, either perforating the membrane or projecting far beyond its posterior margin.

The family contains a considerable number of genera scattered over the tropical and subtropical regions of both hemispheres.

Key of the South African Genera.

- A. Tail slender, perforating the interfemoral membrane and appearing on its upper surface..... *Taphozous*, p. 137.
 B. Tail thick, produced a good distance beyond the posterior margin of the interfemoral membrane... *Nyctinomus*, p. 139.

Genus **TAPHOZOUS.**

Type.

Taphozous, *Geoffroy, Descript. de l'Egypte* ii, p. 126

(1812)..... *T. perforatus*.

Crown of head slightly raised above the face line, with a frontal excavation between the eyes, ears small and separate; tragus short and wide; nostrils simple, valvular, placed at the tip of the snout; first phalanx of the middle (third) finger folded in repose on the dorsal side of the metacarpal bone; tail perforating the interfemoral membrane and appearing on its upper surface, capable of being partially withdrawn.

Dentition.—i. $\frac{1}{2}$, c. $\frac{1}{4}$, pm. $\frac{2}{2}$, m. $\frac{3}{3}$ = 30.

Premaxillary bones cartilaginous, supporting a pair of very weak incisors which are often absent in the adult animals, canines separated from the second premolar by a wide space in which is placed the minute first premolar.

Ten species of this genus are recognised by Dobson, distributed over the Ethiopian, Oriental and Australian regions; only one reaches South Africa.

193. *Taphozous mauritianus*. THE TOMB BAT.

Taphozous mauritianus, *Geoffroy, Descript. de l'Egypte* ii, p. 127 (1812); *Dobson, Proc. Zool. Soc.* 1875, p. 553; *id. Cat. Chiropt. B. M.* p. 386 (1878); *id. Report Brit. Assoc.* 1880, p. 194.

Taphozous leucopterus, *Temminck, Monogr. Mamm.* ii, p. 284, pl. lx, fig. 7 (1841); *Peters, Reise Mossamb. Säugeth.* p. 55, pl. xiii. fig. 20-21 [skull] (1852).

Description.—Ears short, tips rounded; tragus short and broad with an angular projection at the base of the outer margin; gular sac distinct in the males, rudimentary in the females, the throat naked in the position of the sac; a small radio-metacarpal pouch formed by a fold of skin running from the distal end of the radius to the proximal end of the fourth metacarpal; wings to the ankles; feet small.

Tail perforating the interfemoral membrane about half way down and appearing free on its upper surface for about its last quarter of an inch.

The fur extends above and slightly less abundantly below, on to the wing and interfemoral membrane; fur above light buff brown for three quarters of its length, then dark brown with grey extremities, giving a general speckly appearance; below pure white; wing membranes to a line from the ankle to the elbow brown, rest white, except a small patch of brown inside the first phalanx of the third finger.

Dimensions.—Head and body 3·1; tail 1·0; ear ·8; fore arm 2·4 (Dobson).

Distribution.—This bat is found all over Africa, including Madagascar, Mauritius and Bourbon; the only example in the South African Museum was obtained at Heidelberg in the Swellendam division of the Colony, so that it seems to be rare in South

Africa; it has been recorded from Angola by Barboza de Bocage, and from the Zambesi by Peters.

Habits.—These bats have obtained their generic and English names from their having been found inhabiting the ancient Egyptian tombs, where they were discovered in large numbers when the great French Expedition visited that country at the beginning of the century. It is probable that the present species has the same mode of life as its Egyptian cousin.

Genus **NYCTINOMUS.**

Type.

Nyctinomus, *Geoffroy, Descript. de l'Egypte* ii, p.

114 (1812)..... *N. aegyptiacus.*

Ears either united, or with the bases of their inner margins closely approximated; tragus short and stumpy, never linear; muzzle broad, obliquely truncated, terminated by the sharply cut margins of the nostrils; lip usually grooved with vertical wrinkles; tail produced far beyond the margin of the interfemoral membrane.

Dentition.—i. $\frac{1}{3}$ or $\frac{1}{2}$, c. $\frac{1}{1}$, pm. $\frac{2}{2}$ or $\frac{1}{2}$, m. $\frac{3}{3}$ = 28 to 32.

Premaxillary bones separate in front or conjoined by cartilage; upper incisors close to the canines at their bases, separate at their tips.

About thirty-two species are generally recognized from the tropical and warmer temperate zones of both hemispheres; of these four reach the southern part of Africa.

Key of the South African Species.

- A. Premolars $\frac{2}{2}$; antitragus separated by a deep notch; lower incisors four.....
 - a. Lips smooth; antitragus irregularly quadrate; fore arm 2.5..... *N. africanus*, p. 140.
 - b. Lips vertically wrinkled; antitragus half oval
 - a¹. Ears separate; fore arm 1.75..... *N. aegyptiacus*, p. 140.
 - b². Ears conjoined by a deep band; fore arm 1.5 *N. limbatus*, p. 141.
- B. Premolars $\frac{1}{1}$; antitragus separated by a very shallow notch; lower incisors six, fore arm 1.55 *N. acetabulosus*, p. 142.

194. **Nyctinomus africanus.** THE YELLOW BAT.

Nyctinomus africanus, Dobson, *Ann. Mag. N. H.* (4) xvii, p. 348 (1876);
id. Proc. Zool. Soc. 1876, p. 719; *id. Cat. Chirop. B. M.* p. 422, pl.
 xxii, fig. 1 [head] (1878).

Description.—Ears large, their inner margins arising from quite distinct points of origin though close together; antitragus irregularly quadrilateral separated posteriorly by a moderately deep notch; tragus broad, evenly rounded off above, upper lip smooth, unwrinkled. Fur bright orange chestnut above and below.

Lower incisors four in number, not crowded; first upper pre-

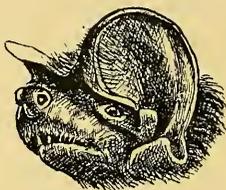


FIG. 124.—Head of the Yellow Bat (*Nyctinomus africanus*).

molar very short and blunt, occupying by its base the whole space between the canine and the second premolar [Dobson].

Dimensions.—Head and body 3·4; tail 2·4; portion of tail free from membrane 1·5; ear 1·0; fore arm 2·5 [Dobson].

Distribution.—This species was originally discovered in the Transvaal; another specimen now in the British Museum is from Madagascar.

It is not represented in the collections of the South African Museum.

195. **Nyctinomus aegyptiacus.** THE BROWN WRINKLED-LIPPED BAT.

Nyctinomus aegyptiacus, Geoffroy, *Descript. de l'Egypte* ii, p. 128, pl. ii (1812); Dobson, *Proc. Zool. Soc.* 1876, p. 721 [revision]; *id. Cat. Chirop. B. M.* p. 424 (1878).

Dysopes geoffroyi, Temminck, *Monogr. Mamm.* i, p. 226, pl. xix, (1835-41).

Description.—Ears separate, but close together by the bases of the inner margins; antitragus half oval separated by a deep notch posteriorly; tragus short, broad and rounded off; nostrils slightly

projecting beyond the upper lip, opening sublaterally, separated by a narrow space with a central ridge; no gular sac in male or female. Wings and interfemoral membrane naked except just close the body; wings from the lower part of the tibia. Colour dark brown or black above, somewhat lighter below.

Upper incisors small with converging points, lower incisors four in number bi-lobed and crowded; first upper premolar somewhat within the tooth line, minute and close to the second, separated from the canine by a space.

Dimensions.—Of a female in alcohol; head and body 2·87; tail 1·43; portion of tail projecting beyond the interfemoral membrane ·88; muzzle from the base of the tragus to the tip of nostril ·48; ear ·57; fore arm 1·75.

Distribution.—This bat was originally obtained in Egypt, it seems probable however that it is found all over Africa, as the British Museum possesses a specimen from Basutoland, and there are examples in the South African Museum from the neighbourhood of Cape Town and from the Albany and Middelburg divisions of the Colony, and from Potchefstroom in the Transvaal.

196. *Nyctinomus limbatus*. PETERS' WRINKLE-LIPPED BAT.

Dysopes limbatus, *Peters, Reise Mossamb. Säugeth.* p. 56, pl. xiv (1852).
Molossus limbatus, *Tomes, Proc. Zool. Soc.* 1861, p. 40 [Lake Ngami].
Nyctinomus leucogaster Grandidier, Rev. Mag. Zool. p. 337 (1869).
Nyctinomus limbatus, Dobson, Proc. Zool. Soc. 1876, p. 724; *id. Cat. Chirop. B. M.* p. 428 (1878).

Description.—Ears much shorter than the head, united by their inner margins by a deep band across the face, inner and outer margins continuous and rounded; antitragus well developed; half oval and separated by a deep notch, tragus very small, almost rudimentary, superior margin straight parallel to the antitragus.

Extremity of the muzzle not projecting very much, upper lip with deep, vertical wrinkles. No gular sac in males or females. Wings from the distal third of the tibia. Fur dark brown on the back, shoulders, and throat, lower abdomen white, this colour increasing with age.

Lower incisors four in number, small and crowded, first upper premolar minute with a sharp cusp, in the tooth-row between the canine and the second premolar.

Dimensions.—From a female in alcohol; head and body 2·25; tail within interfemoral membrane ·70; portion beyond ·80; fore arm 1·5; from base of tragus to nose-tip ·45; height of ear about ·40.

Distribution.—This bat was first described by Peters from Mozambique and has also been obtained in Zanzibar, Angola, French Congo, and Madagascar; Tomes has recorded it from Lake Ngami and the South African Museum possesses an example obtained in the Lydenburg district of the Transvaal.

197. **Nyctinomus acetabulosus.** THE NATAL WRINKLE-LIPPED BAT.

Nyctinomus acetabulosus, *Desmarest, Mammal.* p. 117 (1820); *Dobson, Proc. Zool. Soc.* 1876, p. 734 [revision]; *id. Cat. Chiropt. B. M.* p. 440, pl. xxi, fig. 5 [ear] (1878).

Dysopes natalensis, *Smith, Illustr. Zool. S. Afr. Mamm.* pl. xlix (1847).
Nyctinomus (Mormopterus) *jugularis*, *Peters, Proc. Zool. Soc.* 1865, p. 468.

Description.—Ears quite separate, arising from the sides of the forehead at a short distance above and in front of the eyes, tips attenuated and projecting forwards and inwards, instead of backwards and outwards; antitragus only separated from the outer margin of the ear by a slight emargination; tragus irregularly triangular; sides of the upper lip with short ill-defined vertical wrinkles; a large glandular sac opening on the centre of the throat in the males, rudimentary in the females; wings from the distal third of the tibia. Fur dark reddish above, somewhat paler beneath.

Upper incisors separated from the canines and from each other; lower incisors six in number, small, bifid and crowded; one upper premolar separated by a narrow interval from the canine. (Dobson).

Dimensions.—Head and body 1·9; tail 1·7; free portion of tail ·6; ear ·6; fore arm 1·55.

Distribution.—South Eastern Africa; Madagascar, Mauritius, and Bourbon; the only recorded specimen from South Africa is that described by Sir A. Smith from the neighbourhood of Durban.

Order INSECTIVORA.

This order contains various families of small mammals, without much external resemblance and chiefly united to one another by their inferior organisation, and by the absence of specialisation shown in their structure.

The greater number of them agree in having a pointed snout projecting considerably beyond the lower jaw; they have usually five toes provided with claws, and are plantigrade or subplantigrade; their bodies are covered with soft fur or spines; their molars have projecting cusps, their canines are small and weak, the distinction between the incisors, canines and premolars being as a rule not nearly so well marked as in other orders of mammals.

Among the more important anatomical characters are the following:—Clavicles present (in all South African forms); cerebral hemispheres smooth and not projecting backwards so as to cover the cerebellum; testes abdominal or inguinal not received into a scrotum; uterus two-horned and placenta discoidal and deciduate.

The following account of the South African Insectivora is derived from various sources; the standard work on the subject, Dobson's Monograph, never having been completed, could only be made use of for the families of the golden moles and hedgehogs.

Out of ten families usually recognised, the South African Fauna possesses representatives of four only, the six which are absent being as follows:—

Galeopithecidae (Flying Lemurs) which form a separate suborder from Eastern Asia; *Centetidae* (Tenrecs) from Madagascar only; *Solenodontidae* from the West Indies; *Potomogalidae* from West Africa and Madagascar; *Tupaiidae* (Tree-shrews) from the Oriental Region, and finally *Talpidae* (Moles) from the Northern Temperate Regions of the Old and New Worlds.

Key of the South African Families and Genera.

- A. No tail; adapted to fossorial habits; eyes beneath the skin; middle digit enormously enlarged; skull with zygomatic arch and tympanic bulla (Chrysochloridae) *Chrysochloris*, p. 168.
- B. Tail very short; body covered with an armature of spines; skull with slender zygomatic arches and an annular tympanic bone (Erinaceidae) ... *Erinaceus*, p. 156.
- C. Tail usually as long as the body at least.
- a. Metatarsus and snout much elongated; habits terrestrial and saltatorial; skull with a large bulla (Macroscelididae)
- a¹. With five toes to the hind foot..... *Macroscelides*, p. 145.
- b¹. With four toes to the hind foot *Petrodromus*, p. 154.
- b. Metatarsus and snout not so elongated; skull without zygoma and with an annular tympanic bone (Soricidae)
- a¹. Tail with short subequal hairs..... *Myosorex*, p. 166.
- b¹. Tail with an admixture of long and short hairs..... *Crocidura*, p. 158.

Family MACROSCOLIDIDAE.

Insectivorous animals of fossorial and saltatorial habits in which the skull has a large brain case, a swollen tympanic bulla and an imperfect jugal. The molars are broad with cusps arranged in W-fashion. Symphysis of the pubis long, metatarsus much longer than the tarsus.

The family is now confined to Africa; of the three recent genera two are described below; the third *Rhynchocyon* contains larger animals with shorter hind legs, longer snouts and four toes to both limbs, and is found in East Africa; one species, *Rhynchocyon cirnei*, Peters, may very likely be eventually found South of the Zambesi as it was described from Boror a province of Mozambique just north of that river.

Genus **MACROSCOLIDES.***Type.***Macroscelides**, *A. Smith, Zool. Journ.* iv, p. 435(1829) *M. proboscideus.*

Small insectivora with a long and tapering snout, at the tip of which are the nostrils; fore and hind limbs with five toes, the metatarsal bones much elongated so as to form a long sole on which the animal rests in somewhat kangaroo fashion; tail long and rat-like, sparsely covered with hairs.

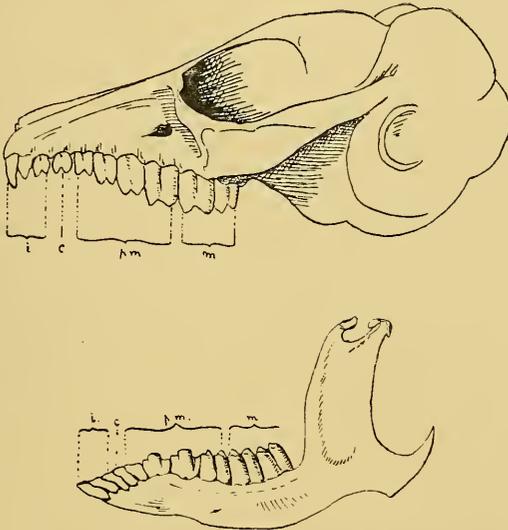


FIG. 125.—Skull of *Macroscelides melanotis*, to show the dentition.

Skull with large brain case, strong zygomatic arches, inflated tympanic bulla and orbit not surrounded by bone; pubic symphysis long.

Dentition.—i. $\frac{3}{3}$, c. $\frac{1}{1}$, pm. $\frac{4}{4}$, m. $\frac{2}{2 \text{ or } 3} = 40 \text{ or } 42$.

Above the incisors are single rooted, the small canine and the two anterior premolars double rooted; the posterior premolar is large and closely resembles the true molars behind it; it was in fact formerly considered to be a permanent tooth until recently

shown by Thomas (*Proc. Zool. Soc.* 1890, p. 445) to be a premolar ; an extra small molar below is present in some species.

This genus is widely distributed all over Africa, though perhaps most abundant in the southern parts ; in addition to the species mentioned below six others have been described, one (*M. rozeti*) from Algeria, one (*M. revoili*) from Somaliland, one (*M. rufescens*) from East Africa, two (*M. pulcher* and *M. fuscipes*) from Central Africa, and one (*M. brachyurus*) from Angola.

Key of the South African Species.

- A. With ten teeth on either side in the lower jaw.
- a. Skull with the auditory bulla enlarged forming the greater part of the posterolateral portion of the skull.
- a¹. Ears long, oval and brownish ; hind foot 1·15 *M. proboscideus*, p. 146.
- b¹. Ears short, broad, rounded and black ; hind foot 1·35 *M. melanotis*, p. 148.
- b. Skull with the auditory bulla normal, not enlarged.
- c¹. Larger ; skull elongated, nearly twice as long as broad ; hind foot 1·30 *M. rupestris*, p. 149.
- d¹. Smaller ; skull shorter ; hind foot 1·18 *M. intufi*, p. 152.
- B. With eleven teeth on either side in the lower jaw ; small ; hind foot 1·15 *M. brachyrhynchus*, p. 153.

198. **Macroscelides proboscideus.** THE ELEPHANT SHREW.

Sorex proboscideus, *Shaw, General Zool. Mamm.* i, pt. 2, p. 536 (1800).

Macroscelides typicus, *A. Smith, Zool. Journ.*, iv, p. 436 (1829).

Macroscelides typus, *A. Smith, S. Afr. Quart. Journ.* ii, p. 64 (1834) ;

id. Illustr. Zool. S. Afr. Mamm. pl. x [animal], pl. xv, fig. 1 [skull and anat.] (1839) ; *Grill, K. Vetens. Akad. Handl. Stockholm* ii, 2, p. 17 (1858) [Roodeval, Oudtshoorn div.] ; *Layard, Cat. Mamm. S. Afr. Mus.* p. 23 (1862).

Rhinomys jaculus, *Lichtenstein, Darstell. Säugeth.* pl. xxxviii (1834).

Description.—General colour above sandy brown with a slight reddish tinge, the fur long, soft and slaty for the greater part of its length, the tips being sandy brown ; below white, also with the basal portion of the fur slaty ; snout slender and tapering about half an inch

in length, the nostrils placed at the tip with small openings separated by a vertical groove; ears long, oval and brownish-coloured, sparsely covered with short white hairs with a fringe of long hair along the inner margins; fore feet with five toes all clawed, the first being shorter and smaller than the others; hind feet comparatively short, five toes all clawed, the first falling short of the others by about $\cdot 4$ inch; tail about the same length as the head and body covered with short hairs or bristles which become longer and darker towards the distal extremity.

The skull of this species resembles that of *M. melanotis* in the great enlargement of the auditory bullae which form two posterolateral swellings on the skull.

The teeth also, like those of *M. melanotis*, are continuous, with scarcely any intervals between them; lower jaw with two molars only.

Dimensions.—From a mounted specimen; head and body 4·80; tail 4·75; from ear opening to tip of snout 1·65; hind foot (without claws) 1·15; snout from incisors to tip $\cdot 41$; skull, length 1·20; breadth $\cdot 75$; upper cheek teeth $\cdot 60$.

Distribution.—This species was founded on a figure given in an old work by Petiver¹ who there named it *Mus araneus capensis*, the Great Cape Shrew Mouse. It is probably distributed all over the dryer parts of the Colony. The South African Museum possesses an example said to have been caught on the Cape flats many years ago, and also specimens from the Worcester and Bedford divisions of the Colony more recently acquired. It was obtained in Oudtshoorn by Victorin.

Habits.—This animal is found inhabiting the dry open arid plains of the Colony, especially where there is a thin coating of brushwood; it lives in burrows underground, the passage to which is often nearly perpendicular; it is diurnal seeking its food during the day and rejoicing in the bright sunshine. When disturbed it retreats to its burrow with great rapidity, and it is thus caught with some difficulty; its food judging by the contents of its stomach consists of insects.

¹ Petiver, *Gazophylacium* i, pl. xxiii, fig. 9, London, 1702.

199. *Macroscelides melanotis*. THE BLACK-EARED ELEPHANT SHREW.

Macroscelides melanotis, *Ogilby, Proc. Zool. Soc. 1838, p. 5.*

Description.—General colour like that of the other species, brown with a slight reddish tinge which is stronger especially at the sides of the body, white below, the bases of the hairs slaty throughout; proboscis slender, hardly tapering, half an inch in length; eyes rather small, no pale ring round them; ears short, broad, and rounded much more so than in any species of the genus;

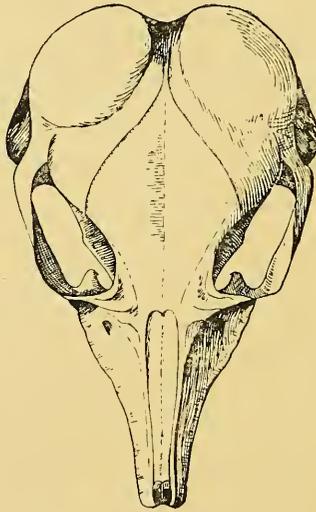


FIG. 126.—Skull of *Macroscelides melanotis*, from above.

their skin quite black covered with very sparse white hairs, but the whole ear appearing black as compared with the other species. Hind feet long and slender and dark in colour owing to the tint of the skin; both they and the front legs clothed with sparse white hairs; tail slender, longer than the head and body, hardly tapering, dark, almost black above and below, the hairs becoming longer towards the tip and almost forming a pencil.

Skull closely resembling that of *M. proboscideus* as figured by Smith, the postero-lateral portions enormously swollen by the

inflation of the tympanic together with the squamosal, parietal and alisphenoid bones, all of which seem to assist in the formation of the enlarged bullae tympani. Teeth as in *M. proboscideus* set close together. [See fig. 125, p. 145.]

Dimensions.—Of a specimen preserved in alcohol; head and body 3·80; tail 4·90; hind foot 1·35; from ear opening to tip of snout 1·85; snout from incisors ·53; skull, length 1·35; breadth ·82; upper cheek teeth ·65.

Distribution.—The type of this species, which is now in the British Museum, was obtained by Captain Alexander, during his journey to the country of the “great Nimaquas” in what is now German South-west Africa; it has also been obtained in Benguela by Monteiro. There are several specimens in the South African Museum from Port Nolloth, Steinkopf and Naroep in Namaqualand, one of which has been compared and found to agree with the type in the British Museum.

200. *Macroscelides rupestris*. THE ROCK ELEPHANT SHREW.

Macroscelides rupestris, *A. Smith, Proc. Zool Soc.* 1830, p. 11; *id. S. Afr. Quart. Journ.* i, no. 5, p. 10 (1831); *id. ibid.* ii, p. 64 (1834); *id. Illustr. Zool. S. Afr. Mamm.* pl. xi [animal] pl. xv, fig. 2 [skull] (1839); *Lorenz, Ann. kk. Hofmus.* ix, *notiz.*, p. 67 (1894) [Marico dist. Z.A.R.].

? *Macroscelides edwardsii*, *A. Smith, Illustr. Zool. S. Afr. Mamm.* pl. xiv (1839).

Description.—General colour above light brown, with a tinge of reddish posteriorly, the hair on the middle of the back being almost half an inch in length, the basal portion dark slate, the tips straw-coloured, with longer black hairs intermixed, below white also with slaty bases; the line of demarcation between the colours above and below not clearly marked; snout tapering a little, over half an inch in length, eyes nearer the ears than the tip of the snout, surrounded by a ring of light-coloured hairs; ears large, somewhat oval, coated within and without with sparse short hairs and a fringe of long white ones along the inner margin; a conspicuous patch of reddish fur on the nape of the neck behind the bases of the ears; fore and hind feet well covered with pale yellowish hairs; tail longer than the head and body, covered with short pale brown bristles, getting longer and darker towards the apex and there forming a slight pencil.

The skull is quite different in shape from that of the other species hitherto described, being long and narrow and with the tympanic bullae quite normal, and not at all enlarged.

There are considerable gaps in the tooth-row between the successive teeth from the anterior incisor to the second premolar in the

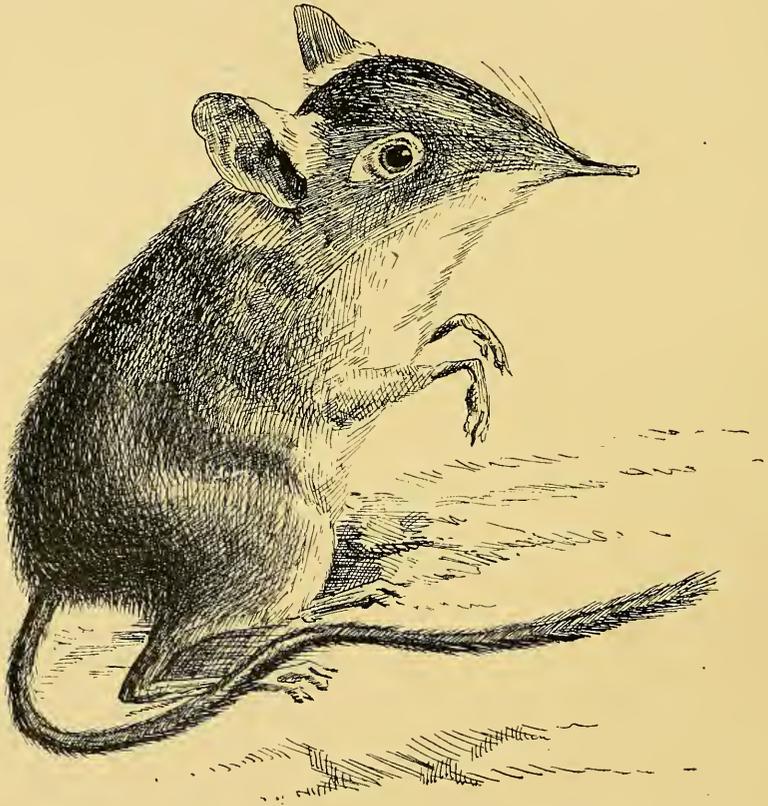


FIG. 127.—The Rock Elephant Shrew (*Macroscelides rupestris*).

upper jaw, and also though not to so great an extent, in the lower. Only two molars in the lower jaw.

Dimensions.—From a skin; head and body 5·0; tail 5·5; from the ear opening to tip of the snout 1·85; hind foot 1·30; snout from the incisors ·5; skull, length 1·58; breadth ·85; length of upper

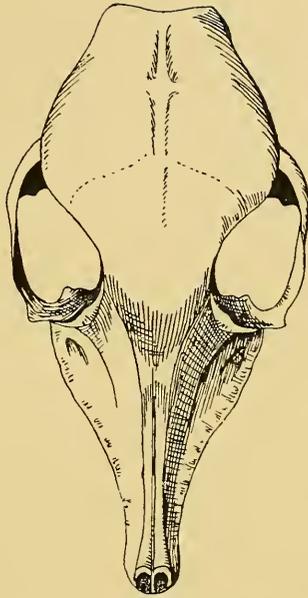


FIG. 128.—Skull of *Macroscelides rupestris*, from above.

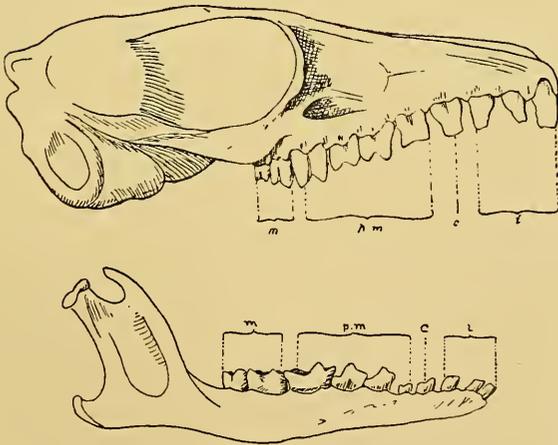


FIG. 129.—Skull of *Macroscelides rupestris*, to show the dentition.

cheek teeth .82; an example measured in the flesh from near Johannesburg is in close agreement with the above.

Distribution.—This species was originally obtained by Sir A. Smith in the mountains towards the mouth of the Orange River; the South African Museum possesses specimens from the Middelburg division of the Colony, the neighbourhood of the Orange River, from Griqualand West, from near Johannesburg and from the Rustenburg district of the Transvaal, while M. Bocage has recorded it from Benguella.

Habits.—Sir A. Smith mentions that this species inhabits chiefly rocky places, but otherwise resembles *M. proboscideus* in its habits; when moving in a leisurely manner it walks regularly, but when startled progresses with long leaps.

203. *Macroscelides intufi*. THE PALE ELEPHANT SHREW.

Macroscelides intufi, A. Smith, *App. Report Exped. Explor. S. Africa* p. 42 (1836); *id. Illustr. Zool. S. Afr. Mamm.* pl. xii. [animal] pl. xv, fig. 3 [skull] (1839); *Peters, Reise Mossamb. Säugeth.* p. 90 (1852).

Macroscelides alexandri, *Ogilby, Proc. Zool. Soc.* 1838, p. 5.

Description.—General colour above greyish yellow, much lighter than *M. proboscideus* or *M. rupestris*, the base of the fur slaty, the distal third greyish yellow variegated here and there with dark brown hairs; below pure white, the slaty bases in this case forming but a quarter of the length of the fur, the upper three quarters being white; the line of demarcation between the colour of the back and the belly is strongly marked; snout tapering and comparatively short, about .35 in. A distinct ring of white hairs round the eyes; ears moderate, somewhat pointed with a sparse covering of short yellow hairs, posteriorly, and of white anteriorly; a line of long white bristles along the edge of the base of the inner margin of the conch; fore and hind feet covered with short white hairs; tail about as long as the head and body, somewhat stout at the base and tapering, covered with short bristles, darker above lighter below, getting somewhat longer towards the tip but not forming a pencil.

Skull without the postero-lateral swellings of *M. proboscideus*, bullae normal; short and somewhat broadened.

In the upper jaw a gap between the posterior incisor and the

canine equal in breadth to that of the former tooth, and other narrower gaps between the incisors and between the canine and the first premolar.

The only specimen of this species in the South African Museum does not possess the extra tooth in the lower jaw described as being present in this species by Peters, nor is this species mentioned among those which possess eleven teeth in the lower jaw by Thomas (*Proc. Zool. Soc.* 1890, p. 445).

Dimensions.—From the type, a skin preserved in the British Museum; head and body 5·1; tail broken; ear to nose-tip 1·9; hind foot 1·25; ear 90; skull length 1·35; breadth 70.

Distribution.—The type of this species was obtained from the neighbourhood of Kurrichane, *i.e.*, in the present Marico district of the Transvaal. In the British Museum are examples from Damara-land (whence came the type of *M. alexandri*), and Angola, and the South African Museum possesses a single specimen brought from the Tebra country west of Lake Ngami by Mr. Eriksson.

202. *Macroscelides brachyrhynchus*. THE SHORT-SNOUTED ELEPHANT SHREW.

Macroscelides brachyrhynchus, *A. Smith, App. Report Exped. Explor. S. Africa*, p. 42 (1836); *id. Illustr. Zool. S. Afr. Mamm.* pl. xiii [animal] pl. xv, fig. 3 [skull] (1839); *Thomas, Proc. Zool. Soc.* 1897, p. 928.

Macroscelides brachyrhynchus, var. *schinzi*, *Noack, Zool. Jahrb.* iv, p. 198 (1889) (Ovampoland).

Macroscelides fuscus, *Peters, Reise Mossamb. Säugeth.* p. 87, pl. xix [animal] xxii, fig. 13-17 [skull] (1852).

Description.—General colour above rich reddish brown sprinkled with black; the fur slate-coloured for the greater part of its length, the distal portion reddish brown, the tips black; below white with slaty bases occupying about two-thirds of the fur; proboscis short, about ·35 in. and tapering; eyes large, surrounded by a whitish ring; ears large, oval, and somewhat pointed, sparsely covered with pale, greyish hairs; the first toe of the hind foot falling short of the others by about ·38 in.; tail rather shorter than the head and body in the skin, brown above, lighter below, covered with very short bristles which become but slightly longer at the apex, thus differing from that of *M. rupestris*.

Skull resembling that of *M. rupestris*, somewhat elongated, and with no traces of the swollen tympanic bullae.

An extra molar is present in the lower jaw making eleven teeth on either side; this tooth is small and only about one quarter of the size of the penultimate molar; in the upper jaw the anterior teeth are about as widely spaced as in *M. intufi*, and in the lower jaw the teeth all touch one another.

Dimensions.—Measured in the flesh by Mr. Marshall; head and body 4.75; tail 4.83; from ear aperture to tip of snout 1.75; ear .90; hind foot 1.12; skull, length 1.40; breadth .70; upper cheek teeth .50.

Distribution.—This animal was originally obtained by Sir A. Smith, between Latakoo and the Tropic, *i.e.*, on the borders of Bechuanaland and the Transvaal; the South African Museum possesses specimens from Rustenburg and Pietersburg in the Transvaal and from Salisbury and Mazoe in Mashonaland. It is also recorded by Thomas from Nyasaland.

Macroscelides fuscus, Peters Reise Mossamb. Säuegeth. p. 87, pl. xix, xxii, figs. 13-17 seems to be closely allied to *M. brachyrhynchus*, differing only in the darker colour of its lower side and in its slightly smaller size; it is from the northern bank of the Zambesi.

Genus **PETRODROMUS.**

Type.

Petrodromus, Peters, Bericht WAkad. iss. Berlin, 1846, p. 258 *P. tetradactylus*.

Insectivora resembling closely those of the preceding genus in most respects, but of larger size and with only four toes instead of five to the hind feet. Dentition and skull as in *Macroscelides*.

Mr. Oldfield Thomas recognizes three species of this genus—*P. tetradactylus* from the Zambesi Valley and Nyasaland, *P. rovumae* from the Rovuma River which divides Mozambique from German East Africa and *P. sultani* from Bagamoyo and British East Africa; the only example hitherto definitely found within South African limits is one obtained by Mr. H. F. Francis, at Inhambane, and presented by him to the South African Museum, which certainly agrees in every respect with *P. sultani* and not with *P. tetradactylus* as one would expect.

203. **Petrodromus sultani.** THE FOUR-TOED ELEPHANT SHREW.

Petrodromus sultani, *Thomas Proc. Zool. Soc.* 1897, p. 435.

VERNACULAR NAME.—Nyakole, near Inhambane (Francis).

Description.—General colour brown with a slight rufous tinge along the back, becoming paler on the sides and rusty white below; fur very soft and fine, with deep slaty black bases and pale brown tips with projecting black hairs above; below with pale slaty bases; proboscis tapering, the nostrils opening on either side of its naked extremity and separated by a groove; head with white patches along the upper lip, round the eye and at the base of the ear, and reddish ones behind the eye and below the ear; ears large, broad and rounded practically hairless. Forelimbs with five toes, the third and fourth approximately equal and longest, the first very short and not reaching to the base of the others; hind limbs elongated, especially the tarsus which is more than half the length of the tibia and bears four approximately equal toes, provided with strong black claws; below the toes at their bases are three well marked pads or papillae, rest of the tarsus with reticulate markings below; tail more than half the length of the head and body, thick at the base and tapering, scaly almost hairless and dark above, paler below, with a set of remarkable club-shaped black elastic bristles running along the greater part of its lower surface reaching a length of about a quarter of an inch.

Skull large and powerful, palate without vacuities, the large ones present in the other species being almost entirely filled up.

Dimensions.—Measured in the flesh by Mr. Francis; head and body 8·5; tail 6·30; ear 1·5; proboscis ·80; hind foot 2·05; the skull measures in total length 2·7; in breadth 1·15; upper cheek teeth ·70.

Distribution.—East and South-east Africa; the type was obtained by Sir John Kirk, at Mombasa in East Africa, it has also been found in Masailand and at Manderan in German East Africa. South of the Zambesi it occurs at Inhambane, whence a large male specimen was sent to the South African Museum by Mr. Francis, and it is stated by the same observer to extend to Southern Gazaland and the Transvaal-Portuguese frontier.

Habits.—This elephant shrew frequents thick bush and lives in holes in the ground or often in ant-heaps; it is stated by Francis to be very partial to the droppings of the Livingstone buck

(*Nesotragus livingstonianus*) but Peters says that it feeds chiefly on insects; it springs and jumps well and has a shrill cricket-like voice.

Family ERINACEIDAE.

Genus **ERINACEUS.**

Type.

Erinaceus, *Linnaeus, Syst. Nat.* 12th ed. i, p. 75

(1766)..... *E. europaeus.*

Insectivorous animals with plantigrade feet, with simple claws not modified for digging or burrowing and with slender clavicles; the whole of the upper surface of the body covered with a thick coating of sharp-pointed, stiff spines; the tail is very short, generally less than an inch in length.

The skull is provided with zygomatic arches and the tympanic bone is ring-shaped and does not form an inflated bulla.

Dentition.—i. $\frac{3}{2}$, c. $\frac{1}{1}$, pm. $\frac{3}{2}$, m. $\frac{3}{3} = 36$.

Dr. John Anderson, the most recent reviser of this genus recognises six African species, and there are in addition about nine others distributed over the Palaearctic and Oriental Regions.

Only one form however, seems to extend to the southern part of Africa; this is the species described below.

204. **Erinaceus frontalis.** THE SOUTH AFRICAN HEDGEHOG.

Erinaceus capensis, *A. Smith, Proc. Zool. Soc.* 1830, p. 11; *id. Philos. Mag. and Annals Philos.* ix, pp. 61, 62 (1831) [nomen nudum]; *Smuts, Enum. Mamm. Cap.* p. 8 (1832).

Erinaceus frontalis, *A. Smith, S. Afr. Quart. Journ.* i, 1830, no. 5, p. 10 (1831); *id. ibid.* ii, p. 61 (1834); *Bennett, Proc. Zool. Soc.* 1832, p. 193; *A. Smith, Illustr. Zool. S. Afr. Mamm.* pl. iii (1838); *Layard Cat. Mamm. S. Afr. Mus.* p. 22 (1862); *Anderson, Proc. Zool. Soc.* 1895, p. 419.

Erinaceus diadematus, *Dobson, Monogr. Insectivora*, pt. i, p. 10. (1882) [*nec Wurttenb.*]

Description.—Body from a line between the ears to the tail covered above with a thick coating of sharp spines each about three-quarters of an inch in length, white with a subterminal band of dark brown or black, and a pale brown tip; each of the spines

has the appearance of being longitudinally ridged, but there are no tubercles on the ridges as is the case in many species of the genus.

The pointed snout is covered with dark brown or black hair between which and the spines is a white frontal band extending downwards on either side of the head below the ears; sides of the body dark brown, below dark brown and white intermixed; ears rounded, standing up above the fur covered with sparse fine white hairs; all the fur very coarse, fore and hind limbs with five toes, all clawed, the pollex and hallux being markedly shorter than the others.

Skull with large vacuities in the posterior part of the palate, formed of the pterygoid bone; posterior glenoid process of the squamosal solid and small.

In the upper jaw the third incisor, canine, and first premolar are double rooted, the small second premolar has three roots.

Dimensions.—From a mounted specimen; head and body 7·5; tail 0·5; from ear opening to tip of snout 1·5; hind foot 1·12; skull length 1·75; breadth 1·08; length of upper cheek teeth ·94.

Distribution.—The South African hedgehog is very rare south of the Orange River, whence it is reported only from the Prieska, Albert and Queenstown divisions; north of the Orange River, however, it appears to be plentiful as far north as Benguela. It is said to be found throughout German South-west Africa, in Gordonina, Griqualand West, the Orange Free State, the Transvaal, Matabeleland and Mashonaland, and also Natal, but it is rare there. The South African Museum possesses examples from Griqualand West, the Transvaal and Natal.

Habits.—This species seems to resemble the European hedgehog in its habits so far as they have been observed; it has the power of rolling itself into a ball when molested and normally at any rate feeds on insects, though possibly it may at times devour fruits and other vegetable food.

Family SORICIDAE.

Genus CROCIDURA.

*Type.***Crocidura**, *Wagler, Isis*, p. 275 (1832) *C. russulus*.**Pachyura**, *Selys-Longch. Micromamm.* p. 32 (1839) ... *C. etrusca*.

Insectivora, generally of small size with long pointed snouts the sides of which are more or less swollen by the roots of numerous strong vibrissae or whisker bristles; the tip of the snout is bifid and the nostrils open laterally; the eyes are small and nearer the ear opening than the tip of the snout; the tail is well developed and usually tapering, and is always provided with a number of scattered long white hairs in addition to the thick covering of short bristles.

On either side of the body is a gland opening near the root of the fore limb, usually more developed in the male; from this is secreted a fluid which often gives these animals a strong musky smell; the urino-genital and alimentary orifices open into a shallow cloaca, and as the male organ is retractile and the testes are abdominal it is often difficult to ascertain the sex; the mammae are six in number and all inguinal in position.

The skull is narrow, elongated and without post-orbital processes or zygomatic arches, the tympanic bone is annular and does not form a swollen bulla.

Dentition.—i. $\frac{3}{3}$, c. $\frac{1}{0}$, pm. $\frac{1}{1}$ or $\frac{2}{1}$, m. $\frac{3}{3}$ = 28 or 30.

The incisors are white, thus differing from those of the true European shrews (*Sorex*) in which they are reddish; the anterior incisors are strongly hooked and have a posterior cusp of varying dimensions, the second incisor is larger than the third which is about the same size as the canine.

The presence or absence of a small tooth between the canine and the large premolar constitutes the chief distinction between the two subgenera *Pachyura* and *Crocidura* "sensu stricto."

The genus is widely spread over Europe, Asia, and Africa, and a very large number of species have been described. Owing to the external resemblance of many of the species and to the fact that it is hard to ascertain when an individual is full grown, especially as they frequently breed before this date, the discrimination of the species is very difficult.

Key of the South African Species.

- A. Four small conical teeth, the hindmost very small behind the large upper incisor [Subgenus *Pachyura*].
 - a. Small, about 1.75 in. ; tail of equal thickness throughout *C. [P.] varilla*, p. 159.
- B. Three small conical teeth, behind the large upper incisor [Subgenus *Crocidura*].
 - b. Of medium size, between 2.5 and 3.0
 - a¹. Tail in spirit-preserved specimens at least $\frac{3}{4}$ the length of the head and body ; dark brown *C. [C] martensi*, p. 162.
 - b¹. Tail in spirit-preserved specimens about $\frac{1}{2}$ the length of the head and body.....
 - a². Ears very hairy ; colour dark red brown *C. [C] pilosa*, p. 163.
 - b². Ears not hairy ; colour slaty grey ... *C. [C] silacea*, p. 163.
 - c. Of large size, head and body more than 3.5 inches *C. [C] flavescens*, p. 160.

205. ***Crocidura (Pachyura) varilla***. THE SMALL SHREW.

Crocidura varilla, *Thomas, Ann. Mag. N. H.* (6), xvi, p. 54 (1895).

Description.—Size very small, with soft, crisp and fairly long fur, the colour of which is slaty for the basal two-thirds of its length, the terminal third being white with brown tips ; below much paler,

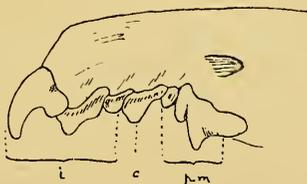


FIG. 130.—Fore-part of the skull of *Crocidura (Pachyura) varilla*, enlarged to show the minute extra premolar.

the whole of the terminal third of the fur being white ; ears projecting beyond the fur, covered, especially along the margins, with scanty short brown hairs ; snout, hands and feet white ; tail long and cylindrical, about the same thickness throughout, thickly

covered with white hairs, the longer ones being particularly numerous, white below, slightly tinged with brown above.

Skull with the third upper incisor shorter than the canine, between which and the large premolar is the anterior premolar always present in this subgenus; this tooth is of fair size, lies in the tooth-row, and is easily visible from without.

Dimensions.—From a specimen in alcohol; head and body 1·70; tail 1·48; hind foot without claws ·40; from ear to tip of snout ·50; skull length ·68; breadth ·30; length of upper cheek teeth ·30.

Distribution.—The type of this species, recently described by Mr. Thomas, is in the British Museum, and was obtained from the neighbourhood of East London; in the South African Museum there are examples of shrews from the Bedford and Middelburg divisions of the Colony, and from near Pietersburg in the Transvaal, which agree in every respect with the original description.

206. *Crocidura (Crocidura) flavescens*. THE LARGE SHREW.

Sorex flavescens. *Is. Geoffroy, Dict. Class.* xi, p. 324 (1827); *id. Mem.*

Mus. xv, p. 126 (1827); *A. Smith, Illustr. Zool. S. Afr. Mamm.* pl. xlv, fig. 2 (1845); *Layard, Cat. Mamm. S. Afr. Mus.* p. 23 (1862).

Sorex religiosa, *Is. Geoffr., Mem. Mus.* xv, p. 128, pl. iv, fig. 1-3 (1827) [Egypt].

Sorex cinnamomeus, *Lichtenstein, Verhandl. Ges. Natur. Fr. Berlin* ii, p. 381 (1829); *id. Darstellung Säugeth.* pl. xxxix, fig. 1 (1830).

Sorex capensis, *A. Smith, S. Afr. Quart. Journ.* ii, p. 62 (1834); *id. Illustr. Zool. S. Afr. Mamm.* pl. xlv, fig. 1 (1845) [*nec Geoffr.*].

Sorex rutilus, *Sundevall, Oefvers. Akad. Forh. Stockholm*, iii, p. 119 (1847) [Port Natal].

Crocidura ferruginea et fusco-murina, *Heuglin, Nov. Act. Caesarco-Leopold.* p. 35 (1862) [N. E. Africa].

Crocidura flavescens, *Dobson, Monogr. Insectivora* pt. iii. pl. xxvii, fig. 6 (1890); *Trouessart, Cat. Mamm. nov. ed.* p. 199 (1897).

Description.—The largest of the South African shrews; general colour above light reddish brown, the fur being long and soft, the basal two-thirds slate-coloured, the terminal third brown; below much lighter, silvery grey, the basal two-thirds of the fur being slaty as before, the terminal third dirty white; snout pointed, the terminal naked portion being bifid with the nostrils opening laterally; ears rounded, the outer margin with two projecting flaps which form a sort of covering to the actual ear opening, the whole covered fairly thickly with short brown hairs

most developed along the margins of the conches; fore and hind feet covered with dirty white hairs and provided below with six well-developed tubercles or pads as in rodents; tail somewhat short, thick at the base and gradually tapering, brown above, lighter below, with a thick covering of short light brown bristles and a number of scattered longer white hairs.

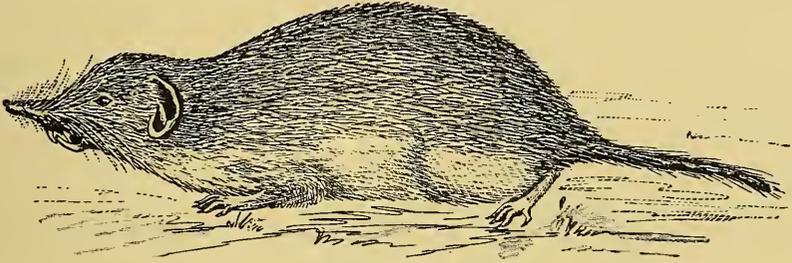


FIG. 131.—The Large Shrew (*Crocidura flavescens*).

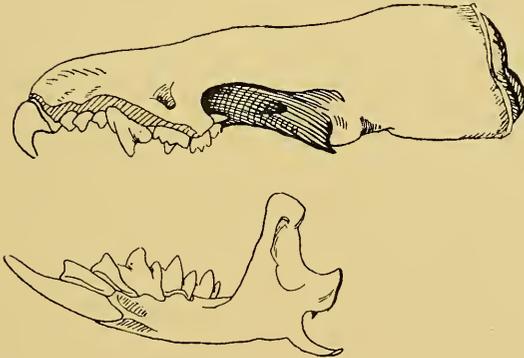


FIG. 132.—Skull of *Crocidura flavescens* (enlarged), to show the teeth.

Skull with the posterior cusp of the first upper incisor not much developed, hardly projecting downwards at all, the third incisor and canine of nearly equal vertical extent, and the latter in contact with the large premolar, the small anterior premolar being absent.

Dimensions.—From a specimen in alcohol; head and body 3·8; tail 2·05; hind foot ·64; from ear opening to tip of snout ·95; skull, length 1·07 breadth ·46; upper cheek teeth ·50.

Distribution.—This shrew is found throughout the Colony and Natal, and according to Trouessart is identical with *C. religiosa*, a species common in Egypt and often found mummified in the tombs; the South African Museum possesses specimens from Cape Town and the neighbourhood, from Albert in the north-east and Pondoland in the east of the Colony, from Durban in Natal and Carolina in the Transvaal.

Habits.—This species is said by Sir A. Smith to inhabit rocky places and wooded ravines about the roots of shrubs and small trees; that it also occasionally inhabits houses is proved by the fact that a specimen now in the South African Museum was caught in the old Art Gallery in Cape Town.

207. **Crocidura (Crocidura) martensi.** MARTENS' SHREW.

Crocidura martensii, Dobson, *Ann. Mag. N. H.* (6) vi, p. 496 (1890);
id. Monogr. Insectivora pt. iii, pl. xxviii, fig. 15 (1890); Matschie,
Säugeth. Deutsch-Ost-Afrikas p. 33 (1895).

Description.—Rather larger than *C. pilosa*, with a very much longer tail; fur dark brown or reddish grey (apud Matschie) with shining tips, the lower surface similar with greyish tips; tail thinly covered with short brown hairs above, mixed with long white ones, beneath whitish; ear conch scantily haired; fore and hind feet covered above with short, pale yellow-brown hairs; lateral gland present, moderate in size.

The first upper incisor has much longer anterior and posterior cusps than that of *C. pilosa* (Dobson).

Dimensions.—Of the type, a male in alcohol; head and body 2.97; tail 2.52; hind foot .52 (Dobson); measurements in the flesh by Mr. Marshall, head and body 3.40; tail 2.12; hind foot .5; ear .2.

Distribution.—The type of this species in the Berlin Museum is from the "Cape of Good Hope" and was described as quoted above by Dobson. Shrews which appear to be identical or very closely allied to this species, from the Clanwilliam, Robertson, Middelburg, Bedford, Albany and Griqualand West divisions of the Colony, and from Salisbury (collected by Mr. G. A. K. Marshall), are preserved in the South African Museum.

208. *Crocidura (Crocidura) pilosa*. THE HAIRY SHREW.

Crocidura pilosa, Dobson, *Ann. Mag. N. H.* (6) vi, p. 496 (1890); *id.* *Monogr. Insectivora*, pt. iii, pl. xxviii, fig. 9 (1890); Thomas, *Ann. Mag. N. H.* (6) xvi, p. 53 (1895) [Pretoria].

Description.—Of moderate size, the body densely clothed with rather long fur, dark red brown above and slightly paler with shining tips below, the basal four-fifths of the hairs on both upper and lower surfaces bluish with a greyish tinge; the ears are more thickly clothed with short hairs than is usual with species of this genus, and the same remark applies to the tail, which is well covered with coarse short hairs, which lengthen and form a short pencil at the extremity, interspersed through the basal two-thirds are long fine hairs; the feet are well covered with short hairs, those on the tail are dark brown above and slightly paler beneath; those on the feet similar to those on the upper surface of the tail.

The teeth resemble somewhat those of *C. fulvescens*, the posterior cusp of the anterior upper molar being short and not projecting.

Dimensions.—From the type, a female in alcohol; head and body 2·37; tail 1·88; hind foot ·56; skull length ·75; breadth ·35; upper cheek teeth ·31.

Distribution.—The type of this species, which is in the Berlin Museum, came from the Transvaal, as did also an example collected by Mr. Distant, near Pretoria, now in the British Museum.

Shrews differing only in minor points from the description quoted above from Delagoa Bay, Durban, Damaraland, Griqualand West and Salisbury are preserved in the South African Museum.

209. *Crocidura (Crocidura) silacea*. THE GREY SHREW.

Crocidura silacea, Thomas, *Ann. Mag. N. H.* (6) xvi, p. 53 (1895).

Description.—Size and proportions of *C. pilosa*; fur close and velvety; colour dark slaty grey above, paler beneath; ears not specially hairy or tufted; claws of fore limb short and strongly curved; upper surface of hands and feet brownish grey; tail rather long, slender, not incrassated at the base, thinly covered with hair, brown above, slightly paler below, lateral gland absent, at any rate in the female.

Skull and dentition resembling those of *C. pilosa* (Thomas).

This species appears to be closely allied to *C. pilosa*, but differs in colour, being grey instead of brown, and also in its paler feet, less hairy ears and tail, and in its shorter and more strongly curved claws.

Dimensions.—Of the type, a female in alcohol; head and body 2·55; tail 1·75; hind foot ·48; skull length ·75; breadth ·37.

Distribution.—This species, the type of which is in the British Museum, was discovered by Dr. P. Rendall at Fig Tree Creek in the de Kaap Goldfields, Transvaal. There are in the South African Museum two small shrews from the Pretoria and Pietersburg districts of the Transvaal which appear to be referable to it.

The following species I have been unable to identify satisfactorily and they are here briefly mentioned.

210. *Crocidura (Pachyura) gracilis*.

Sorex gracilis, *Blainville, Ann. Sci. Nat.* (2) x, p. 120 (1838); *id. Ann. Etrang.* ii, pl. xiv, fig. 8; *Coquerel, Ann. Sci. Nat.* (3) ix, p. 195, pl. ii, fig. 3 (1848).

Description.—Dark chestnut brown above; the flanks and the cheeks somewhat lighter; below the body is greyish, a little darker on the chest than on the belly; the tail and extremities light brown; the head is large and the snout is provided with some long white bristles; the ears are well developed; the tail is very thick at its base and for its proximal third from thence it gradually tapers to its extremity. (Blainville).

Dimensions.—Head and body 1·70; tail 1·0. (Blainville).

Distribution.—The Cape, probably from the neighbourhood of Cape Town. This species is probably identical or closely allied to *C. [Pachyura] varilla*, see p. 159.

211. *Crocidura (Crocidura) mariquensis*.

(?) *Sorex concolor*, *A. Smith, App. Report Exped. Explor. S. Afr.* p. 43 (1836).

Sorex mariquensis, *A. Smith, Illustr. Zool. S. Afr. Mamm.* pl. xlv, fig. 1 (1844); *Jentink, Notes Leyd. Mus.* p. 178 (1887).

Description.—The general colour above is brownish-red; lighter on the head and tail, below also lighter with a distinct tint of pearly

grey; eyes small and nearer the ears than the apex of the snout; ears moderately large, semicircular, their anterior surface sprinkled with fine, short hair; tail cylindrical, thick at its base, tapering towards the point, the latter with a delicate pencil of rigid hairs; claws brownish-red (Smith).

Dimensions.—Head and body 3·34; tail 1·82 (Smith).

Distribution.—The type from which the description was taken was obtained by Sir A. Smith, in northern Buchuanaland “near the tropic of Capricorn.” A shrew described by Dr. Jentink from the neighbourhood of Mossamedes has been identified with this species; there are in the South African Museum two skins from Salisbury, which may be identical with it.

212. *Crocidura (Crocidura) cyanea*.

Sorex cyaneus, *Duvernoy, Mem. Soc. Hist. Nat. Strasb.* ii, *Suppl.* p. 2 (1838); *id. Mag. Zool.* p. 21, pls. xl, xli (1842).

Description.—General colour uniform bluish grey above and on the sides, slightly paler below; ears naked and apparent; whiskers long; muzzle slender, elongated and terminated by a black snout; tail slender, three quarters the length of the body.

Skull and dentition like that of *S. araneus* of Europe (Duvernoy).

Dimensions.—Head and body 3·35; tail 2·0 (Duvernoy).

Distribution.—The type and only known specimen was obtained by J. Verreaux on the banks of the Oliphant River in the Colony. This species appears to be closely allied to if not identical with *C. martensi*.

213. *Crocidura (Crocidura) argentata*.

Sorex argentatus, *Sundevall, K. Vetens. Akad. Handl. Stockholm*, ii, 2, p. 16 (1858).

Description.—General colour silvery white a little paler below, the tips of the hairs above pale brown, so that there is on the back a slight reddish tinge; snout dusky as far as the angle of the mouth; limbs dark ashy; the hairs with shining tips, tail quadrangular about as thick as the metatarsus, brown with long pale hairs; internal valves of the ears provided with stout thickly-spread hairs; snout bifid.

Dentition.—With the third and fourth teeth of the upper jaw (*i.e.* last incisor and first canine) small and equal; anterior cusp of the third tooth of the lower jaw (third incisor) a little higher than half its basal length (Sundevall).

Dimensions.—Head and body 3.0; tail 1.75; hind foot with claws .5 (Sundevall).

Distribution.—The type and only known specimen was obtained at Roodeval in the Oudtshoorn division of the Colony on the 21st of January, 1850, by Victorin, and is now in the Stockholm Museum.

Genus **MYOSOREX.**

Type.

Myosorex, Gray, *Proc. Zool. Soc.* 1837, p. 124..... *M. varius*.

Shrews with white teeth and with tails clothed with short hairs of equal or subequal length, but with no longer white hairs, so characteristic of *Crocidura*; the third upper incisor is shorter than the second; the anterior upper premolar is very small, almost rudimentary.

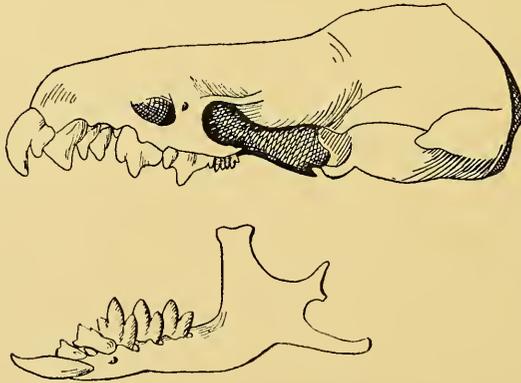


FIG. 133.—Skull of *Myosorex varius* (enlarged).

Dentition.—i. $\frac{3}{2}$, c. $\frac{1}{1}$ or $\frac{1}{0}$, pm. $\frac{2}{1}$, m. $\frac{3}{3}$ = 30 or 32.

Dobson further gives as a character of this genus that the cloaca is absent, the generative organs and alimentary canal opening on the surface by distinct orifices; this in the specimens examined by me is not the case, the single opening, a long slit, is surrounded by a

sphincter muscle, and within this the genital and alimentary apertures open, but they cannot be said to open separately on the surface.

In addition to the single South African representative, three other species, all from the Cameroons district of West Africa, have been described.

214. *Myosorex varius*. SMUTS' SHREW.

Sorex varius, *Smuts, Enum. Mamm. Cap.* p. 108 (1832); *A. Smith, S. Afr. Quart. Journ.* ii, p. 63 (1834); *id. Illustr. Zool. S. Afr. Mamm.* pl. xlv, fig. 2 (1844); *Grill, K. Vetens. Akad. Handl. Stockholm* ii, 2, p. 16 (1858) [Cape division]; *Layard, Cat. Mamm. S. Afr. Mus.* p. 23 (1862).

Myosorex varius, *Gray, Proc. Zool. Soc.* 1837, p. 124; *Dobson, Proc. Zool. Soc.* 1837, p. 575; *id. Monogr. Insectivora*, pt. iii, pl. xxv, fig. 1 [pt. of skull] (1890).

Sorex caffer, *Sundevall, Oefvers. Akad. Forh. Stockholm* iii, p. 119 (1847).

Description.—Figure slender, snout pointed, fur short and dense, slate-coloured below, darker above, almost black, the tips of the longer hairs yellowish-brown, giving a general speckly appearance to the fur; below somewhat lighter; ears short and rounded, projecting slightly beyond the fur, covered above and below with brown hairs.

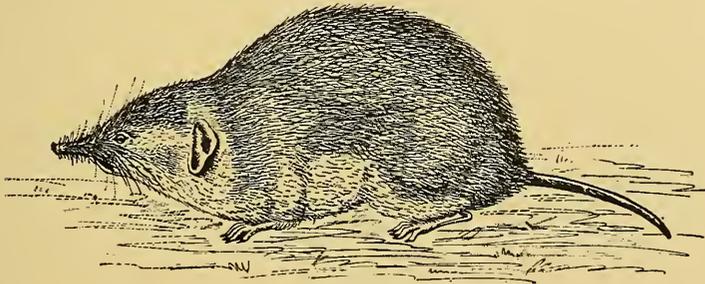


FIG. 134.—Smuts' Shrew (*Myosorex varius*).

Tail short, less than half the length of the head and body, densely clothed with short, stiff brown hairs and with no longer hairs as in the other shrews (*Crocidura*); a large lateral gland on either side of the body opening by a slit-like aperture situated just

behind the fore limb, present in the males, rudimentary in the females.

Teeth thirty-two in number; upper incisors with prominent basal processes, the third being smaller than the canine, the anterior premolar is very minute and can hardly be detected with the naked eye lying inside the tooth row between the canine and the second premolar; in the lower jaw a very minute tooth, quite invisible from without, succeeds the second incisor, and is considered to represent the canine or the anterior premolar, so that there are seven teeth on either side of the lower jaw instead of six as in all other species of *Soricidae*.

Dimensions.—From a specimen in alcohol; head and body 3·15; tail 1·6; from ear opening to tip of snout ·95; hind foot without claw ·59; skull, length ·83; breadth, ·45; upper cheek teeth ·40.

Distribution.—Cape Colony and Natal, extending as far northward as Namaqualand in the west; the South African Museum possesses examples from the neighbourhood of Cape Town, Calvinia, Durban and Zululand.

Family CHYSOCHLORIDAE.

This family contains only one genus, the characters of which, as given below, are those of the family.

Genus CHRYSOCHLORIS.

Type.

Chrysochloris , <i>G. Cuvier, Leçons d'Anat. Comp.</i> i (1800).....	<i>C. aurea.</i>
Amblysomus , <i>Pomel, Archiv. Sci. Phys. et Nat. Geneve</i> ix, p. 247 (1848)	<i>C. hottentota.</i>
Chalcochloris , <i>Mivart, Journ. Anat.</i> ii, p. 133 (1868)	<i>C. hottentota.</i>

Mole-like insectivora with the fore limbs modified for digging; skull conical, not constricted between the orbits, with well developed zygomatic arches and tympanic bullae; no symphysis pubis, the pubic bones being separated; the eyes are small and almost entirely concealed by the skin, the ears are without conches, and open by a simple aperture closely surrounded by the fur; the external tail is

completely absent and the mammary teats are thoracic and inguinal and situated in cup-shaped depressions.

Dentition.—i. $\frac{3}{3}$, c. $\frac{1}{1}$, pm. $\frac{3}{3}$, m. $\frac{3}{3}$ or $\frac{3}{2}$, = 36 or 40.

The upper molars with v-shaped cusps and with short or nearly obsolete internal basal processes.

These animals, though resembling the true moles in their habits and in their general modification for underground life, are structurally much more nearly allied to the tenrecs or *Centetidae* a family of shrew-like animals inhabiting Madagascar.

These differences are well shown by a comparison of the structure of the fore limb and its attachment in the two families (moles and golden moles); to admit of fossorial action and progression the fore limbs must project as little as possible beyond the body and yet preserve their leverage and muscular strength; in the true moles this is brought about by the lengthening forwards of the front end

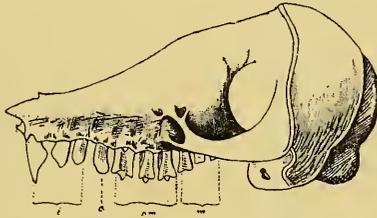


FIG. 135.—Skull of *Chrysochloris aurea*.

of the sternum (manubrium) and the shortening of the clavicles so that the limbs are brought forward opposite the narrowest part of the body; in the golden moles, however, the manubrium is not elongated nor are the clavicles shortened, and the limbs rest in a hollow space formed for their reception in the anterior part of the thorax by the inbending of the anterior ribs; again, in the true moles, the hand is flattened and trowel shaped and bears five more or less equally developed strong claws which form an organ suitable for digging in soft moist earth, whereas in the golden moles the palmar surface is much contracted and bears one (the third) greatly enlarged claw for digging, the others being all much smaller.

This genus and the family of which it is the sole representative, is confined to Central and South Africa; in addition to the five South African species below described, two other species are

recognised, one *C. leucorhina*, M. Edwards and Huet, from French Congo, the other *C. stuhlmanni*, Matschie, from Central Africa, in the neighbourhood of the Semliki River and Ruanda between Victoria Nyanza and Tanganyika.

Key of the South African Species.

A. With 40 teeth.

a. With a prominent swelling in the posterior wall of the temporal fossa; colour brown; head short and broad; size about 4·5 in. ... *C. aurea*, p. 170.

b. With very slight or no swelling in the posterior wall of the temporal fossa; upper margin of the posterior root of the zygomatic arch as high as the crown of the skull.

a¹. Smaller, about 6 inches in length..... *C. villosa*, p. 174.

b¹. Larger, about 9 inches in length *C. trevelyani*, p. 173.

B. With 36 teeth; no trace of the swelling in the temporal fossa.

a. Anterior cusp of second upper incisor shorter than the posterior; colour reddish with bright iridescence; size about 4·5; head long and narrow *C. hottentota*, p. 175.

b. Anterior cusp of second upper molar longer than the posterior; colour pale brownish with golden and greenish iridescence, size about 3·75, head short and broad *C. obtusirostris*, p. 176.

215. **Chrysochloris aurea.** THE CAPE GOLDEN MOLE.

Talpa asiatica, *Linnaeus, Syst. Nat.* 12th ed., i, p. 73 (1766).

Talpa aurea, *Zimmermann, Geogr. Geschichte*, ii, p. 391 (1778).

Talpa inaurata, *Schreber, Säugeth.* iii, p. 562, pl. 157 (1778).

Talpa capensis, *Shaw, General Zool.* p. 521 (1800).

Chrysochloris capensis, *Desmarest, Mamm.* p. 156 (1820); *A. Smith, Descript. Cat. S. Afr. Mus.* p. 30 (1826); *Smuts, Enum. Mamm. Cap.* p. 10 (1832); *A. Smith, S. Afr. Quart. Journ.* ii, p. 81 (1834); *Layard Cat. Mamm. S. Afr. Mus.* p. 23 (1862).

Chrysochloris aurea, *Fischer, Synops. Mamm.* p. 248 (1829); *Dobson, Monogr. Insectivora*, pt. ii, p. 110, pl. xi, fig. 1 [skull] (1883).

Chrysochloris damarensis, *Ogilby, Proc. Zool. Soc.* 1838, p. 5.

Chrysochloris inaurata, *Grill et Sundevall, K. Vetens. Akad. Handl. Stockholm* ii, 2, p. 15 (1858).

LITERATURE.—Seba, *Thesaurus*, i, 51, pl. 32 (1734), described as the Siberian mole; Sparrman (1785), p. 213, synonymy and dentition; Vosmaer (1787), early history and description with coloured plate; Thunberg (1795) p. 262, described as the “blinde moll;” Moseley (1892), p. 127, note on its occurrence near Simonstown.

Description.—Head short and broad forming almost an equilateral triangle at the apex; the snout consists of a broad, naked

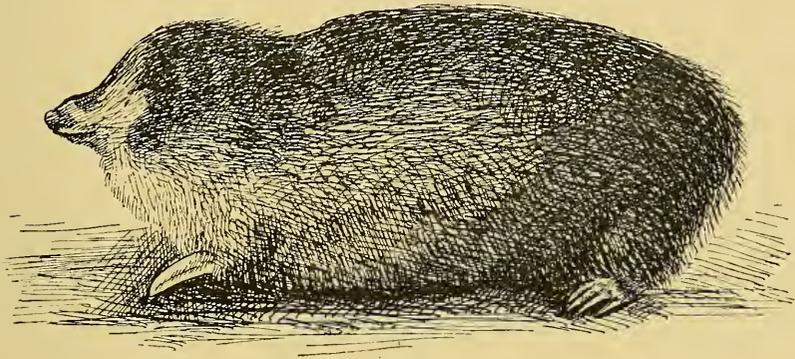


FIG. 136.—The Cape Golden Mole (*Chrysochloris aurea*).

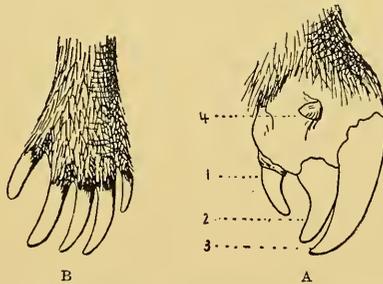


FIG. 137.—A, Fore and, B, hind foot of *Chrysochloris aurea*.

patch of skin ending in a wedge-shaped horizontally flattened edge, which is probably used as a digging organ, its proximal part being separated from the distal portion by a transverse furrow; on the lower side of this wedge-shaped projection open the nostrils side by side.

Eye small, lying entirely underneath the skin and completely covered with thick fur so that its position can only be made out with great difficulty; external ear quite absent, represented only by the small circular opening of the auditory meatus also thickly surrounded by hair and difficult to find.

Limbs very short and enclosed in the general skin almost to the ankles; fore limbs with four clawed digits, the first slender and short, the second slender but as long as the third which is far the largest and bears the enormously enlarged strong claw; the fourth very small placed at the base of and at right angles to the third; hind foot nearly circular with five claw-bearing digits of almost equal length.

The tail is practically absent, being entirely underneath the skin and not projecting at all.

General colour above, dark velvety brown to dark reddish, the hair being for about three quarters of its length dark grey and woolly, the tips shining and metallic; when the animal is held in certain lights a greenish or coppery iridescence is seen, this iridescence is much more marked in specimens preserved in spirit; below rather lighter; an indistinct band of white on either side of the head in the neighbourhood of the eye.

Skull (fig. 135, p. 169) short and broad, with vesicular hemispherical swellings between the posterior roots of the zygoma and the sides of the skull; upper margin of the posterior zygomatic roots lower than the crown of the skull.

Teeth forty in number, *i.e.*, with three molars on either side above and below, second upper incisor with the posterior cusp the longest; the lower molars without the postero-internal cusp present in the other species.

Dimensions.—Measurements of a specimen preserved in alcohol; head and body 4·35; from the ear to the tip of the snout ·92; third claw of fore limb ·47; hind foot to tip of middle claw ·58; skull length 1·05; breadth ·75; length of upper cheek teeth ·45.

Distribution.—This species is common in the south-western part of the Colony especially in the neighbourhood of Cape Town; it extends northwards to Port Nolloth in Namaqualand, to Beaufort West and Kimberley whence the South African Museum possesses specimens, and apparently to Damaraland whence came Ogilby's type of *C. damarensis* now in the British Museum, and since shown to be identical with *C. aurea*.

Habits.—The golden mole is exceedingly common in gardens

where it makes runs just underneath the surface in all directions in search of the worms and grubs on which it lives. Although generally supposed to be destructive it is really a great aid to the gardener as it destroys quantities of larvae especially those of a certain gamma moth (*Plusia sp.*); these larvae are nocturnal, spending the day deep in the earth near the roots of the plants on which they feed during the night; a certain amount of mischief however, is done by the mole in pursuit of its prey by disturbance of roots and of freshly-sown seeds.

The golden mole makes a round nest of grass and in this the young are born; it does not construct anything like the complicated castle and labyrinth of the European mole.

History.—The golden mole was first described by Seba; he believed, however, that it was a native of Siberia and so it received the name given it by Linnaeus; Vosmaer and Sparrman first proved that it was a native of South Africa; very few careful observations have been made on its habits.

216. *Chrysochloris trevelyani*. THE GIANT GOLDEN MOLE.

Chrysochloris trevelyani, *Gunther, Proc. Zool. Soc.* 1875, p. 311, pl. xliii [animal]; *id. Ann. Mag. N. H.* (4), xvii, p. 346, pl. xx, figs. A and B [skull] (1875); *Dobson, Monogr. Insectivora*, pt. ii, p. 111, pl. xi, fig. 4 [skull] (1883).

Description.—Very large, about 9 inches in length and so nearly double the size of any other species of the genus; the naked space about the snout somewhat narrow; fur of two kinds, a woolly underfur of a pale grey colour, beyond which projects the coarser longer fur of which the basal two-thirds is pale, the terminal third brown with a slight iridescence which, however, is much less than that of the other species of the genus; below rather paler; the colour varies, however, in different individuals.

Skull long and narrow, the distinguishing feature being the great development of the posterior roots of the zygomata which are broadened and lengthened posteriorly to the level of the crown of the skull, their postero-internal margins coalescing with the occipital crest to form a very marked transverse ridge across the skull, from the median point of which runs forwards a prominent sagittal suture; the bony swelling at the back of the temporal fossa is only very slightly developed.

Teeth, forty in number, as in *C. aurea*; the lower molars with well marked postero-internal processes.

Dimensions.—From a mounted specimen; head and body about 9·0; head, from the ear opening to the tip of the snout, about 2·25; third claw of manus ·80; hind foot 1·05; skull (from Dobson) length 1·65; breadth 1·10.

Distribution.—The eastern part of the Colony; hitherto only recorded from the Pirie bush near King Williams Town.

Habits.—This species has only recently been discovered; the original specimen was obtained by Mr. Trevelyan in 1875, from a Kaffir accompanying a shooting party into the Pirie forest near King Williams Town, and the skin is apparently used by the Kaffirs of that district as a tobacco pouch; there are several skins in the South African Museum which have obviously been used for this purpose, including one obtained at Ladysmith in Natal. Whether the animal from which the last mentioned skin was taken was killed in that neighbourhood or had been brought from the Pirie forest is doubtful.

217. *Chrysochloris villosa*. THE ROUGH-HAIRED GOLDEN MOLE.

Chrysochloris villosa, *A. Smith, S. Afr. Quart. Journ.* ii, p. 81 (1834);
id. Illustr. Zool. S. Afr. Mamm. pl. ix (1839); *Dobson, Monogr. Insec-*
tivora, pt. ii, p. 111 (1883).

Description.—Smaller than *C. trevelyani*, which it seems to resemble in every other respect, the only difference, as described by Dobson, being that in the skull the long sagittal crest is separated from the transverse deep occipital crest uniting the posterior roots of the zygoma, whereas in *C. trevelyani* the two crests are united.

The only reason why Dobson did not unite the two species was that in the large skull of *C. trevelyani*, examined by him, the squamosal suture was still present, proving that the skull was not yet adult, whereas in the smaller *C. villosa* this suture was closed.

The collection and comparison of more specimens can alone prove whether the two species are really distinct or not.

Dimensions.—From a skin in the South African Museum; head and body 7·0; head, from the tip of the snout to the ear opening, about 1·75; third claw of fore foot 0·70: hind foot to end of longest claw ·87; length of skull about 1·60; breadth of skull ·90; length of upper cheek teeth ·63. These measurements are all rather larger than those given in Dobson's monograph.

Distribution.—The eastern part of the Colony and Natal. The type was procured by Sir A. Smith near Durban, and is now in the British Museum. Another example, described by Dr. Dobson, was from the neighbourhood of Maritzburg, while there are in the South African Museum three skins obtained at Entafufu in Pondoland, which seem to be referable to the species.

218. **Chrysochloris hottentota.** THE RED GOLDEN MOLE.

Chrysochloris hottentotus, *A. Smith, Zool. Journ.* iv, p. 436 (1829)

id. S. Afr. Quart. Journ. ii, p. 81 (1834).

Chrysochloris holosericea, *Lichtenstein, Darstell. Säugeth.* pl. xli, fig 2 (1834); *Layard, Cat. Mamm. S. Afr. Mus.* p. 23 (1862).

Chrysochloris rutilans, *Wagner, Schreber, Säugeth. Suppl.* ii, p. 125 (1844); *Dobson, Monogr. Insectivora* pt. ii, p. 125 (1884).

Description.—About the same size as *C. aurea* differing externally only in the shape of the head which is much longer and narrower, and in the colour which is usually a coppery red above and below; the occiput is often black and the front part of the snout grizzled black and white, but the colouration varies considerably in different individuals; as in *C. aurea* the iridescence is very much greater in spirit-preserved specimens and the coppery sheen much more noticeable than the green.

The skull differs very considerably from that of *C. aurea*; it is much longer and narrower and the hemispherical swellings at the root of the zygoma are absent; the auditory bullae are more inflated and smoother, and not furrowed as in *C. aurea*. Teeth, thirty-six in number, *i.e.*, with only two molars on either side above and below; the postero-internal cusp of the lower molars is well developed, and the second upper incisor is large, its posterior cusp being well developed.

Dimensions.—From a specimen preserved in alcohol; head and body 4·35; head from the ear opening to the tip of the snout ·84; third claw of fore foot ·38; hind foot to tip of middle claw ·58; skull length 1·10; breadth ·66; upper cheek teeth ·41.

Distribution.—The red golden mole is chiefly found in the eastern parts of the Colony and Natal, though it apparently extends as far westwards as Stellenbosch; other localities whence there are specimens in the South African Museum are the Swellendam, Albany, Stutterheim, and Pondoland divisions of the Colony and Natal.

219. **Chrysochloris obtusirostris.** PETERS' GOLDEN MOLE.

Chrysochloris obtusirostris, Peters, *M. B. Akad. Berlin*, 1851, p. 467 ;
id. Reise Mossamb. Säugeth. p. 70, pl. xviii, fig. 1 [animal], pl. xxii, fig.
18-23 [skull] (1852); Dobson, *Mongr. Insectivora* pt. ii, p. 112, pl.
xi, fig. 6 [skull] (1883).

Description.—Smaller than *C. aurea* with a very much broader and more obtuse snout, the naked portion at the tip being quite twice as broad as long; the large third claw of the fore limb is much slenderer than that of *C. aurea*. Fur brown with greenish or coppery metallic iridescence; sides of the head and below very much paler almost white in parts; altogether, judging from the coloured illustration of Peters and from the single specimen preserved in spirit in the South African Museum a somewhat paler and less iridescent form.

Skull of about the same general shape as that of *C. aurea*, but with no trace of the swelling in the wall of the temporal fossa at the posterior root of the zygoma so characteristic of that species; root of the zygoma much below the level of the crown of the skull.

Teeth, thirty-six in number, the third or posterior molars being therefore absent; the second and third upper incisors with two cusps, of which the anterior is the longest and best developed; lower incisors with very small basal processes at their postero-internal margins.

Dimensions.—From a specimen preserved in spirit; head and body 3·70; head from ear opening to tip of snout ·80; third claw ·33; hind foot ·49; length of skull ·90, breadth ·64; upper cheek teeth ·40.

Distribution.—This species was originally discovered by Dr. Peters in the neighbourhood of Inhambane in Portuguese East Africa; the South African Museum possesses an example from Delagoa Bay; no other locality has been recorded.

Habits.—Dr. Peters states that in the stomach of his specimen were found the remains of beetles, which therefore constitute the food of the animal.

Order CETACEA.

This order includes the animals usually known as Whales, Porpoises, and Dolphins; they are entirely modified for aquatic life and thus differ very widely both in form and structure from all other mammals; their exact relationship to the other orders is a question of considerable doubt, and many widely differing ideas on the subject are current. Sir W. Flower believes that on the whole their affinities are towards some primitive group of the *Ungulata*.

The following are some of the more striking characters of the order: the body is fish-like and fusiform, there being no neck; at the posterior end of the body are two laterally directed, pointed, triangular fins of the same shape as the tail of a fish but placed horizontally instead of vertically; these are known as the flukes, and are supported by dense fibrous tissue.

The head is large and the mouth usually very wide; the forelimbs are reduced to the condition of flippers or paddles, being enclosed in a common integument, and show externally no sign of division into segments; there are also no traces of nails or claws. The hind limbs are completely absent externally.

The surface of the body is smooth and glistening, there being no covering of hairs as in the other orders of mammals, with the exception of a few small bristles, usually found in the neighbourhood of the mouth; beneath the epidermis is a very thick layer of fatty matter known as the blubber; this serves the same purpose as the hairy covering of other mammals in assisting to keep the body at a constant temperature.

The eye is comparatively small and has no nictitating or third eyelid, nor any lachrymal apparatus; the ear externally consists of a minute pit situated behind the eye, and there is no trace of the pinna or conch as in most other mammals; the nostrils open either separately or more usually by a single crescentic opening on the vertex of the head.

The skull consists of a rounded brain-case with a more or less elongate rostrum or beak; the cervical vertebrae are small, and generally some of them at least are fused together into a single mass; there are no vertebrae united to form a sacrum. The clavicles are absent and the pelvic bones are reduced to two small styliform ossicles placed longitudinally some distance below the vertebral column, to the outer surface of which are sometimes fixed small nodules of bone or cartilage, the rudiments of the skeleton of the hind limbs.

The teeth, when present, are simple and uniform in character throughout the jaws; they are never preceded by milk teeth, and the dentition may therefore be described as homodont and monophyodont.

The *Cetacea* are mostly marine but a certain number enter the larger rivers and a few are entirely fluviatile. They are nearly all predaceous, subsisting on animal food, though recently one of the dolphins from the estuaries of the Cameroons in West Africa has been reported to be herbivorous. Like other mammals the *Cetacea* are air-breathers, and although they have the power of making long dives, have eventually to ascend to the surface to replenish their stock of oxygen. The violent expiration of the heated and moist air from the lungs through the blow-hole or nostrils gives the appearance of a fountain of water suddenly shot up, and it is usually supposed to be due to the expulsion of water that has been taken into the mouth; this, however, is an entirely erroneous idea.

The chief authorities on whom I have relied in drawing up the present list of South African *Cetacea* are the late Sir W. Flower, and Mr. True of the United States National Museum, whose papers are quoted in the synonymy of the various species treated of.

The *Cetacea* of South Africa can be divided into two very distinct suborders containing in all three families, which may shortly be diagnosed as follows.

- | | |
|--|-------------------------------|
| A. No teeth after birth; baleen or whalebone present in the jaws, breathing orifice (<i>i.e.</i> , nostrils) double (Mystacoceti) | <i>Balaenidae</i> , p. 179. |
| B. Teeth present throughout life; no baleen; breathing orifice single (Odontoceti) | |
| a. Functional teeth in the lower jaw only; often much reduced | <i>Physeteridae</i> , p. 185. |
| b. Teeth (except in <i>Grampus</i>) present in both jaws, usually numerous | <i>Delphinidae</i> , p. 196. |

Suborder **MYSTACOCETI.**

Whalebone whales with teeth never developed after birth; palate provided with numerous plates of baleen or whalebone; external respiratory aperture double, situated on the vertex of the head; skull symmetrical; rami of the mandible arched outwards, the anterior ends connected by fibrous tissue only; sternum a single piece connected with one pair of ribs only.

Family **BALAENIDAE.**

The characters of the single family are those of the suborder.

Key of the South African Genera.

- A. Dorsal fin absent; throat smooth..... *Balaena*, p. 179.
 B. Dorsal fin present; throat furrowed with grooves
 a. Pectoral fin very long and narrow, more than $\frac{1}{4}$ the length of the whole animal; dorsal fin small, on a hump towards the hinder part of the body; below furrowed to the vent..... *Megaptera*, p. 181.
 b. Pectoral fin short, narrow and pointed, dorsal fin strong and falcate; furrowed on throat only... *Balaoptera*, p. 183.

Genus **BALAENA.***Type.*

- Balaena**, *Linnaeus, Syst. Nat.* 12th ed. i, p. 105 (1766)..... *B. mysticetus*.
Eubalaena, *Gray, Proc. Zool. Soc.*, 1864, p. 201... *B. australis*.

Whalebone whales with the skin of the throat smooth, not furrowed, no dorsal fin, a short, broad pentadactylous flipper; head very large.

Skull with arched upper profile, the facial bones being very narrow; cervical vertebrae ossified to form a single mass.

Tympanic bone deep and angular, with comparatively small inflation.

Besides *B. australis* the only other well defined member of this genus is *B. mysticetus*, the arctic right whale, which is found only in the neighbourhood of the arctic ice fields.

220. *Balaena australis*. THE SOUTHERN RIGHT WHALE.

Balaena australis, *Desmoulins, Dict. Class. d'Hist. Nat.* ii, p. 161 (1822); *Trimen, Trans. S. A. Phil. Soc.* i, p. 41 [on the "bonnet"] (1877); *Turner, Challenger Reports Zool.* i, p. 32 (1880); *Flower List Cetacea. B. M.* p. 2 (1885).

Balaena mysticetus (antarctica), *Smuts, Enum. Mamm. Cap.* p. 100 (1832); *Smith, S. Afr. Quart. Journ.* ii, p. 241 (1834).

Eubalaena australis, *Gray, Proc. Zool. Soc.* 1864, p. 202; *Flower, ibid.*, p. 391, fig. 2 [nasal bones]; *Gray, Cat. Seals Whales B. M.* p. 91 (1866).

LITERATURE.—G. Cuvier, *Ossemens foss* (1823), v, pp. 369, 374, pl. xxv, fig. 1-4, juv. 5-8 adt. described as "Baleine du Cap"; Bennett (1840), ii, p. 229, on the Cape Right Whale; Ross, *Voyage of Discovery* (1847) i, p. 169, ii, p. 327, note on its occurrence in Antarctic Regions.

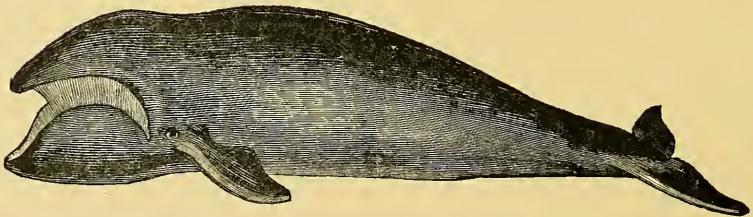


FIG. 138.—The Southern Right Whale (*Balaena australis*).
(Flower and Lydekker.)

Description.—Black above and below; head as compared with that of the other species smaller in proportion to the body, being about a quarter of the total length: the upper lip is very highly arched. It is further distinguished by the greater number of its vertebræ (57-8 against 54) and ribs (15 against 12-13), and by the shortness of its baleen.

This whale can be always distinguished from the other whales likely to be met with in Cape Seas by the absence of the dorsal fin, and by its very large head.

Dimensions.—Mr. Warwick gave Mr. Gray (*Cat. Seals, Whales*, p. 93) the following dimensions of an adult whale caught in False Bay:—Total length 68 ft.; height 14 ft.; head 16 ft.; width of tail $15\frac{1}{2}$ ft.

Distribution.—This species was founded by Cuvier on two skeletons sent to Paris from the Cape of Good Hope by Delalande;

it is still fairly abundant round the coasts of the Colony, and is taken most years in False and Table Bays. There are several skulls and skeletons in the South African Museum.

This whale is almost certainly identical with the Biscayan whale or Nordkaper (*B. glacialis*, Bonn., or *B. biscayensis* auct.), the sletbag of the Basque whalers, which was hunted from the tenth to the sixteenth centuries, before the discovery of the Arctic species on the coasts of Europe. It is probably also identical with the Japanese whale of the North Pacific and the black whale, formerly killed in large numbers along the Australian and New Zealand coasts, now much reduced by persecution.

Should these various whales be all ultimately found to be identical, the correct name according to True would be *Balaena glacialis* Bonn.

Habits.—This whale comes into Table and False Bays in June and July for the purpose of calving; they usually arrive in pairs, and the young are born soon after their arrival, unless, as is often the case, they are driven away or killed. Attached to an example recently obtained in False Bay were a number of barnacles deep set in the skin (*Tubicella trachealis*). This species is said to be fiercer and more agile than the Arctic Right Whale. Like all the members of the family its food consists entirely of microscopic mollusca and crustacea which occur in enormous numbers floating on the surface.

Genus MEGAPTERA.

Type.

Megaptera, Gray, *Zoology of Erebus and Terror*,
p. 16 (1846) *M. longimana*.

Whalebone whales with moderate, somewhat depressed and flat heads, almost straight jaws, and a low dorsal fin placed on a slight hump about two-thirds of the length of the body from the head; the lower surface of the body from the chin to the vent is marked with thick longitudinal ridges separated by narrow deep furrows. The flippers are tetradactylous and exceedingly long and narrow, more than a quarter of the total length of the body; the cervical vertebrae are not fused to one another.

221. *Megaptera longimana*. THE HUMP-BACK WHALE.

Balaena longimana, *Rudolphi, Abhandl. Akad. Berlin*, p. 133, pl. iv (1829).

Balaena lalandii, *Fischer, Synop. Mamm.* p. 525 (1829).

Balaena sulcata (antarctica), *Smuts, Enum. Mamm. Cap.* p. 101 (1832).

Balaenoptera capensis, *A. Smith, S. Afr. Quart. Journ.* ii, p. 242 (1834).

Poescopia lalandii, *Gray, Cat. Seals, Whales*, p. 126 (1866).

Megaptera lalandii, *Turner, Challenger Reports, Zool.* i, p. 30 (1880).

Megaptera boops, *Flower, List Cetacea B. M.* p. 4 (1885); *van Beneden, Mem. Couron. Acad. Belge*, xl (1887) [natural history].

Megaptera longimana, *True, Proc. U. S. Nat. Mus.* xxi, p. 635 (1898).

LITERATURE.—G. Cuvier, *Ossimens foss.* (1823) v, p. 370, pl. xxvi, fig. 1-4, described as “*Rorqual du Cap*”; Bennett (1840) ii, p. 231, account of the Cape Humpback.

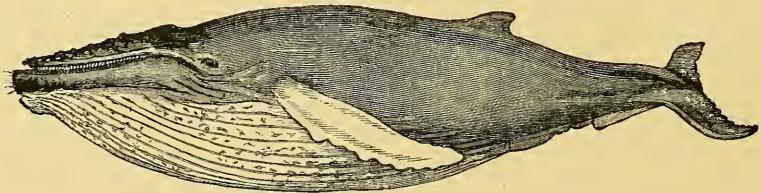


FIG. 139.—The Hump back (*Megaptera longimana*).
(Flower and Lydekker.)

Description.—Above and on the sides black, front part of lower surface white; hinder part mottled black and white.

Baleen plates about 300 in number on either side of the mouth bluish black, short, broad and somewhat triangular.

Pectoral fins very long and narrow, scalloped along the anterior and posterior edges, black above, white below.

Vertebrae 53 in number, cervical vertebrae free from one another.

Tympanic bone much inflated with two longitudinal ridges on the lower surface.

Dimensions.—Smith gives the measurements of a specimen examined by him as follows:—Total length $34\frac{1}{2}$ ft.; from the tip of the lower jaw to the angle of the mouth $7\frac{1}{2}$ ft.; pectoral fins, length 9 ft.; width 2 ft.

Specimens obtained on the English Coasts have usually measured from 45 to 50 ft.; the female is always larger than the male.

Distribution.—A skeleton of this whale was also taken to Paris

by Delalande and described by Baron Cuvier; it is not uncommon in the Cape seas, and the South African Museum possesses the skeleton of an example killed in Table Bay in 1897.

Humpbacks are found in the North Atlantic and have been occasionally taken on the British Coasts, they are also known from the North and South Pacific, from the Persian Gulf and in fact from almost all parts of the world.

Whether there are several species of humpback whales or only one widely distributed species cannot be definitely settled until further comparisons with more material are possible.

Habits.—Like the right whale the humpback seems to frequent the shallow waters of bays and inlets for breeding purposes, arriving in Table and False Bays in the middle of winter. As the whalebone is very short and not of great value and the blubber is not very thick it is seldom molested by the whale boats of the Colony.

Among the parasites of this species taken from the specimen the skeleton of which is now in the South African Museum, were the coronetted barnacles, *Coronella diadema*, and ship's barnacle, *Conchoderma aurita*, and an amphipodous crustacean, *Cyamus*, which usually clings round the bases of the barnacles.

Genus **BALAENOPTERA.**

Type.

Balaenoptera, *Lacépède, Table des Ordres, Hist. Nat.*

des Cétacés, p. xxxvi (1804)..... **B. physalus.**

Whalebone whales with comparatively small and flat heads, pointed in front; body long and slender; skin of the throat plicated, a strong falcate dorsal fin; pectoral limb tetradactylous small, narrow and pointed.

Cervical vertebrae free; tympanic bone inflated and rounded, with the involuted portion thickened and pyriform, below somewhat flattened with scarcely any traces of the ridge found in *Megaptera*

222. **Balaenoptera sp. inc.** THE FIN WHALE.

Balaenoptera rorqual, *Smith, S. Afr. Quart. Journ.* ii, p. 242 (1834).

Fin whales are not uncommon off the coast of South Africa, but so far as I know, no specimen has ever been secured for a Museum, or been examined by a competent authority.

Four species of the genus are now clearly identified by naturalists in the northern seas, and the fin whales of other parts of the world all seem to conform more or less to the type of one of these four. In order to facilitate comparison of the Cape fin whales with these four, their characters as described by Mr. R. Collett (*Proc. Zool. Soc.* 1886, p. 264), may here be shortly given.

(1) *Balaenoptera musculus*, Linn. (*B. sibbaldi* auct.), the blue whale, the largest of all known animals living or extinct, attaining a length of 70 to 80 ft., but rarely exceeding 85; height to length $1-5\frac{1}{2}$. Dark blue grey, with small white spots on the breast; flippers $\frac{1}{7}$, jaws $\frac{2}{9}$, of total length.

(2) *Balaenoptera physalus*, Linn. (*B. musculus* auct.), the common rorqual; length 60 to 65 ft., rarely exceeding 70; very elongate; height to total length $1-6\frac{1}{2}$; greyish slate above and on the left lower jaw; below, right lower jaw, inside of flippers and lower side of tail-flukes white; flipper $\frac{2}{9}$; jaws $\frac{1}{8}$ of total length.

(3) *Balaenoptera borealis*, Less. Rudolphi's whale; length 40 to 48 ft. rarely attaining 52; height to total length $1-5\frac{1}{2}$; bluish black above, with oblong white spots, more or less white below; tail and flippers black above and below, flippers very small $\frac{1}{11}$, jaws $\frac{2}{9}$ of total length.

(4) *Balaenoptera acuto-rostrata*, Lacep. (*B. rostrata* auct.), the lesser fin-whale, length 25 to 30 ft., seldom exceeding 33; height of body to total length $\frac{1}{5}$; greyish black above, white below, including the lower side of the tail; a broad band of white across the outer side of each flipper; inner side all white; flippers $\frac{1}{8}$; jaws $\frac{2}{11}$ of total length.

Suborder ODONTOCETI.

Whales with teeth always present; no baleen; external respiratory orifice single; manus with five digits always; rami of mandible straight, the anterior ends forming a true symphysis; sternum of several pieces and connected with several pairs of ribs.

Family PHYSETERIDAE.

No functional teeth in the upper jaw ; those of the lower jaw varying in number, often reduced to a single pair.

Bones of the cranium raised at the sides and behind the nares, so as to form a prominent crest with a basin-shaped space in front ; pterygoid bones thick, produced backwards, meeting in the middle line and not involuted to form the outer wall of the post-palatal air sinus.

The hinder ribs lose the tubercular but retain a capitular articulation with the bodies of the vertebrae ; sternal ribs not ossified.

Key of the South African Genera.

- A. Numerous teeth in the mandible set in a long groove imperfectly divided (Physeterinae).
 - a. Of large size ; teeth in the lower jaw 20 to 25 on each side *Physeter*, p. 185.
 - b. Smaller ; teeth of the lower jaw 9 to 15 on each side *Kogia*, p. 188.
- B. Teeth in the mandible reduced to a single pair, which are often very large, especially in the males (Ziphiinae).
 - c. Teeth set at the anterior end of the mandible..... *Ziphius*, p. 191.
 - d. Teeth set some distance from the anterior end of the mandible, about opposite the posterior end of the symphysis *Mesoplodon*, p. 193

Genus **PHYSETER.**

Type.

Physeter, *Linnaeus, Syst. Nat.* 12th ed. i. p. 107 (1766) *P. macrocephalus*.

Massive animals with the head forming about a third of the length of the body ; spiracle (*i.e.*, nasal orifice) single, on the upper anterior extremity of the head a little to the left of the middle line.

Skull concave above, with its posterior and lateral edges raised into a high crest ; mandible long and narrow, the symphysis

occupying more than half the ramus; atlas free, other cervical vertebrae united into a single mass.

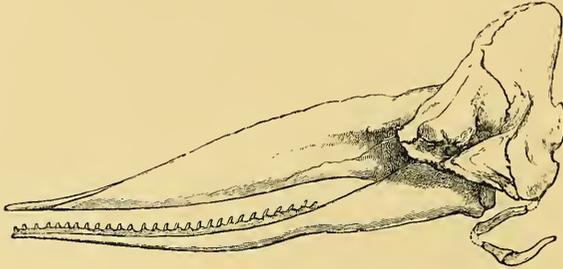


FIG. 140.—Skull of *Physeter macrocephalus*.
(Flower and Lydekker.)

Upper teeth rudimentary, functionless and embedded in the gums; lower jaw with 20 to 25 stout conical and recurved teeth on either side.

Only the single species described below is known.

223. *Physeter macrocephalus*. THE SPERM WHALE OR CACHALOT.

Physeter macrocephalus, *Linnaeus, Syst. Nat.* 12th ed. i, p. 107 (1766); *Smuts, Enum. Mamm. Cap.* p. 102 (1832); *Flower, Trans. Zool. Soc.* vi, p. 309, pl. lv-lxi [osteology] (1869); *id. List Cetacea B. M.* p. 8 (1885).

Catodon macrocephalus, *A. Smith, S. Afr. Quart. Journ.* ii, p. 239 (1834).

LITERATURE.—Le Vaillant (1796) i, p. 236, on a Sperm Whale stranded at the mouth of the Oliphant's River; Beale, *The Natural History of the Sperm Whale* (1839), account of a whaling voyage and of the Natural History and Economy of the Sperm Whale; Bennett, (1840) ii, p. 153-228, account of hunting, catching and killing the Sperm Whales.

Description.—Colour blackish with greenish reflections, sometimes marked with white, especially about the abdomen and tail, below a little lighter, almost grey, the two colours shading in front into one another; head truncate and somewhat cubical in front; its huge size and remarkable form being due to the accumulation of an oily substance, spermaceti, in cells and cavities occupying the greater part of its bulk; spiracle situated at the anterior end of

the snout a little to the left side, sigmoid in shape, like the opening of the sounding board of a violin; pectoral fins short, broad and obliquely truncated.

Dimensions.—The adult male sperm whale attains an average length of 55 ft., and seldom, if ever, exceeds 60 ft.; the female is much smaller, being only from 30 to 35 ft. in length. In a large male the pectoral fins measure about 3 ft. by 2 ft., and the flukes 19 ft. across.

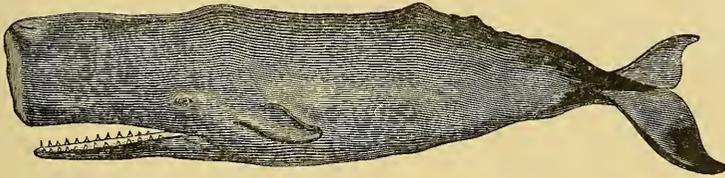


FIG. 141.—The Cachelot, or Sperm Whale (*Physeter macrocephalus*).
(Flower and Lydekker.)

Distribution.—Cosmopolitan, except in the polar regions; most abundant in the tropical and subtropical seas; the sperm whale has occasionally been stranded on the coasts of Cape Colony; le Vaillant mentions an instance, and two years ago (1897) an individual was obtained near Port Elizabeth, the skeleton of which is preserved in the museum there.

Habits.—The sperm whale is always found in the deeper and more oceanic regions of the globe, and seldom, if ever, approaches land like the whalebone whales; the examples, for instance, that have reached the English coasts have nearly always drifted there when dead.

The food of the sperm whale chiefly consists of squids and cuttles of various kinds, and recently considerable additions to our knowledge of these creatures, which sometimes attain gigantic proportions, have been made by the Prince of Monaco, who has examined the contents of the stomach of numerous sperm whales for this special purpose.

Fishes, such as rock-cod, albicore and bonito are also eaten.

The young of this whale are born out at sea, away from land, unlike those of the whalebone whales, which are usually born in shallow water near the coast; only one calf, as a rule, is produced at a time.

Sperm whales were much hunted at the close of the last century and at the beginning of this, especially by American and English whalers; the blubber yields sperm oil, which is much more valuable than the ordinary whale oil, and the cavity of the head spermaceti, which is used for making candles. Another product of the sperm whale is ambergris; it is not, however, usually taken from the animal itself, but is found floating on the surface of the sea, and is a concretion formed in the intestine of the whale. It is used in perfumery, and is of considerable value commercially.

Genus **KOGIA**.

Type.

- Kogia**, *Gray, Zool. Ereb. and Terror*, p. 22 (1846)... K. breviceps.
Euphysetes, *Wall, Hist. and Descript. New Sperm Whale, Sydney*, p. 37 (1851) K. breviceps.

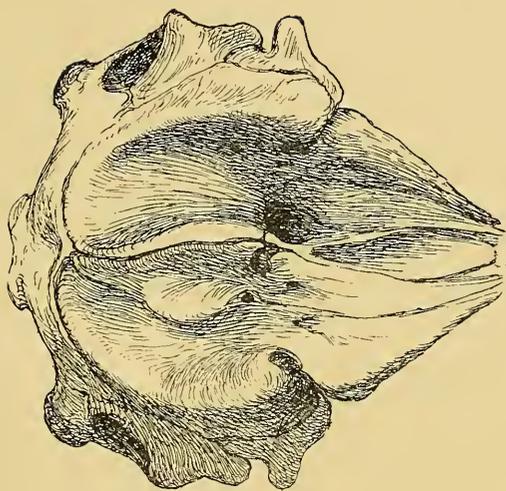
Animals with more external resemblance to a porpoise than to a sperm whale, with the mouth very small and inferior in position, and the spiracle on the left side of the middle line just anterior to the eyes but not at the front end of the snout.

Upper surface of the cranium concave with thick rounded lateral and posterior margins forming a basin-shaped cavity; rostral portion of the skull short and triangular.

Mandible with the symphysis forming only about a quarter of the whole ramus.

To nearly every individual of this genus, the skeleton of which has been preserved, there has been given a separate specific name on grounds which seem hardly sufficient.

The original species (*Physeter breviceps* of Blainville) was founded on a specimen from the Cape Seas and agrees fairly well with the Australian specimen in size and the larger number of teeth; the Indian example (*Euphysetes simus* of Owen) is smaller and has fewer teeth and agrees very well with the specimen recently obtained in Table Bay, the skeleton of which is now in the South African Museum, and on which the account given below is founded. Both these latter examples are females, and it would seem to be probable that the larger-sized individuals may be males, which, judging from the analogy of the allied sperm whale, would be much larger than the females; in this way the variation in size of different specimens may be accounted for.



B



A

FIG. 142.—Skull of *Kogia breviceps*—A, from the side; B, from above ($\frac{1}{15}$ nat. size).

224. *Kogia breviceps*. THE SMALL SPERM WHALE.

Physeter breviceps, *Blainville, Ann. Anat. Phys.* ii, p. 337 (1838).

Kogia breviceps, *Gray, Zool. Ereb. and Terror*, p. 22 (1846); *Flower, List of Cetacea B. M.* p. 9 (1885).

Euphysetes grayi, *Wall, Hist. and Descript. New Sperm Whale, Sydney*, p. 37, pl. ii [skeleton] (1851).

Euphysetes macleayi, *Kreffft, Proc. Zool. Soc.* 1865, p. 708, fig. 1-6.

Euphysetes simus, *Owen, Trans. Zool. Soc.* vi, p. 30, pls. x-xiv (1866); *Elliot, ibid.* p. 171.

Description.—General colour slaty above, becoming paler on the side and white below, pectoral fin dark slate, flukes dark slate above, white below; head rounded and blunt in front, the mouth very small, about 5 inches in length, opening on the lower surface of the body some 7 inches from the front of the snout; spiracle crescentic and slit-like, convex forwards, to the left of the dorsal median line just in front of the eye about 9 inches from the tip of the snout, dorsal fin low and not conspicuous, pectoral fin lobate.

Teeth, 9 on both sides of the lower jaw.

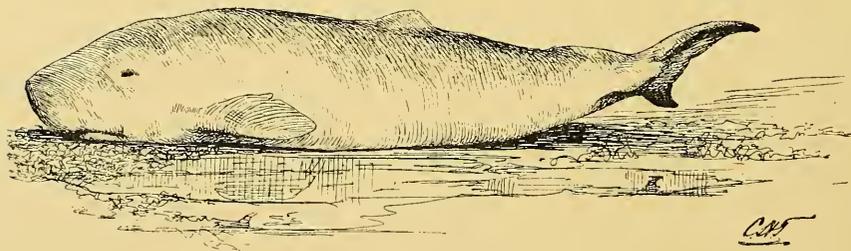


FIG. 143.—The Small Sperm Whale (*Kogia breviceps*).

Dimensions.—Of a young female measured in the flesh; total length 5 ft. 9; from the snout to the eye 11.5, to spiracle 9; pectoral fin along the anterior edge 11; flukes from tip to tip 18.

The Indian specimen, also a female, was 7 ft. 2 in length, the Australian examples were from 9 to 10 ft.

The skull in the South African Museum measures in total length 10 in.; breadth 8.50; the mandible measured in a straight line from tip to condyle 8.50.

Another specimen stranded at Knysna, of which the skeleton has recently been acquired by the South African Museum is much

larger, and was probably a male ; the skull measures 15·0 by 13·0, and the lower jaw, which contains 14 teeth, is 14·5 from tip to condyle.

Distribution.—The type of the species described by Blainville was obtained at the “ Cape of Good Hope,” and is now in the Paris Museum.

Other specimens on which other species have been founded have been obtained at Madras in India, near Sydney in New South Wales and at Mazatlan on the Pacific Coast of Mexico ; this whale is therefore widely distributed.

As already stated there are in the South African Museum a skeleton of a young female stranded on the rocks at Green Point, near Cape Town, in 1896, and one of a much larger individual obtained in the Knysna division of the Colony.

Genus **ZIPHIUS.**

Type.

Ziphius, *G. Cuvier, Ossemens foss.* 2nd ed. v, p. 352

(1823) *Z. cavirostris.*

Petrorhynchus, *Gray, Proc. Zool. Soc.* 1865, p. 524 *Z. cavirostris.*

Porpoise-like animals with elongate bodies, a falcate dorsal fin and small pentadactylous pectorals, situated rather low down and close together.

Skull of a peculiar shape, the premaxillae in front of and at the sides of the nares expanded and hollowed out with elevated lateral margins, the posterior ends rising to the vertex and curving forwards, the right bone more developed than the left ; conjoint nasal bones forming a strongly pronounced symmetrical eminence on the top of the cranium overhanging the nares and separated on either side by a notch from the premaxillae ; antorbital notch not distinct ; rostrum triangular, tapering from the base to the apex ; vertebrae 49, the three anterior cervicals being united.

No teeth in the upper jaw, a single conical tooth of moderate size on each side of the mandible towards its anterior extremity directed upwards and forwards.

Several species have been described, but there is nothing to show that the South African form, known only by the skeleton, differs in any way from the type species of the genus ; Sir W. Flower recognizes another species from New Zealand Seas.

225. *Ziphius cavirostris*. CUVIER'S WHALE.

Ziphius cavirostris, *G. Cuvier, Ossements foss.* 2nd ed., v, p. 352 (1823); *Flower, Trans. Zool. Soc.* viii, p. 207 (1872); *id. List of Cetacea B. M.* p. 10 (1885); *id. Proc. Zool. Soc.* p. 476 (1876).

Ziphius indicus, van Beneden, Mem. Acad. Roy. Belg. xvi, (1863); *Owen, Brit. Foss. Cetacea, Palaeont. Soc.* p. 7, figs. 4-8 [skull] (1870).

Hyperoodon capensis, Gray, Proc. Zool. Soc. 1865, p. 359.

Petrorhynchus capensis, Gray, Proc. Zool. Soc. 1866, p. 528 [figs. of skull]; *id. Cat. Seals and Whales*, p. 346 (1866).

Description.—External characters not well known but a specimen stranded in New Zealand and described by von Haast (*P. Z. S.*, 1876, p. 466) under the name of *Z. novae-zealandiae* is said to have been of a bluish black colour above, and white below, and the upper portion of the body marked with oval spots 2 to 4 inches in diameter and to have been entirely without a dorsal fin; on the other hand the specimen described by Burmeister (*Ann. Mus. Buenos Ayres*, vol. i, p. 312, 1869) is stated to have possessed a well-developed dorsal fin.

This whale can be easily recognised by the shape of the skull with the peculiar overhanging nasal bones, and also by the small size and the position and conical shape of the mandibular teeth.

Dimensions.—The skull figured by Owen (l. s. c.) which came from the Cape of Good Hope measures about 38 in length by 31 in breadth, and the mandible from condyle to tip 32.

The length of von Haast's specimen, an aged female alluded to above, was 26 feet.

Distribution.—The skull which forms the type of the species, described by Cuvier was picked up on the Mediterranean coast of France; the types of *Z. indicus* and *H. capensis* were obtained from the Cape seas and are now preserved in the Museum of Louvain in Belgium and in the British Museum respectively; Whales closely allied, if not identical with Cuvier's have been recorded from the seas of Northern Europe, the Argentine Republic and New Zealand; so that the distribution of Cuvier's whale is probably very wide.

Nothing seems to be known about the habits of these animals.

Genus **MESOPLODON.**

Type.

- Mesoplodon**, *Gervais, Ann. Sci. Nat.* (3) xiv, p. 16
 (1850)..... *M. bidens.*
Dolichodon, *Gray, Cat. Seals and Whales*, p. 353 (1866) *M. layardi.*

Small whale-like animals with beaks somewhat resembling that of *Ziphius* but distinguished by cranial and dental characters.

Skull with a long, narrow and solid rostrum, nasals narrow and sunk down between the upper ends of the maxillae, concave in front and not forming a roof to the nares as in *Ziphius*. Teeth in the upper jaw absent, or at any rate rudimentary and not attached to the bone; in the lower jaw a single pair of compressed and pointed teeth present, usually at some distance from the apex of the ramus with the points directed upwards and sometimes backwards.

Vertebrae 46 to 48, two or three of the anterior cervicals united, the others all free.

This genus is spread over the Northern and Southern Hemispheres though more abundant in the latter; about eight species are now recognised of which two have been recorded from the coasts of South Africa; the others are from European, Australian and New Zealand waters.

Key of the South African Species.

- A. With two long strap-shaped teeth in the mandible, which in the adults grow upwards right round the rostrum of the upper jaw and cross above it..... *M. layardi*, p. 193.
 B. With two comparatively small teeth in the mandible which forms a massive and swollen base for their reception *M. densirostris*, p. 195.

226. Mesoplodon layardi. LAYARD'S BEAKED WHALE.

Ziphius layardi, *Gray, Proc. Zool. Soc.* 1865, p. 358, fig. a. b. [skull], *id. Cat. Seals and Whales*, p. 353 (1866); *Owen, Brit. Foss. Cetacea, Palaeont. Soc.* p. 7, pl. i [skull] (1870).

Mesoplodon layardi, *Flower, Trans. Zool. Soc.* viii, p. 211 (1872); *id. ibid.* x, p. 416 (1878); *Hector, Trans. New Zealand Inst.* x, p. 341 (1878); *Turner, Challenger Reports, Zool.* i, pt. iv, pp. 2-26, pls. i-iii (1880); *Sutton, Proc. Zool.* p. 440, fig. 7 [lower jaw] (1885); *Flower List. Cetacea B. M.* p. 11 (1885); *Mosley, Notes by a Naturalist*, 2nd. ed. p. 135 [fig. of a skull] (1892); *Trimen, Trans.*

S. A. Phil. Soc. v. p. 295 (1893); *Forbes, Proc. Zool. Soc.* p. 227 (1893).

Description.—This whale is described as being black on the back and white below, the two colours being distinctly separated from one another, the external characters however are not well known.

In the skull the foramina in the premaxillary and maxillary bones, opening above, for the exit of two branches of the second division of the fifth nerve are on about the same level.

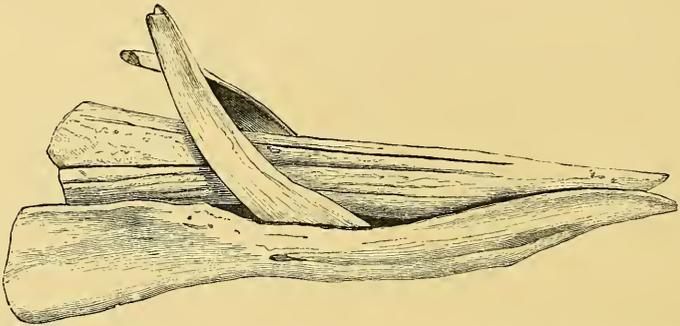


FIG. 144.—Rostrum of skull and lower jaw of *Mesoplodon layardi*, showing the two elongated strap-shaped teeth springing from the lower jaw and crossing above the rostrum. (*Proc. Zool. Soc.*)

The most remarkable characteristic of this whale, however, is its dentition; the teeth of the upper jaw are rudimentary or absent, those of the lower jaw are two in number, situated at some distance behind the front end; they consist of a strap-shaped mass of osteodentine about $2\frac{1}{2}$ in. in width, and $\frac{1}{4}$ in. in thickness passing upward and backwards, and curving round to cross one another above the rostrum of the upper jaw; situated at the top of the strap-shaped portion is a little conical mass which probably represents the true tooth.

It is very difficult to understand how an arrangement of this sort can have originated, as it must almost entirely prevent the animal from opening its mouth, so much so that it was at one time believed that the great development of the teeth was pathological; however, the acquisition of a considerable number of specimens has shown that this is not the case, and we must conclude that the animal has the power of opening its jaws only to a very limited extent.

Dimensions.—The length of a specimen stranded near Cape Point was stated to be 18 ft. ; the skull of the type measured 3 ft. 7 from the condyles to the tip of the rostrum, the lower jaw 3 ft., and of this the symphysis occupied 11.75; the exposed portion of the tooth measures 9; a pair of teeth now in the South African Museum measure 14.5 in total length.

Distribution.—This whale is entirely confined to the Southern Oceans; it has been recorded from New Zealand and the Chatham Isles, the Falklands and the Cape. The type specimen was obtained by Mr. Layard in the Colony, and is now in the British Museum; Professor Moseley during the stay of the Challenger Expedition in Simon's Bay obtained parts of two skulls, one of an individual said to have been stranded near Cape Point in 1865, the other stated to have been brought from Walfisch Bay in German South-west Africa.

Habits.—The food of this whale seems to consist chiefly of Cephalopods (*i.e.*, Cuttle-fish and Octopus).

227. *Mesoplodon densirostris*. BLAINVILLE'S BEAKED WHALE.

Delphinus densirostris, *Blainville, N. Dict. d'Hist. Nat.* 2nd ed. ix, p. 178 (1817).

Ziphius sechellensis, *Gray, Zool. Ereb. and Terror*, p. 28 (1846).

Dioplodon sechellensis, *Kreft, Proc. Zool. Soc.* 1870, p. 426; *Gray, Suppl. Cat. Seals and Whales, B.M.*, p. 102, fig. 11 [skeleton] (1871).

Mesoplodon densirostris, *Flower, Trans. Zool. Soc.* x, p. 416 (1878).

Description.—The external characters of this whale are not well known; the skull is distinguished by the presence of a strong deep lateral groove running along the maxillae, and by the fact that the premaxillary foramen on the surface of the skull for the exit second division of the fifth nerve is a good deal posterior to the corresponding maxillary foramen.

The mandibular tooth which is situated some distance from the front end of the mandible has its apex directed vertically upwards and is placed on a massive base caused by the expansion of the alveolar margin of the lower jaw, the tooth is comparatively short and conical and entirely different from that of *M. layardi*.

Dimensions.—Total length of the skeleton without cartilage 14 ft. 8; skull length 2 ft. 5.5; breadth 14; lower jaw 27; tooth 6 in length by 3 $\frac{3}{8}$ in width by 1 $\frac{3}{4}$ in thickness.

Distribution.—The original specimen was obtained many years ago in the Seychelles, and is now in the Paris Museum; a skull from South Africa is in the Museum of the Royal College of Surgeons in London, and one from Lord Howe Island in the Australian Museum at Sydney.

Family DELPHINIDAE.

Teeth usually numerous in both jaws; pterygoid bones small, each involuted to form with the palatine bones the outer wall of the post-palatal air sinus; symphysis of the mandible never much exceeding $\frac{1}{3}$ of the ramus in length, usually much less.

The ribs retain their tubercular attachment to the transverse processes throughout the vertebral column, the capitular attachment being lost posteriorly; the transverse processes themselves are gradually transferred from the arches to the bodies of the vertebrae passing from the front backwards; sternal ribs firmly ossified.

This family contains the largest number of genera and species of the order, and is a difficult one to deal with, owing chiefly to the scantiness of the material preserved in Museums.

Key of the South African Genera.

- A. Head rounded, with no very distinct beak;
in the skull, the rostral portion is equal to
or less than the cranial portion.
- a. Teeth absent in the upper jaw, present only
in the anterior half of the lower; $\frac{0}{3-7}$... *Grampus*, p. 201.
- b. Teeth only in the front half the upper and
lower jaws, $\frac{5-12}{5-12}$ *Globicephalus*, p. 199.
- c. Teeth distributed all along both jaws.
- a¹. No dorsal fin, teeth spade-like $\frac{18-19}{15-19}$ *Neophocaena*, p. 202.
- b¹. Dorsal fin present, teeth rounded and
normal.
- a². Teeth very strong and stout, $\frac{12}{12}$ *Orcinus*, p. 197.
- b². Teeth numerous and small.
- a³. Pterygoids united, teeth $\frac{23-33}{23-33}$ *Lagenorhynchus*, p. 203.
- b³. Pterygoids separate, teeth $\frac{25-30}{25-30}$... *Cephalorhynchus*, p. 205.

- B. Head with a very distinct rostrum or beak marked off from the head by a V-shaped groove; the rostral considerably exceeds the cranial portion of the skull.
- a. Pterygoid bones normal meeting in the middle line.
- a¹. Palate with deep lateral longitudinal grooves, mandibular symphysis short; teeth small, $\frac{40-60}{40-60}$ *Delphinus*, p. 208.
- b¹. Palate smooth without grooves.
- a². Mandibular symphysis short; teeth $\frac{30-50}{30-50}$ about $\frac{1}{4}$ inch in diameter, and smooth *Tursiops*, p. 211.
- b². Mandibular symphysis short; teeth, $\frac{21-25}{21-25}$, about $\frac{1}{3}$ inch in diameter and smooth *Prodelphinus*, p. 206.
- c². Mandibular symphysis at least $\frac{1}{4}$ th of ramus; teeth $\frac{21-25}{21-25}$ about $\frac{1}{4}$ in. in diameter and roughened..... *Steno*, p. 213.
- b. Pterygoid bones narrow, separated in the middle line; teeth $\frac{30-35}{30-35}$ about $\frac{3}{16}$ in. in diameter..... *Sotalia*, p. 214.

Genus **ORCINUS**.

Type.

- Orca**,* *Gray, Zool. Ereb. and Terror*, p. 33 (1846) O. orca.
- Orcinus**, *Fitzinger, Wiss. pop. Naturg. Säugeth.* vi, p. 204 (1860) O. orca.

Large rapacious animals with the anterior part of the head broad and depressed; the dorsal fin which is situated near the middle of the back, very high and pointed.

Rostrum broad, flattened and rounded in front, pterygoids not quite meeting in the middle line.

Vertebrae 51 or 52, the first, second, and sometimes the third united.

Teeth about $\frac{1}{2}$, distributed all along the rostrum, very strong and stout, with conical recurved crowns and large roots.

A considerable number of species of this genus have been described, but hitherto no definite specific differential characters

* Previously applied to another genus of *Cetacea*.

have been given, and until this is done it will perhaps be better to refer all the forms to the originally described *Delphinus orca* of Linnaeus.

Should the Cape species subsequently be considered worthy of separation, it will bear the name of *Orcinus capensis*.

228. **Orcinus orca.** THE KILLER OR GRAMPUS.

Delphinus orca, *Linnaeus, Syst. Nat.*, 12th ed. i, p. 108 (1766).

Delphinus gladiator, *Bonnaterre, Cetacès* pp. 22, 23 (1789).

Grampus gladiator, *A. Smith, S. Afr. Quart. Journ.* ii, p. 238 (1834);
Layard, Cat. Mamm. S. Afr. Mus. p. 82 (1862).

?*Delphinus victorini*, *Grill, K. Vet. Akad. Handl. Stockholm* ii, 2, p. 21,
pl. i (1858).

Orca capensis, *Gray, Proc. Zool. Soc.* 1870, p. 71, fig. 2, 4 [skull]; *id.*
Suppl. Cat. Seals and Whales p. 90 (1871).

Orca gladiator, *Flower, Proc. Zool. Soc.* 1883, p. 507; *id. List Cetacea*
B. M. p. 18 (1885); *True, Bull. U. S. Nat. Mus.* No. 36, p. 187,
pl. xlv, figs. 1-2 (1889).

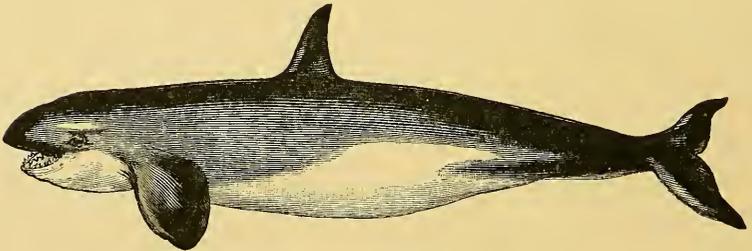


FIG. 145.—The Killer (*Orcinus orca*).
(Flower and Lydekker.)

Description.—General colour above black, below white, the white forms below and behind the dorsal fins a three-forked marking, the lateral forks extending upwards and backwards; above the eye is a longitudinal white stripe.

The dorsal fin, especially in the males, is very large and pointed, reaching a height of 3 ft. 10 in some cases; the pectoral fin is short and broad.

This is a description of the external characters of the European form, it remains to be proved whether the Cape form differs appreciably.

Dimensions.—The length is given as between 19 and 20 ft.

A skull in the South African Museum measures as follows :—total length 3 ft. 3 ; breadth 1 ft. 11 ; length of lower jaw 2 ft. 8 ; the teeth sockets number $\frac{11}{11-12}$.

Distribution.—The killer appears to be found in all seas from Greenland to Tasmania ; there are specimens from South Africa and from the Seychelles in the British Museum, and the South African Museum possesses an old and toothless skull found in a cave at Plettenberg Bay in the Knysna district.

Habits.—The killer is the most rapacious and voracious of all the *Cetacea* ; it is the only member which preys on other warm blooded creatures, although it by no means disdains fish ; it associates together in small troops or schools, and attacks seals, dolphins, porpoises and even whales. Captain Scammon has witnessed the attack of three killers on a cow whale and her calf on the coast of California ; the calf, though three times the size of the killers, was killed, and the cow escaped, though not without many severe wounds about the mouth and lips.

Genus **GLOBICEPHALUS.**

Type.

Globicephala, Lesson, *Mamm. Decouvert depuis 1788*,
p. 441 (1788) *G. melas*.

Cetaceans with very rounded heads in consequence of the great development of fat in front of the blow hole, with a low and somewhat triangular dorsal fin and with long and narrow pectoral fins, the second digit of which is the longest and consists of twelve to thirteen phalanges.

Skull broad and depressed, the rostral and cranial portions being of about equal length ; premaxillae concave in front of the nares ; pterygoids normal, meeting or nearly meeting in the middle line ; vertebrae 58 to 59, the five or six anterior cervicals united.

Teeth $\frac{6-12}{5-12}$ on either side confined to the anterior part of the rostrum and mandible, conical and curved, sometimes deciduous in old age.

Two well-marked species are recognised by Sir W. Flower, and several others by True. *G. melas* is found apparently all over the world, from the Faroes to New Zealand, though not yet recorded from Cape Seas ; the other species is *G. macrorhynchus*, below described.

229. **Globicephalus macrorhynchus.** THE CAPE BLACK FISH OR
CA'ING WHALE.

Phocaena globiceps, *A. Smith, S. Afr. Quart. Journ.* ii, p. 238 (1834).

Globiocephalus macrorhynchus, *Gray, Zool. Ereb. and Terror*, p. 33 (1846); *Layard, Cat. Mamm. S. Afr. Mus.* p. 82 (1862); *Flower, List Cetacea B. M.* p. 21 (1885); *True, Bull. U.S. Nat. Mus.* no. 36, p. 138 (1899).

Globiceps macrorhynchus, *Flower, Proc. Zool. Soc.* 1883, p. 509.

Description.—General colour black above, somewhat lighter but not white below; head rounded, no beak, a very short pointed and scarcely distinct snout; dorsal fin low and somewhat triangular, pectorals very narrow and pointed, tail crescent-shaped.

Skull with the premaxillary bones much widened out from the middle of their length forwards to the points, so as to entirely cover and conceal the maxillae, in this way differing from those of *G. melas* in which a narrow strip of the maxillae is visible all along the edge of the rostrum.

Teeth $\frac{7}{8}$ fewer and rather stouter than in *G. melas*.

Dimensions.—The young specimen described by Sir A. Smith, now in the British Museum, is about 5 ft. 6 in length; an adult described by Cope, from the Coasts of Delaware, was 12 ft. 6 $\frac{1}{2}$, and the pectoral fin 25 $\frac{1}{2}$ in., and another specimen measured, stranded near Calcutta in India, measured 14 ft. 2 in length from snout to tail.

Distribution.—The type of the species is a skull preserved in the Museum of the Royal College of Surgeons in London, it was described by Gray, and was obtained by Mr. F. D. Bennett, from the Southern Seas; another young specimen from the Cape now in the British Museum, alluded to above, was obtained and described by Sir A. Smith. Other black fish, apparently identical with this species though described under other names, are recorded from Calcutta by Blyth, from Guadalupe in the West Indies, by Van Beneden and from the Coasts of Delaware, and California by Cope.

Habits.—These animals are mild and inoffensive in their manners, and feed chiefly on cephalopods; they associate in herds of 200 to 300, and are often surrounded, driven on shore and despatched by the fishermen of the North of Scotland, the Faroes and Iceland; they have the curious habit of always following their leader like a flock of sheep; their movements in the water are very slow compared with those of the true porpoises.

Genus **GRAMPUS.**

Grampus, *Gray, Spic. Zool.* p. 2 (1828)G. griseus. *Type.*

Porpoise-like animals externally closely resembling the last genus *Globicephalus*, but with the fore part of the head less rounded, and the pectoral fins less elongated.

In the skull the rostral portion is somewhat shorter than the cranial portion, and the upper surface of the premaxillae in front of the narial aperture is convex; pterygoid bones in contact; vertebrae 68 in number; manus long and pointed, the second digit the longest with 10 phalanges.

Teeth $\frac{0}{8 \text{ to } 7}$, none in the upper jaw, those of the lower jaw confined to the front part of the ramus. Only one species of this genus is definitely established; it is possible, however, that the South African form may eventually prove to be distinct.

230. **Grampus griseus.** RISSO'S PORPOISE.

Delphinus griseus, *G. Cuvier, Ann. Mus.* xix, p. 14, pl. i, fig. 1 (1812).

Grampus cuvieri, *Gray, Ann. Mag. N. H.* xvii, p. 85 (1846); *id. Proc. Zool. Soc.* 1865, p. 357.

Grampus richardsoni, *Gray, Proc. Zool. Soc.* 1865, p. 522; *id. Cat. Seals Whales B. M.* p. 299 (1866).

Grampus griseus, *Flower, Trans. Zool. Soc.* viii, p. 1, pls. i, ii. [external characters and skeleton] (1871); *id. Proc. Zool. Soc.* 1883, p. 510; *id. List Cetacea B. M.* p. 21 (1885); *True, Bull. U. S. Nat. Mus.* no. 36 pp. 125, 182, pl. 39, figs. 1-2 (1889).

Description.—General colour slaty grey, varying in parts to nearly white and black, the back with its fin, the flukes and the pectoral fins being darker; the body especially along the sides is everywhere covered with irregular and unsymmetrically arranged light striae.

The head is rounded and globular, but a little less so than in the black fish, the mouth is obliquely placed, and the lower jaw is shorter than the upper; the dorsal fin is high and pointed and the pectorals very narrow.

This description of the external characters is from an example from European waters. In the Cape form the skull is the only portion of the animal known, this is rather narrower in proportion to its length, and the antorbital notch is less deep than in the European form, and the teeth number $\frac{0}{4}$.

Dimensions.—This animal attains a length of 13 ft. ; the female from near the Eddystone Lighthouse, described by Sir W. Flower, measured 10 ft. in total length, and the pectoral fin 1 ft. $11\frac{3}{4}$; skull length 19.2, breadth 12, length of mandible 15 ; the example from Kalk Bay now in the British Museum, measured 8ft. in length, the dorsal fin 10 in. in height, and the pectoral fin 1 ft. 10 ; the skull 18 in. in length, and the ramus of the mandible 14.

Distribution.—Risso's Porpoise is widely dispersed all over the world : a good many specimens have been recorded from the Atlantic and Mediterranean coasts of Europe, from Japan, and the North Pacific. A skull now in the British Museum was obtained at Kalk Bay, near Cape Town, many years ago, and described by Gray under the name of *G. richardsoni*, this is the only record from Cape Seas.

Genus **NEOPHOCAENA.**

Type.

- Neomeris**,¹ *Gray, Zool. Erebus and Terror*, p. 30 (1846) N. phocaenoides.
Neophocaena, *Palmer, Proc. Biol. Soc., Washington*, xiii, p. 23 (1899) N. phocaenoides.

Dolphins of small size with conical, not beaked, heads, without dorsal, and with ovate pectoral fins.

Skull small with short and broad rostrum ; pterygoids small and separated ; proximal ends of the premaxillae raised into irregular bosses in front of the nares ; symphysis of the mandible short.

Teeth peculiar, small, compressed and spade-like, $\frac{18}{15}$ to $\frac{19}{19}$ in number ; vertebrae 63.

Only one species is generally recognised ; it can be distinguished by its lack of the dorsal fin.

231. **Neophocaena phocaenoides.** THE LITTLE INDIAN PORPOISE.

Delphinapterus phocaenoides, *G. Cuvier, Regne Anim.* 2nd ed., i, p. 291 (1829).

Neomeris phocaenoides, *Gray, Zool. Erebus and Terror*, p. 30 (1846) ; *True, Bull. U.S. Nat. Mus.* no. 36, pp. 114, 178, pl. 34, figs. 1, 2 (1889).

Phocaena phocaenoides, *Blanford, Mamm. India*, p. 574 (1891).

¹ Previously used for a genus of Coelenterata.

Description.—Snout rounded; head very convex, no dorsal fin; pectorals subovate; a band of tubercles on the back, broad in front, narrow behind, from above the insertion of the pectorals to above the vent. General colour black, a purplish red patch on the upper lip and one on the throat.

Teeth about $\frac{18}{8}$, spade-shaped [Blanford].

Dimensions.—Of a female; length 50; girth 31; flukes 15·0 across; pectorals, 9·0; skull, basal length 7·75; rostrum 3·0; breadth between the orbits 4·75.

Distribution.—The Pacific and Indian Oceans, being recorded from the coasts of Japan, India and the Colony whence there is a skull preserved in the Paris Museum, probably the type of the species. Not represented in the South African Museum.

Habits.—From the observations of Mr. W. F. Sinclair, of Bombay, quoted by Blanford, it appears that this species is a shallow water form, frequenting tidal creeks and sounds among the reefs and islands; it feeds chiefly on prawns, also on small cuttlefish and fishes; it is usually solitary but sometimes seen in pairs and is sluggish and inactive. Nothing is known of its habits on the South African coasts.

Genus **LAGENORHYNCHUS.**

Type.

Lagenorhynchus, Gray, *Zool. Erebus and Terror*, p. 34

(1846) L. acutus.

Dolphins with the rostral portion scarcely exceeding the cranial portion of the skull; pterygoid bones normal, meeting in the middle line; teeth small, not exceeding ·02 in diameter, $\frac{2}{3}$ to $\frac{3}{3}$; vertebrae numerous, 80 to 90; spinous and transverse processes of the lumbar vertebrae very long and slender, bodies short; head with a short but not very distinct beak.

Eight valid species are recognised by True, of which two come from the Cape Seas.

232. **Lagenorhynchus obscurus.** GRAY'S PORPOISE.

Delphinus (Grampus) obscurus, Gray, *Spic. Zool.* p. 2, pl. ii, fig. 3 (1828); A. Smith, *S. Afr. Quart. Journ.* ii, p. 237 (1834).

Phocaena homeii, A. Smith, *Zool. Journ.* iv, p. 440 (1829).

Clymene similis, Gray, *Proc. Zool. Soc.* 1868, p. 147, fig. 2 [palate].

Clymenia obscura, *Flower, Proc. Zool. Soc.* 1883, pp. 495, 512.

Prodelphinus obscurus, *Flower, List Cetacea B. M.* p. 28 (1885).

Lagenorhynchus obscurus, *True, Bull. U.S. Nat. Mus.* no. 36, pp. 104, 174, pl. 29, figs. 1, 2 (1889).

Description.—General colour black above, shading on the head and at the base of the pectorals to slaty grey and pure white below, the lips black shading to slaty grey above and white below; the white of the belly becomes narrower posteriorly, and reaches as far as the anus where the slaty colour again begins; from about this point there extends obliquely forwards into the black of the sides two slaty stripes; tail and pectoral fins dark slate. Dorsal fin high and falcate, pectorals also somewhat falcate. Teeth $\frac{28}{30}$, in the type $\frac{32}{30}$. This description is drawn up from an example recently obtained, of which the skin and skeleton are preserved in the South African Museum.

Dimensions.—Total length 5 ft. 5, from nose-tip to commencement of dorsal fin 2 ft. 8; height of dorsal 7·0; length of pectorals along the anterior edge 12·25; flukes from tip to tip 1 ft. 3; skull length 13·75; rostrum from notch 7·5; extreme breadth of skull 6·5; breadth of rostrum at base 3·0.

Distribution.—The type of the species, now in the British Museum, came from the Cape of Good Hope; there are further examples from the Cape, Chilian and New Zealand coasts in the British Museum and other European Museums, but so far the species does not seem to have been recorded from European waters. The description and measurements are based on a specimen recently acquired by the South African Museum captured in Hout Bay near Cape Town.

233. *Lagenorhynchus superciliosus*. SCHLEGEL'S PORPOISE.

Delphinus superciliosus, *Schlegel, Abhandb. in der Geb. Zool.* i, p. 22, pls. i. ii (1841).

Lagenorhynchus superciliosus, *True, Bull. U.S. Nat. Mus.* no. 36, pp. 92, 171, pl. 25, fig. 3 (1889).

Description.—This species was founded on a skull obtained at the Cape some years ago by Dr. van Horstock and now preserved in the Leyden Museum.

It appears to be closely allied to the previously described species, only differing in the flatness of the premaxillae and the

levelling of their proximal extremities. Further information is required before any final decision can be come to about this form.

Genus **CEPHALORHYNCHUS.**

Type.

Cephalorhynchus, *Gray, Cat. Cetacea B. M.* p. 106

(1850) *C. heavisidii*.

Porpoises of small size with dorsal fins obtusely triangular or rounded never falcate; pectoral fins small, ovate and oblong; snout rounded without a groove separating the beak from the hinder part of the head.

Skull with the rostrum about half its length, palate ungrooved; pterygoid bones short and separate; symphysis of the mandible short.

Teeth small, the largest less than $\frac{1}{8}$ in. in diameter, numbering from 25 to 30 on either side, above and below; vertebrae 63 to 66.

This genus seems to be confined to Southern seas; porpoises closely allied to the Cape form described below are found round the New Zealand coast, whether specifically distinct or not is uncertain; a third form from the Chilian coasts (*C. eutropia*), appears to be undoubtedly distinct.

234. **Cephalorhynchus heavisidii.** THE TONINE.

Delphinus heavisidii, *Gray, Spic. Zool.* p. 2, pl. ii, fig. 6 (1828); *Smuts, Enum. Mamm. Cap.* p. 104 (1832); *Smith, S. Afr. Quart. Journ.* ii, p. 237 (1834).

Delphinus capensis, *F. Cuvier, Hist. Nat. Mamm. livr.* lviii (1829).

Delphinus hastatus, *Rapp, Die Cetaceen*, p. 37, pl. iii (1837).

Tursio heavisidii, *Gray, Cat. Seals and Whales*, p. 263 (1866).

Cephalorhynchus heavisidii, *Flower, Proc. Zool. Soc.* 1883, pp. 473, 506; *id. List Cetacea B. M.* p. 16 (1885); *True, Bull. U. S. Nat. Mus.* no. 36, pp. 108, 176, pl. 31, figs. 1, 2 (1889).

Description.—Of small size, general colour black above, white below, a transverse band in front of the pectoral fins and a triangular mark behind them, the white of the belly expands posteriorly to form a trident, the lateral tines of which extend backwards up the sides.

Dorsal fin low and triangular, about 5 in. in height, caudal

crestic not deeply excavated in the middle line; pectorals small and ovate.

Teeth $\begin{smallmatrix} 28 \text{ to } 30 \\ 25 \text{ to } 30 \end{smallmatrix}$.

Dimensions.—Total length 4ft. to 4ft. 2; skull about 11 in. in length; dorsal fin 6·5 along the anterior, and 4 along the posterior edge; two old specimens without skulls, now in the South African Museum, measure 5 ft. 2, and 3 ft. 10 respectively.

Distribution.—The type of this species was procured by Captain Heaviside at the Cape, and is now preserved in the British Museum; the South African Museum possesses two specimens without history, but apparently identical, alluded to above; unless the New Zealand form is similar no other locality is known.

Habits.—Gregarious.

Genus PRODELPHINUS.

Type.

- Clymene**, *Gray, Proc. Zool. Soc.* p. 237 (1864) [*nec Savi*] *P. euphrosyne*.
Clymenia, *Gray, Synops. Whales, Dolphins*, p. 6 (1868) [*nec Munster*] *P. euphrosyne*.
Prodelphinus, *Gervais, Ostéogr. des Cétacés*, p. 604 (1880)

Cetaceans externally resembling those of the genus *Delphinus*, but with no lateral grooves on the palate; the pterygoid bones are in contact along their inside borders, the rostrum is long and narrow and more than half the length of the skull; the symphysis of the lower jaw is less than $\frac{1}{4}$ of the length of the ramus; the vertebrae number 73 to 76.

Teeth small, less than ·13 in. in diameter; always exceeding 30 in number on either side of each jaw.

Sir W. Flower recognises four or five species of this genus, to which True adds another four; of these three have been procured on our coasts, but the discrimination of the species is by no means easy and they are chiefly founded on skulls, the external characters not being well known.

Key of the South African Species.

- A. Teeth 38 to 40; body dark above, ashy below ... *P. attenuatus*, p. 207.
 B. Teeth 44 to 45; body with a dark line running from the eye to vent *P. euphrosyne*, 207.
 C. Teeth 52; body spotted above and below with slate grey *P. longirostris*, p. 208.

235. *Prodelphinus attenuatus*. THE NARROW-SNOUDED DOLPHIN.

Steno attenuatus, Gray, *Zool. Ereb. and Terror* p. 44 (1846).

Steno capensis, Gray, *Proc. Zool. Soc.* 1865, p. 522.

Clymenia attenuata, Flower, *Proc. Zool. Soc.* 1883, pp. 498, 512.

Prodelphinus attenuatus, Flower, *List Cetacea B. M.* p. 30 (1885);

W. L. Sclater, *Cat. Mamm. Ind. Mus.* ii, p. 324 (1891) [Cape Seas];

True, *Bull. U. S. Nat. Mus.* no. 36, pp. 67, 165, pl. 17, figs. 1-2 (1889).

Description.—This species is distinguished by its very narrow rostrum, and by the symphysis of the lower jaw, which is between $\frac{1}{4}$ and $\frac{1}{5}$ of the total length of the rostrum; the teeth number $\frac{38 \text{ to } 40}{38 \text{ to } 40}$. The colour is stated to be dark on the back and ashy grey below.

This species is somewhat intermediate between *Prodelphinus* and *Steno*, the next genus, but is assigned by Sir W. Flower to its present position.

Dimensions.—The type skull; total length 15·0, rostrum 9·0, length of mandible 13·0.

Distribution.—A skull, the type of *S. capensis*, of Gray, now in the British Museum, is from the Cape of Good Hope; other specimens from the Seychelles and the Indian coasts are preserved in the same Museum, and *Delphinus brevimanus* of Hombron and Jacquinot from Malacca is probably identical. The distribution area is therefore, so far as is yet known, the Indian Ocean from the Cape to Malacca. This species is not represented in the South African Museum.

236. *Prodelphinus euphrosyne*. THE EUPHROSZYNE DOLPHIN.

Delphinus euphrosyne, Gray, *Zool. Ereb. and Terror* p. 40, pl. xxii (1846).

Clymenia euphrosyne, Flower, *Proc. Zool. Soc.* 1883, pp. 497, 512.

Prodelphinus euphrosyne, Flower, *List Cetacea B. M.* p. 29 (1885);

True, *Bull. U. S. Nat. Mus.* no. 36, pp. 63, 163, pl. 15, figs. 1-2 (1889).

Description.—Upper parts black; sides blackish, margins of the jaws blackish, throat and belly white, circumference of the eye black; a narrow black band runs from the eye to the vent with a branch given off above the base of the pectoral fins and running a short distance downwards and backwards; a pair of parallel black bands run from the eye to the base of the pectoral

fin; fins black with white anterior edges; snout long, dorsal fin high and falcate, pectoral fins small.

Teeth $\frac{4.5}{4.4}$, about .12 in diameter. Vertebrae 76 [True].

Dimensions.—Head and body 6 ft. 10; breadth of flukes 16.5; anterior margins of the pectorals 12.0; skull length 18.75; rostrum 11.5 [True].

Distribution.—There is a skull from South Africa referred to this species by Sir W. Flower, in the British Museum. Other specimens have been obtained from various localities in the Atlantic and on the European coasts; the description here given is founded on that of *Delphinus marginatus* of Duvernoy, from Dieppe in France, identified by Flower and True with this species.

237. *Prodelphinus longirostris*. THE LONG-BEAKED DOLPHIN.

Delphinus longirostris, *Gray, Spic. Zool.* p. 1 (1828).

Prodelphinus longirostris, *Flower, List Cetacea B. M.* p. 31 (1885);
True, Bull. U. S. Nat. Mus. no 36, pp. 75, 166, pl. 20, fig. 2 (1889).

Description.—Back and fins dark grey, with very small irregular blotches of lighter grey; belly white with irregular, more or less stellate spots of dark grey.

Teeth $\frac{5.2}{5.2}$; skull small, rostrum very long, two-thirds of the total length of the skull; traces of lateral grooves along the palate.

Dimensions.—Of the type skull; length, 16.5; length of rostrum 11.0.

Distribution.—The type of the species, a skull now preserved in the Leyden Museum, was from the Cape; other specimens closely resembling it have been procured in the Pacific near the Galapagos and on the Australian coasts. There is no example in the South African Museum.

Genus DELPHINUS.

Type.

Delphinus, *Linnaeus, Syst. Nat.* 12th ed, i, p. 108

(1766) D. delphis.

Cetaceans with a long, narrow beak separated from the narial elevation by a very distinct V-shaped ledge.

Skull with two deep longitudinal grooves along the palatal surface of the maxillary bone; inner borders of the pterygoids

meeting along their whole length, rostrum long and narrow, usually twice the length of the cranial portion of the skull; its width at its base usually about one-third of the length. Vertebrae 73-75, only the first two united.

Teeth $\frac{40 \text{ to } 60}{40 \text{ to } 60}$; small, not exceeding .12 in. in diameter.

Many nominal species of this genus have been described, and while there are found all over the world dolphins indistinguishable

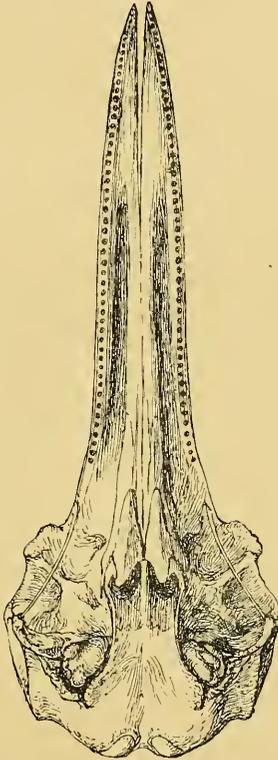


FIG. 146.—Skull of *Delphinus delphis*, from below, showing the longitudinal palatal grooves ($\frac{1}{5}$ nat. size).

from the type species of the genus, individual variation is considerable, so much so that from specimens obtained in the Bay of Arcachon in France alone, Labout has tried to establish no less than five species.

Sir W. Flower admits four or five species in addition to *D. delphis* as possibly distinct.

238. *Delphinus delphis*. THE COMMON DOLPHIN.

Delphinus delphis, *Linnaeus, Syst. Nat.* 12th ed. i, p. 108 (1766); *Flower, Trans. Zool. Soc.* xi, p. 1, pl. i, fig. 1 [animal] (1880); *id. Proc. Zool. Soc.* 1883, pp. 500, 511, fig. 9 [palate]; *id. List Cetacea B. M.* p. 24 (1885); *True, Bull. U. S. Nat. Mus.* no. 36, pp. 45, 160, pl. xi, figs. 1-3 (1889).

Description.—General colour slaty above, grey below; the upper beak round the edge of the lower beak, round the eye, the upper third of the sides as far as the dorsal fin, and behind this the greater

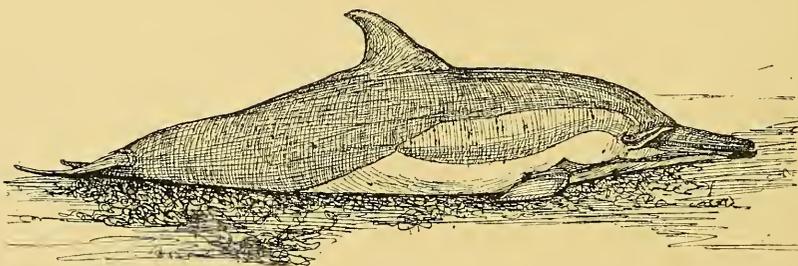


FIG. 147.—The Common Dolphin (*Delphinus delphis*), drawn from an example captured in the Cape Seas.

part of the sides, the pectoral fin and a stripe forwards from it to the front end of the lower jaw slaty; a wide stripe from behind the eye to the level of the dorsal fin yellow grey; rest of the body pure grey; snout much elongated, gradually narrowing in front, separated by a steep V-shaped ledge from the narial elevation; dorsal fin pointed and somewhat falcate about 10 in. in height; pectoral fin broad and somewhat falcate; caudal slightly hollowed out hardly crescentic.

Teeth $\frac{52-53}{52-53}$; vertebrae 73. The description is drawn up from a dolphin caught in Table Bay.

Dimensions.—From the same specimen; total length 7 ft. 7; length of pectoral fin along the anterior edge 14; of dorsal fin along the anterior edge 16; flukes from tip to tip 21; skull length 20; breadth at widest part 7.75; length of rostrum from the notch 13.50.

Distribution.—This dolphin is apparently universally distributed

throughout the warmer seas, it is common in the Mediterranean and Bay of Biscay, and is occasionally taken on the English coasts. Dolphins showing no very apparent distinction from the type species have been recorded from the Atlantic and Pacific coasts of America and from the seas of Tasmania and the Cape.

The South African Museum possesses a mounted skin and skeleton, and a skull from two individuals harpooned in Table Bay in August, 1896.

Habits.—Dolphins associate in shoals of varying numbers of individuals, they are active and playful, and are frequently seen at sea gambolling round a ship which they will often follow for a considerable distance; their food consists chiefly, in British seas, of herrings and pilchards. A single offspring is produced at a birth and is tended by the female parent with assiduous care.

239. *Delphinus capensis*. THE CAPE DOLPHIN.

Delphinus capensis, *Gray, Spic. Zool.* p. 2, pl. ii, fig. 1 (1828); *Flower, List Cetacea, B. M.* p. 26 (1885).

Delphinorhynchus capensis, *A. Smith, S. Afr. Quart. Journ.* ii, p. 236 (1834).

Description.—This species is closely allied to the common dolphin differing only in the longer rostrum and the greater number of teeth which amount to $\frac{9}{6}$.

Dimensions.—Total length 6 ft.; height of dorsal fin $5\frac{1}{2}$ in.

Distribution.—The skull of the individual on which this species was founded by Gray is now in the British Museum, it was procured at the Cape many years ago by Captain Heaviside; very possibly it may be identical with *Delphinus delphis*.

Genus TURSIOPS.

Type.

Tursiops, *Gervais, Hist. Mamm.* ii, p. 323 (1855) *T. tursio*.

Dolphin-like animals of stout build with somewhat short beaks well marked off from the narial elevation; dorsal fin high and falcate.

Skull with no lateral grooves on the palate; pterygoid bones normal, united in the middle line; symphysis of the lower jaw short. Vertebrae 64.

Teeth $\frac{21 \text{ to } 25}{21 \text{ to } 25}$; large about $\frac{1}{4}$ in. in diameter.

As in the other genera of dolphins a very large number of nominal species of *Tursiops* have been described, not differing in

any very obvious characters from the type species of the European Coasts; Sir W. Flower recognises as certainly distinct only *T. catalania* from the Australian Seas.

240. **Tursiops tursio.** THE BOTTLE-NOSED DOLPHIN.

Delphinus tursio, *Fabricius, Fauna Groenland*, p. 49 (1780); *Flower, Trans. Zool. Soc.* xi, p. i, pl. 1, fig. 2 [animal] (1880).

? *Tursiops aduncus*, *Gervais, Hist. Nat. Mamm.* ii, p. 323 (1855) [Cape of Good Hope].

Tursiops tursio, *Flower, Proc. Zool. Soc.* 1883, pp. 478, 512, fig. 5 [palate]; *id. List Cetacea B. M.* p. 26 (1885); *True, Bull. U. S. Nat. Mus.* no. 36, pp. 32, 158, pl. 8, figs. 1-2 (1889); *W. L. Sclater, Cat. Mamm. Ind. Mus.* ii, p. 323 (1891) [Port Natal].

Description.—General colour above shining black shading into white below, the line of the change of colour being rather irregular; some specimens are grey all over.

Dimensions.—Adults attain a length of from 10 to 12 ft., a male measured by Sir W. Flower was 10 ft. in length; the skull of the same individual measured 21 in. in length; another skull from the Cape seas, referred by Gervais to another species *T. aduncus*, measured $23\frac{3}{4}$ in. in length and had $\frac{24}{4}$ teeth.

Distribution.—The European and American coasts of the Atlantic, the Pacific coasts of Japan, California, Australia and New Zealand, the Indian Ocean, and the Cape seas. There are skulls in the Paris Museum from the Cape seas and in the Indian Museum at Calcutta is a skeleton from Durban. This species is not represented in the South African Museum.

Habits.—At Hatteras in North Carolina in the United States, there is a fishery of this dolphin established, and Mr. F. W. True has there obtained some information regarding its habits. The bottle-nosed dolphins associate in schools consisting in spring of individuals of both sexes and all ages; later on the herds become more uniform as regards sex and age; it is supposed that they migrate northwards in summer and southwards in winter; the young are born in spring.

Genus **STENO.**

Type.

Steno, *Gray, Zool. Ereb. and Terror*, p. 43 (1846) ... *S. rostratus*.

Cetaceans resembling dolphins externally, with a long narrow

and compressed rostrum, very distinct from the cranium; no lateral grooves along the palate; pterygoid bones meeting and uniting along the middle line; symphysis of the mandible very long, more than one quarter the length of the ramus; vertebrae 66.

Teeth $\frac{21-25}{21-25}$; large, measuring about .25 in. in diameter, usually roughened by longitudinal grooves.

Only one species is recognised by Sir W. Flower, though many nominal ones have been described.

241. *Steno rostratus*. THE ROUGH-TOOTHED DOLPHIN.

Delphinus rostratus, *Desmarest, N. Dict. d'Hist. Nat.* ix, p. 160 (1817).
? *Delphinus* (*Steno*) *perspicillatus*, *Peters, M.B. Akad. Berlin*, 1876, p. 360, pls. ii, iii.

Steno rostratus, *Flower, Proc. Zool. Soc.* 1883, pp. 482, 513, fig. 6 [palate]; *id. List Cetacea B. M.* p. 31 (1883); *True, Bull. U.S. Nat. Mus.* no. 36, pp. 24, 157, pl. vi, figs. 1-2 (1889).

Description.—Back black, belly white, sides yellow, a white streak bordered below by a dark one runs from the eye round the edge of the narial elevation, a dark ring round the eye.

Teeth $\frac{24-23}{23-22}$; the largest about .51 by .25.

Dimensions.—Total length 6 ft. 6; height of dorsal fin 16.0; length of pectoral fin 28.0; skull length 21.64, breadth 8.75; length of the ramus of the lower jaw 16.75, of the symphysis 5.5.

The description and dimensions are taken from Peters' account of his *D. perspicillatus* which does not seem to differ materially from *S. rostratus*.

Distribution.—This species is confined to the Southern Atlantic and the Indian Ocean so far as is yet known; there are skulls from the Cape seas in the British Museum, from the Red Sea and Nicobar Islands in the Indian Museum, and from the East India Archipelago in the Leyden Museum. Peters' *D. perspicillatus* was obtained in the Southern Atlantic about 1,200 miles west of the Cape.

Genus **SOTALIA**.

Type.

Sotalia, *Gray, Cat. Seals and Whales*, 2nd ed. p.

401 (1866) *S. guianensis*.

Dolphins resembling those of the genus *Steno* in the cranial characters except that the pterygoid bones at the end of the palate,

instead of meeting along their inner edges, are separated by a considerable space; the rostrum is long and narrow, and the symphysis of the lower jaw is about one quarter the total length of the ramus.

Vertebrae 51-55; pectoral fin broad at the base, caused by the great development of the two outer digits.

Teeth $\frac{30 \text{ to } 35}{30 \text{ to } 35}$ large, about $\frac{1}{4}$ in. in diameter and smooth.

Several species of this genus have been described, one of the best known is the Chinese white dolphin (*S. sinensis*).

242. *Sotalia lentiginosa*. THE SPECKLED DOLPHIN.

Delphinus (*Steno*) *lentiginosus*, *Owen, Trans. Zool. Soc.* vi, p. 20, pl. v. fig. 2, 3 (1866).

Sotalia lentiginosa, *Flower, Proc. Zool. Soc.* 1883, pp. 489, 513; *True. Bull. U.S. Nat. Mus.* no. 36, pp. 15, 155, pl. ii, fig. 3 (1889).

Steno lentiginosus, *Blanford, Mammals of India*, p. 584, fig. 19 (1891).

Description.—The external characters as described by Blanford are “above pale leaden grey with numerous long drop-shaped spots, of these the majority are white, others are slate-coloured or black; below the ground colour is white mottled on the belly with leaden grey.” The dorsal fin is rather round and not very falcate.

A skull in the South African Museum found on the shores of False Bay agrees very well with the description of this species, and is probably referable to it. The pterygoids are separate behind, but not widely or increasingly so; the teeth number $\frac{34-34}{33-32}$ and are smooth and measure .20 in. in diameter.

Dimensions.—Of an adult male; total length 10 ft. 6; pectoral fins 15.0; expanse of flukes 27.0 [Blanford].

Of the skull in the South African Museum above referred to, length 21.0, breadth 9.25; length of rostrum from notch 13.25.

Distribution.—The type of this species now in the British Museum was obtained from Vizagapatam on the coast of India, other examples have been since obtained from the same coast; the skull alluded to above from False Bay has been provisionally assigned to this species, but owing to the complete want of knowledge of the external characters and of the rest of the skeleton it is impossible to be certain of the identification.

Order EDENTATA.

This order contains a small number of still-existing animals, the degenerate survivors of a much larger series formerly extremely abundant, especially in South America. As is frequently the case with groups the prime of which is past, the survivors now differ widely in organisation and habit, and are thus by no means easy to define as a whole.

The following characters of the dentition are the only ones common to the whole order; teeth when present, with two exceptions, homodont and monophyodont, never rooted but growing from persistent pulps, and consisting of dentine only and no enamel; no teeth in any members of the group in the premaxillae or in the corresponding portion of the lower jaw, *i.e.*, incisors constantly absent.

The name *Edentata* first applied to this order by Cuvier is hardly appropriate, since a considerable proportion of the members are supplied with teeth; nevertheless the sanction of usage and the absence of any other more suitable term makes its retention desirable. Five very distinct families make up the order, of these three are confined to the New World, *i.e.*, *Bradypodidae* (the Sloths), *Myrmecophagidae* (the Ant-eaters), and *Dasypodidae* (the *Armadillos*); the other two *Manidae* (the Pangolins), and *Orycteropodidae* (the Aard-varks) are confined to the Old World.

Recent researches, especially those of Flower (*Proc. Zool. Soc.* 1882, p. 358), and Thomas have shown that the mutual affinities not only of the New and Old World families, but also of the two Old World families to each other are exceedingly remote, so that logically it would perhaps be more correct to give ordinal rank to all three groups; but it will be safer to postpone doing this until a little more is known about the paleontological history of the Old World families, which may possibly in the future throw more light on their relationships to each other and to other orders.

The two South African families and genera may very easily be diagnosed as follows:—

- A. Body covered with a series of overlapping horny scales; no teeth in either jaw (Manidae) *Manis*, p. 216.
 B. Body covered with scant hair; molars teeth in the jaws (Orycteropodidae)..... *Orycteropus*, p. 219.

Family MANIDAE.

Genus **MANIS**.

Type.

- Manis**, *Linnaeus, Syst. Nat.* 12th ed. i. p. 52 (1766)..... *M. tetradactyla*.
Pholidotus, *Storr, Prodr. Mamm.* p. 40 (1780) ... *M. tetradactyla*.
Smutsia, *Gray, Proc. Zool. Soc.* 1865, p. 369..... *M. temmincki*.

Moderate-sized animals, covered, except on the lower surface of the body and insides of the limbs, with overlapping horny scales, with sometimes a few scattered hairs protruding between them; no teeth in the jaws, mouth very small, tongue long, vermiform and protractile; limbs short, toes, 5-5. Other characters are as follows: skull conical-shaped, with the small end forwards, smooth and free from crests, zygomatic arch incomplete, there being no jugal bone; lachrymal also absent; palate long and narrow; bulla small and crescentic, with no tubular meatus; mandible slight and straight without any angle or coronoid process and with a small projection at the front end; the vertebrae have no accessory articular processes as is the case with the South American families; clavicles absent; no caecum, a gall bladder present: testes in the inguinal canal, penis well developed; uterus bicornuate; placenta diffused and non-deciduate.

As above remarked the family is confined to the Old World; all the recent members of the family are included in the present genus, of which some seven species are generally recognised, three Indian and four African; only one, however, comes within our limits.

243. **Manis temmincki.** THE SCALY ANT-EATER OR PANGOLIN.

Manis temminckii, *Smuts, Enum. Mamm. Cap.* p. 54, pl. iii, figs. 6, 7 [skull] (1832); *A. Smith, S. Afr. Quart. Journ.* ii, p. 176 (1834); *Bennett, Proc. Zool. Soc.* 1834, p. 81; *Smith, Illustr. Zool. S. Afr. Mamm.* pl. vii, (1849); *Peters, Reize Mossamb. Süügeth.* p. 174, pl. xxxii, fig 8 [hyoid bone] (1852); *Kirk, Proc. Zool. Soc.* 1864, p. 654; *Holmwood, Proc. Zool. Soc.* 1878, p. 632 [habits].

Manis tetradactyla, *Layard, Cat. Mamm. S. Afr. Mus.* p. 59 (1862), [nec Linn.].

Smutsia temminckii, *Gray, Proc. Zool. Soc.* 1865, p. 369.

LITERATURE.—Burchell (1822), ii, p. 423, noticed in Bechuanaland with native names and habits; Steedman (1835), ii, p. 108, described from near Litakun in Bechuanaland; Kirby (1896), p. 537, native names and habits in the Eastern Transvaal; id. (1899), p. 340, distribution in Portuguese East Africa.

VERNACULAR NAMES.—Ijzer magauw of the Boers of the Transvaal; Kwara of Basutos (Kirby); Khaaka of Bechuanas (Burchell).

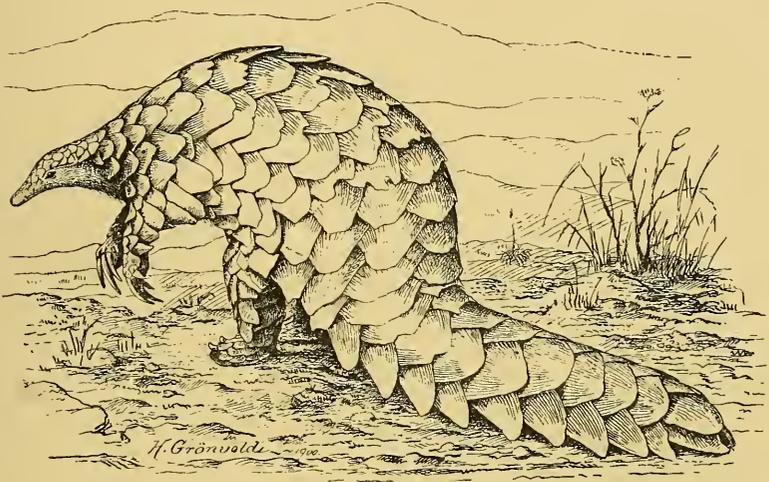


FIG. 148.—The Scaly Ant-eater (*Manis temminckii*).

Description.—General form somewhat elongated and lizard-like, covered everywhere, except on the lower surface of the head and body and inside the limbs, with a series of over-lapping broad scales of a dark horn-brown colour with paler edges and tips; head very small and pointed, the scales covering it above very much smaller than those on the body; mouth-opening very small with a very long extensile tongue; no external ear; an elongated depression on the side of the head leading to the internal auditory organ. Across the middle of the back eleven rows of scales, those of the middle line being the largest and measuring about $2\frac{1}{2}$ inches across; limbs short each with five toes and claws; the claws and toes of the forelimbs

are in walking turned slightly inwards and backwards so that the animal rests on the outer dorsal surface of the foot; in the hind limb the sole rests on the ground in the normal plantigrade fashion. Tail very broad, hardly less so than the body, covered above with on the proximal half 5, on the distal half 4 rows of broad scales, those along the margin forming a backwardly directed serrated ridge; below the tail is covered by a similar series of 5 and 4 scales so that the whole is completely encased; no bare spot below the tip of the tail, as in many of the species of the genus.

Dimensions.—From a mounted specimen; head and body 24; tail 18; from ear opening to tip of snout 2.75. Kirby states that an example obtained by him measured 4 ft. 9, in all of which the head and body was 2 ft. 4 and the tail 2 ft. 5.

Distribution.—The scaly ant-eater is chiefly found to the north of the Orange River, though said to occur rarely in Prieska and the other districts just south of the river; from here it extends through the Orange Free State, the Transvaal, Bechuanaland, the Kalahari and German South-west Africa to Rhodesia; north of the Zambesi it occurs in South Angola, Nyasaland and East Africa as far as Somaliland.

The South African Museum possesses examples from Colesberg in the Colony and from the Orange Free State.

History and Habits.—This species was first noticed by Burchell who saw a few imperfect remains at Litakun in Bechuanaland which he identified with the genus *Manis*; he endeavoured to obtain a more perfect specimen but was unable to do so; subsequently Smuts described it at length, also from a fragmentary example obtained at the same place.

These animals seem to be found chiefly in dry country, where they burrow in the ground, though not so deeply as the aard-vark; they are also said to climb trees, a fact which is certainly true of some of the West African allied forms. Their food consists of ants and termites, which they obtain in exactly the same way as the aard-vark, by breaking into an ant-hill and catching the ants on their long and sticky tongues, which are thrust into the nests for this purpose. They are cautious and timid, often raising themselves on their tails and hind limbs to look out for approaching danger, and when attacked make no attempt to retaliate, but roll themselves up into a round ball; when in this state it is very difficult to open them, and they will often give their captor a severe pinch should his fingers get between the scales. Little is known of

their breeding habits; Holmwood states that a female in his possession produced one young one, and in this case the scales did not harden till the second day.

This animal is regarded with a good deal of superstition among the natives; the Bechuanas, whenever they get one, according to Smith, burn it alive in the cattle kraal in order to increase the fertility of the cattle. Peters states that from the scales rings for the forefinger are made, said to be very efficient against the evil eye and other charms.

Family ORYCTEROPODIDAE.

Genus **ORYCTEROPUS.**

Type.

Orycteropus, *E. Geoffroy, Bull. Soc. Philom.* i, p. 103 (1795)...*O. afer*.

Animals of the size of a pig, covered externally with a thin coating of hair; the head is prolonged into a long and tubular snout, the ears are large, pointed and erect, and the tongue, though thicker than in *Manis*, is long and protractile.

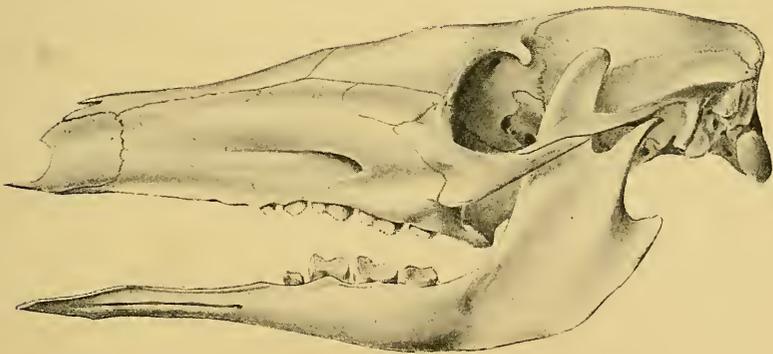


FIG. 149.—Skull of *Orycteropus afer*.

Dentition.—i. $\frac{0}{0}$, c. $\frac{0}{0}$, pm. $\frac{5 \text{ to } 7}{5 \text{ to } 7}$, m. $\frac{3}{3}$ = 32 to 40. Teeth somewhat heterodont and diphodont, of very peculiar and complex structure, the whole set seem never all present at the same time, usually there are only five above and below at once.

Skull with the facial portion somewhat cylindrical and tapering ; the bony palate ends behind in a thickened transverse ridge of the palatines, the pterygoids not taking any part in its formation ; the tympanic bone is annular and only loosely attached to the skull ; the mandible is slender in front but has a well-developed coronoid process, and a second upwardly directed process near the angle ; caecum and gall-bladder present, testes inguinal, probably descending at times into a scrotum, penis very small, uterus bicornuate, the two portions opening separately into the vagina ; placenta zonary.

The structure of the teeth in *Orycteropus* is unique among mammals and has some resemblance to that of certain fishes. The teeth are made up of a number of columns of dentine, each with its separate pulp cavity, from which radiate outwards the dentinal tubes ; these columns are tightly packed together to form the solid tooth, so that in section the tubes show a polygonal outline ; the summits of the teeth are at first rounded, but become gradually flattened with wear ; the bases are not tapering but become cylindrical, without roots, and growing throughout the life of the tooth. The presence of milk teeth has recently been recognised by Mr. Thomas, they are seven in number in the upper and four in the lower jaw ; they apparently never cut the gums, and may therefore be regarded as entirely functionless. Two recent species of this genus are generally recognised, the South African one described below and another (*O. aethiopicus*) from North-east Africa, ranging as far as the borders of Egypt ; this is distinguished by its less hairy body, the longer inner toe of the forefoot, and the shorter snout and tail. Remains of extinct species allied to the living forms have been described from the eocene beds of France, the miocene of Persia and Samos, and the pliocene of Madagascar.

244. *Orycteropus afer*. THE AARD-VARK.

- Myrmecophaga afra*, Pallas, *Miscell. Zool.* p. 64 (1766).
Myrmecophaga capensis, Pallas, *Act. Acad. Petrop.* 1777, pt. 2, p. 223. pl. 9 (1780) ; Gmelin, *Syst. Nat.* i, p. 53 (1788) ; Thunberg, *Mem. Acad. Petersb.* iii, p. 301 (1811).
Orycteropus capensis, Smuts, *Enum. Mamm. Cap.* p. 52 (1832) ; A. Smith, *S. Afr. Quart. Journ.* ii, p. 175 (1834) ; Layard, *Cat. Mamm. S. Afr. Mus.* p. 58 (1862) ; Kirk, *Proc. Zool. Soc.* 1864, p. 654 ; Gray, *Proc. Zool. Soc.* 1865, p. 382 ; P. L. Selater, *Proc. Zool. Soc.* 1869, p. 431 [fig.] ; *id. ibid.* 1870, p. 670 ; Noack, *Zool. Jahrb.* iv, p. 105 (1889) [Danaraland].

Orycteropus afer, *Thomas, Proc. Royal Soc.* xlvii, p. 246, pl. viii (1890) [milk dentition].

LITERATURE.—Kolben (1733) ii, p. 118, easily recognisable description under the name of the Earth Hog; Buffon (1782) suppl. ii, p. 230, pl. xxxi, description from Allamand; le Vaillant (1796), iii, p. 391, described as the "Goup" of the Namaquas; Daniell (1820), pl. ii, figure with note; Burchell (1822), i, p. 342, ii, p. 424, habits and native names; Steedman (1835), i, p. 172, habits; Grout (1863), p. 297 habits and native names in Natal; Drummond (1875), p. 400, habits; Martin (1890), p. 261, habits; Kirby (1896), p. 537, habits and names in the eastern Transvaal.

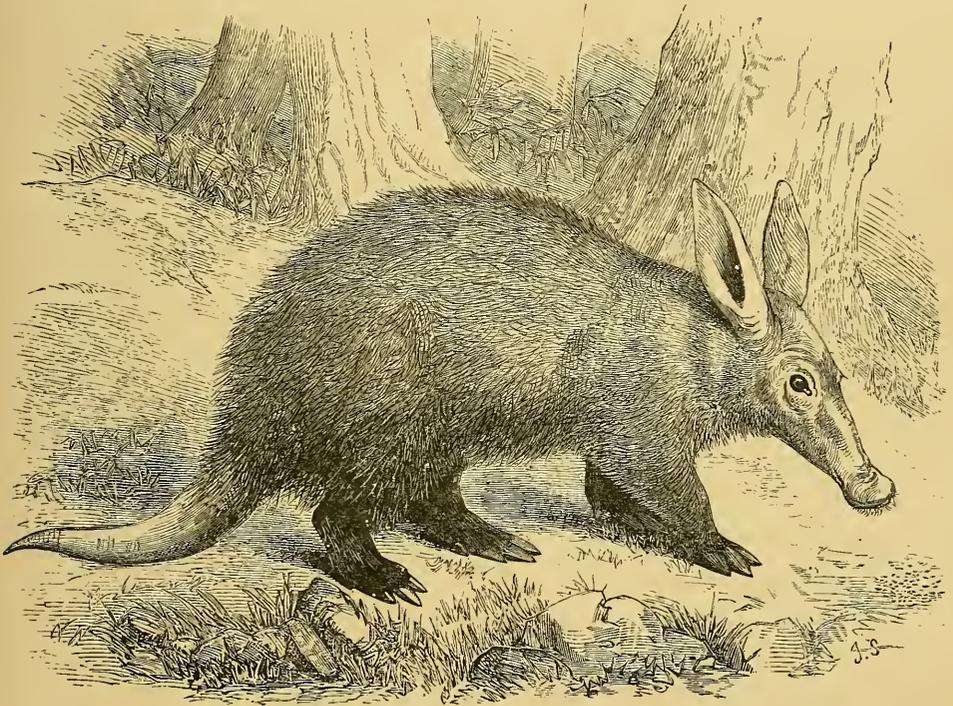


FIG. 150.—The Aard-vark (*Orycteropus afer*).
(*Proc. Zool. Soc.*)

VERNACULAR NAMES.—Aard-vark (*i.e.* Earth-hog) of Dutch Colonists, Ant-bear of English; Ibenxa of Amaxosa (Stanford); Isambane of Zulus (Grout) and Swazis (Kirby); Takadu of Basutos (Kirby); Takkaru of Bechuanas (Burr'ell); Goup of Namaquas (le Vaillant).

Description.—General form plump, with short legs and a long stout tail; colour pale sandy or straw, the hairs being thin and

flat-lying, and allowing the skin nearly everywhere to show through; head elongated and tapering, ending in a rounded disc somewhat like that of a pig, within which open the nostrils; facial line straight, forehead flat; ears long, more than half their distance from the snout-tip, rather narrow and pointed, very thinly covered with short hairs externally, naked within, with a fleshy tint; external aspect of the legs clothed with thick, long, dark brown hair; forelimbs with four, hind limbs with five, very strong, blunt-pointed claws, the second and third of both limbs being about equal and the longest; tail very thick at the base, gradually tapering, clothed throughout with a thin covering of hairs becoming shorter towards the tip. Young more hairy than the older animals.

Dimensions.—From a female measured in the flesh; head and body 48·0; tail 17·5; ear from notch 6·75; from ear-opening to nose-tip 11·5. Skull, length 9·25, breadth 3·5; length of cheek teeth 3·5; Smith gives the measurements of a large individual as following; head and body 4 ft. 8; tail 2 ft.

Distribution.—The aard-vark though seldom seen is by no means uncommon, and seems to be found throughout the length and breadth of South Africa, from Ovampoland and Rhodesia to the Colony and Natal; it is occasionally procured on the Cape Flats, as a skull in the Museum testifies, and in nearly every district its large burrows are met with.

North of the Zambesi it has been recorded from Angola and from Nyasaland; aard-varks are also found throughout German and British East Africa, but whether they should be referred to this or the other Ethiopian species is not yet definitely ascertained.

History.—The aard-vark was first described in a good and recognisable manner by Kolben, together with a quaint account of its habits; in 1778, Pallas wrote a description of it from a foetus preserved in the museum of the Prince of Orange sent from the Cape, and finally Buffon republished in his Supplement Allamand's account, obtained, together with a skin and sketch from Colonel Gordon, to whom South African zoology owes a considerable debt.

Habits.—The aard-vark is found in the more open country wherever there are ant-hills, here it makes very large and wide earths or burrows which are a constant danger to riders, as the openings are frequently concealed beneath bushes and are then difficult to avoid. The burrows are excavated by these animals with the forefeet and the earth is thrown out behind by the hind feet and so fast do they work that they are stated to sink out

of sight in a very few minutes. It is said to be impossible to dig them out except by sinking a perpendicular shaft far in front of their estimated position and digging down to meet them. They are strictly nocturnal animals, being very rarely seen during the daytime, but issuing at night in search of food, which consists entirely of ants and termites. Kirby states that they use their tails to thump the ground near the ants' nest and so cause a panic within; anyhow they very quickly make an opening in the side of the ant-heap and then collect the ants by means of their sticky tongues which are projected for this purpose.

When outside their burrows they are easily caught as they are exceedingly bad runners, but they are difficult to secure when inside. Stories are often told of attaching a team of oxen to a reim tied to the aard-vark's tail in order to drag it out. They are very shy and timid animals, with very quick hearing; they are easily dispatched, and their flesh, which is often loaded with fat, is very much appreciated and is often salted and smoked.

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